



**Larson & Darby Group**

Architecture Engineering Interiors

PROJECT MANUAL

POOL RENOVATIONS

WEST MIDDLE SCHOOL

1900 N. ROCKTON AVE, ROCKFORD, IL 61103

ROCKFORD PUBLIC SCHOOLS 205

PROJECT MANUAL

FOR

POOL RENOVATIONS AT WEST MIDDLE SCHOOL  
1900 N. ROCKTON AVE, ROCKFORD, IL 61103  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

RPS PROJECT NO: 2122; IFB 21-13

LDG PROJECT NO. 30269

DATE: January 25, 2021

LARSON & DARBY GROUP  
4949 HARRISON AVENUE, SUITE 100  
Illinois Design Firm Registration Number: 184-000280

ARCHITECTURE-ENGINEERING-INTERIORS  
ROCKFORD, ILLINOIS 61108

---

STEPHEN M. NELSON  
Licensed Architect  
LIC. EXPIRES: 11/30/2022

---

Date

---

---

RAED SALEM  
Registered Professional Engineer  
LIC. EXPIRES: 11/30/2021

---

Date

---

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

TABLE OF CONTENTS

**PROCUREMENT AND CONTRACTING DOCUMENTS**

**DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS BY RPS**

00 41 00 Bid Offer Form  
00 73 00 Supplementary Conditions

**SPECIFICATIONS**

**DIVISION 01 - GENERAL REQUIREMENTS**

01 10 00 Summary  
01 20 00 Price and Payment Procedures  
01 30 00 Administrative Requirements  
01 50 00 Temporary Facilities and Controls  
01 60 00 Product Requirements  
01 70 00 Execution and Closeout Requirements  
01 78 23 Operation and Maintenance Data  
01 78 39 Project Record Documents

**DIVISION 09 – FINISHES**

09 01 90.52 Maintenance Repainting  
09 30 00 Tiling  
09 51 13 Acoustical Panel Ceilings

**DIVISION 26 - ELECTRICAL**

26 05 00 Basic Electrical Requirements  
26 05 19 Low-voltage Electrical Power Conductors And Cables  
26 05 29 Hangers And Supports For Electrical Systems  
26 05 33 Raceway And Boxes For Electrical Systems  
26 05 53 Identification For Electrical Systems

END TABLE OF CONTENTS

**BID OFFER FORM**

Bid # 21-14 POOL RENOVATION FOR WEST MIDDLE SCHOOL, for ROCKFORD PUBLIC SCHOOLS DISTRICT 205.

BID SUBMITTED BY: \_\_\_\_\_

Date: January 25, 2021

The undersigned, having become familiar with the local conditions affecting cost of work and with the Bidding Documents, including the advertisement of the Invitation for Bid, the Instructions and Supplementary Instructions to Bidders, this Bid Offer Form, the General and Supplementary Conditions, the Drawings and Specifications, and Addenda issued thereto, as prepared and issued by the Board of Education of Rockford School District No. 205, Winnebago and Boone Counties, Illinois hereby agrees to furnish all labor, material and equipment necessary to do the Work required for the project and IFB identified above, for the amount shown below:

**Note: Contractor to write "No Bid" in the dollar amount section for any line items not bid.**

**BASE BID:**

A. BASE BID:

\_\_\_\_\_ DOLLARS (\$ \_\_\_\_\_)

**ALTERNATE BIDS:**

State the amount to be added to or deducted from the Base Bid when Work shown or specified Under the Alternate Bids is accepted and incorporated in the Contract.

**ALTERNATE BID NO. 1 – TILE AT POOL STAIRS:** At two stairs in Pool Room 118A, remove and dispose of existing tile on treads and nosings, and furnish and install new tile treads and nosings. Metal repair and repainting remains part of Base Bid Work. Add the sum of:

\_\_\_\_\_ DOLLARS (\$ \_\_\_\_\_)

**ADDENDA RECEIVED**

The undersigned acknowledges receipt of Addenda \_\_\_\_ to \_\_\_\_ inclusive.

**PRE-BID MEETING ATTENDANCE**

A Bidder representative attended the Pre-Bid Meeting? YES \_\_\_\_\_ OR No \_\_\_\_\_.

**SITE VISIT**

Existing premises and conditions were checked by an on-site inspection on \_\_\_\_\_.

**CONTRACTOR'S QUALIFICATION STATEMENT**

A fully completed AIA Document A305-1986 Contractor's Qualification Statement is **required AND MUST BE SUBMITTED WITH THE BID.** Include at least three references from projects completed in the past five (5) years

**BID OFFER FORM**

with phone number, date of completion, description of work, and project architect (or engineer) contact name with phone number. Projects must be similar to the scope of this bid, and the bidder must have acted in the capacity of prime or general contractor.

Contractor has adequate equipment to perform the work properly and expeditiously: \_\_\_Yes \_\_\_No.

**COMMENCEMENT AND COMPLETION OF CONTRACT**

The undersigned agrees, if awarded the Contract, to commence the contract work within five (5) days of receipt of Order to Proceed or if required, upon execution of a formal written contract and to complete said Work within the specified completion time. The undersigned further agrees to execute the Contract, furnish satisfactory performance and payment bond as well as insurance coverage, as specified in strict accordance with the Contract Documents.

Date of Commencement of Construction: June 11, 2021  
Date of Substantial Completion: June 30, 2021  
Date of Final Completion: June 30, 2021

BIDDER: \_\_\_\_\_  
(Corporation) (Partnership) (Individual) Circle One  
Address \_\_\_\_\_  
Street \_\_\_\_\_  
City State Zip Code \_\_\_\_\_  
Phone No. Email address \_\_\_\_\_

BIDDER FEIN/SSN NO. \_\_\_\_\_

By: \_\_\_\_\_  
Bidder or Authorized Agent Signature Print name

Title: \_\_\_\_\_

Subscribed and sworn to before this \_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
Notary Public  
My commission expires: \_\_\_\_\_

**BID DEPOSIT CERTIFICATION**

A Bid Deposit is required in the amount of 5% of the total Bid including Alternate Bids. This Bid Deposit is to be a Bid Bond, Bank Draft or Certified Check made payable to the "Rockford School District No. 205", as a guarantee that if awarded all or part of the Bid, the firm will enter into a contract to perform with the Board of Education.

Amount of Total Bid \$ \_\_\_\_\_

**BID OFFER FORM**

Amount of Bank draft or Certified Check \$ \_\_\_\_\_

BIDDER: \_\_\_\_\_

\_\_\_\_\_  
Signature of Bidder or Authorized Agent

**SUBCONTRACTOR LISTING**

1. Pursuant to bidding requirements for the Work:

The Bidder, for portions of the Work equaling or exceeding 1/2 of 1% of the total Contract Sum, proposes to use the following Subcontractors. The Bidder proposes to perform all other portions of the Work with its own forces. The District reserves the right to qualify all Subcontractors. **COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY.**

2. <u>Portion of the Work</u>	<u>Subcontractor Name and Address</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Bidder: \_\_\_\_\_

By: \_\_\_\_\_

**BID OFFER FORM**

Bidder or Authorized Agent Signature

-END OF BID OFFER FORM-

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

DOCUMENT 007300 – SUPPLEMENTARY CONDITIONS

1. CHANGE ORDER MARK-UPS: Add the following to provisions regarding Change Order markups in the Conditions of the Contract:
  - A. The combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:
    - .1 For the Contractor, for Work performed by the Contractor's own forces, twelve percent (12%) of the cost.
    - .2 For the Contractor, for Work performed by the Contractor's Subcontractors, five percent (5%) of the amount due the Subcontractors.
    - .3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, twelve percent (12%) of the cost.
    - .4 For each Subcontractor involved, for Work performed by the Subcontractor's Subcontractors, five percent (5%) of the amount due the Sub-subcontractor.
    - .5 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also.

END OF DOCUMENT 007300



POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY OF WORK

- A. Project: Pool Renovation at West Middle School, Rockford, Illinois.
- B. Owner: Rockford Public Schools District 205.
- C. The Work includes but is not limited to the following:
  - 1. New lighting and repairs to finishes.
- D. Work Under Other Contracts:
  - 1. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

1.2 WORK RESTRICTIONS

- A. Contractor's Use of Premises: During construction, Contractor will have limited use of site and building indicated.
  - 1. Owner will occupy premises during construction. Perform construction during normal working hours (7 AM to 4 PM Monday thru Friday, other than holidays), unless otherwise agreed to in advance by Owner. Clean up work areas and return to a useable condition at the end of each work period.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 10 00

SECTION 01 20 00 - PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 ALLOWANCES

- A. Allowances shall include cost to Contractor of specific products and materials ordered by Owner under allowance and shall include taxes, freight, and delivery to Project site. Allowances are specified in the Bid Form.
- B. Obtain three proposals for each allowance and submit to Architect with recommendations. Purchase products and systems selected by Owner.
- C. Advise Architect of the date when selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- D. Submit invoices to show cost of products furnished under each allowance. Reconciliation of Allowance amounts with actual costs will be by Change Order.

1.2 ALTERNATES

- A. An alternate is an amount proposed by bidder for certain work that may be added to or deducted from the Base Bid amount if Owner accepts the Alternate. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum. B. Alternates are specified in the Bid Form.

1.3 UNIT PRICES

- A. A unit price is an amount proposed by bidders and stated on the Bid Form as a price per unit of measurement for work added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased. Unit prices are specified in the Bid Form.
- B. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 20 00

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 PROJECT MANAGEMENT AND COORDINATION

- A. Coordinate construction to ensure efficient and orderly installation of each part of the Work.
- B. Schedule and conduct progress meetings at Project site at regular intervals. Notify Owner and Architect of meeting dates and times. Require attendance of each subcontractor or other entity concerned with current progress or involved with planning or coordination of future activities.
  - 1. Record minutes and distribute to everyone concerned, including Owner and Architect.

1.2 SUBMITTAL PROCEDURES

- A. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 1. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 2. Prepare submittals as PDF packages and transmit to Architect by email.
    - 1 Email Address: DocumentAdmin@Larsondarby.com.
    - 2 Architect will annotate PDF submittal and return.
  - 3. Architect will return submittals, without review, received from sources other than Contractor.
- B. Place a permanent label or title block on each submittal for identification. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect. Include the following information on the label:
  - 1. Project name.
  - 2. Date.
  - 3. Name and address of Contractor.
  - 4. Name and address of subcontractor or supplier.
  - 5. Number and title of appropriate Specification Section.
- C. Identify deviations from the Contract Documents on submittals.
- D. Contractor's Construction Schedule Submittal Procedure: Submit two copies of schedule within 10 working days after date established for Commencement of the Work.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. Product Data: Mark each copy to show applicable products and options. Include the following:
  - 1. Manufacturer's written recommendations, product specifications, and installation instructions.
  - 2. Testing by recognized testing agency.
  - 3. Compliance with specified standards and requirements.

- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data. Submit on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches. Include the following:
  - 1. Dimensions and identification of products.
  - 2. Fabrication and installation drawings and roughing-in and setting diagrams.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture and for a comparison of these characteristics between submittal and actual component as delivered and installed. Include name of manufacturer and product name on label.
  - 1. If variation is inherent in material or product, submit at least three sets of paired units that show variations.

## 2.2 INFORMATION SUBMITTALS

- A. Qualification Data: Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- B. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

## 2.3 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

## 2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type schedule within 10 days of date established for the Notice of Award.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

## PART 3 - EXECUTION

### 3.1 SUBMITTAL REVIEW

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Architect will review each action submittal, make marks to indicate corrections or modifications required, stamp and mark as appropriate to indicate action taken, and return.

3.2 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Distribute copies of approved schedule to Owner, Architect, subcontractors, testing and inspecting agencies, and parties identified by Contractor with a need-to-know schedule responsibility. When revisions are made, distribute updated schedules to the same parties.
- B. Updating: At monthly intervals, update schedule to reflect actual construction progress and activities.
  - 1. As the Work progresses, indicate Actual Completion percentage for each activity.

END OF SECTION 01 30 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Use Charges: Cost or use charges for temporary facilities shall be included in the Contract Sum.
- B. Use water and electric power from Owner's existing system without metering and without payment of use charges.
- C. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TEMPORARY UTILITIES

- A. Sanitary Facilities: Contractor may use existing toilets when the building is not occupied by students.

3.2 TEMPORARY SUPPORT FACILITIES

- A. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Collect waste daily and, when containers are full, legally dispose of waste off-site. Comply with requirements of authorities having jurisdiction.
- B. Install project identification and other signs in locations approved by Owner to inform the public and persons seeking entrance to Project.

3.3 TEMPORARY SECURITY AND PROTECTION FACILITIES

- A. Provide temporary environmental protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- B. Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

END OF SECTION 01 50 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
- B. Product Substitutions: Substitutions include changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor after award of the Contract.
  - 1. Submit three copies of each request for product substitution.
  - 2. Submit requests within ten days after the Notice of Award.
  - 3. Do not submit unapproved substitutions on Shop Drawings or other submittals.
  - 4. Identify product to be replaced and show compliance with requirements for substitutions. Include a detailed comparison of significant qualities of proposed substitution with those of the Work specified, a list of changes needed to other parts of the Work required to accommodate proposed substitution, and any proposed changes in the Contract Sum or the Contract Time should the substitution be accepted.
  - 5. Architect will review the proposed substitution and notify Contractor of its acceptance or rejection.
- C. Comparable Product Requests:
  - 1. Submit three copies of each request for comparable product. Do not submit unapproved products on Shop Drawings or other submittals.
  - 2. Identify product to be replaced and show compliance with requirements for comparable product requests. Include a detailed comparison of significant qualities of proposed substitution with those of the Work specified.
  - 3. Architect will review the proposed product and notify Contractor of its acceptance or rejection.
- D. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Deliver products to Project site in manufacturer's original sealed container or packaging, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 3. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
  - 4. Store materials in a manner that will not endanger Project structure.
  - 5. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
- E. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS

- A. Provide products that comply with the Contract Documents, are undamaged, and are new at the time of installation.
1. Provide products complete with accessories, trim, finish, and other devices and components needed for a complete installation and the intended use and effect.
  2. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
- B. Product Selection Procedures:
1. Where Specifications name a single product or manufacturer, provide the item indicated that complies with requirements, or Owner-approved equal.
  2. Where Specifications include a list of names of products or manufacturers, provide one of the items indicated that complies with requirements, or Owner-approved equal.
  3. Where Specifications include a list of names of products or manufacturers, accompanied by the term "available products" or "available manufacturers," provide one of the named items that complies with requirements, or Owner-approved equal. Comply with provisions for "comparable product requests" for consideration of an unnamed product.
  4. Where Specifications name a product as the "basis-of-design" and include a list of manufacturers, provide the named product, or Owner-approved equal. Comply with provisions for "comparable product requests" for consideration of an unnamed product by the other named manufacturers.
  5. Where Specifications name a single product as the "basis-of-design" and no other manufacturers are named, provide the named product or Owner-approved equal. Comply with provisions for "comparable product requests" for consideration of an unnamed product by another manufacturer.
- C. Unless otherwise indicated, Architect will select color, pattern, and texture of each product from manufacturer's full range of options that includes both standard and premium items.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 60 00



SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 CLOSEOUT SUBMITTALS

- A. Record Drawings: Maintain a set of prints of the Contract Drawings as Record Drawings. Mark to show actual installation where installation varies from that shown originally.
  - 1. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
- B. Operation and Maintenance Data: Submit one copy of manual. Organize data into three-ring binders with identification on front and spine of each binder, and envelopes for folded drawings. Include the following:
  - 1. Manufacturer's operation and maintenance documentation.
  - 2. Video on CD or flashdrive of training seminar for Owner use.
  - 3. Maintenance and service schedules.
  - 4. Maintenance service contracts.
  - 5. Emergency instructions.
  - 6. Spare parts list.
  - 7. Copies of warranties.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Examine substrates and conditions for compliance with manufacturer's written requirements including, but not limited to, surfaces that are sound, level, plumb, smooth, clean, and free of deleterious substances; substrates within installation tolerances; and application conditions within environmental limits. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Before proceeding to lay out the Work, verify layout information shown on Drawings.
- C. Take field measurements as required to fit the Work properly. Where fabricated products are to be fitted to other construction, verify dimensions by field measurement before fabrication and, when possible, allow for fitting and trimming during installation.

3.2 CUTTING AND PATCHING

- A. Do not cut structural members or operational elements without prior written approval of Architect.
- B. Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- C. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

3.3 INSTALLATION

- A. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Comply with manufacturer's written instructions for installation. Anchor each product securely in place, accurately located and aligned with other portions of the Work. Clean exposed surfaces and protect from damage.
- C. Clean Project site and work areas daily, including common areas.

3.4 FINAL CLEANING

- A. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion:
  - 1. Remove labels that are not permanent.
  - 2. Clean exposed finishes to a dust-free condition, free of stains, films, and foreign substances. Sweep concrete floors broom clean.
  - 3. Vacuum clean floors in areas of Work.
  - 4. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication. Clean plumbing fixtures. Clean light fixtures, lamps, globes, and reflectors.
  - 5. Clean Project site, yard, and grounds, in areas disturbed by construction activities. Sweep paved areas; remove stains, spills, and foreign deposits. Rake grounds to a smooth, even-textured surface.

3.5 CLOSEOUT PROCEDURES

- A. Substantial Completion: Before requesting Substantial Completion inspection, complete the following:
  - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  - 2. Advise Owner of pending insurance changeover requirements.
  - 3. Submit specific warranties, maintenance service agreements, and similar documents.
  - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 5. Submit Record Drawings and Specifications, operation and maintenance manuals, and Similar final record information.
  - 6. Deliver tools, spare parts, extra materials, and similar items.
  - 7. Complete final cleaning requirements.
  - 8. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will proceed with inspection or advise Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will advise Contractor of items that must be completed or corrected before certificate will be issued. C. Request inspection for Final Completion, once the following are complete:
  - 1. Submit a copy of Substantial Completion inspection list stating that each item has been completed or otherwise resolved for acceptance.
- C. Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- D. Submit a written request for final inspection for acceptance. On receipt of request, Architect will proceed with inspection or advise Contractor of unfulfilled requirements. Architect will prepare final Certificate for Payment after inspection or will advise Contractor of items that must be completed or corrected before certificate will be issued.

3.6 DEMONSTRATION AND TRAINING

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system. Include a detailed review of the following:
  - 1. Include instruction for basis of system design and operational requirements, review of documentation, emergency procedures, operations, adjustments, troubleshooting, maintenance, and repairs.

END OF SECTION 01 70 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  1. Operation and maintenance documentation directory.
  2. Emergency manuals.
  3. Operation manuals for systems, subsystems, and equipment.
  4. Product maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  1. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
  1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Owner.
    - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    - b. Enable inserted reviewer comments on draft submittals.
  2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Owner will return two copies.
- C. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Owner will return copy with comments.
  1. Correct or revise each manual to comply with Owner's comments. Submit copies of each corrected manual within 15 days of receipt of Owner's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information.
- B. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  1. Title page.
  2. Table of contents.
  3. Manual contents.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- C. Title Page: Include the following information:
1. Subject matter included in manual.
  2. Name and address of Project.
  3. Name and address of Owner.
  4. Date of submittal.
  5. Name and contact information for Contractor.
  6. Name and contact information for Architect.
  7. Names and contact information for major consultants to the Owner that designed the systems contained in the manuals.
  8. Cross-reference to related systems in other operation and maintenance manuals.
- D. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- F. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- G. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
  2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
  4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

## 2.2 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.
  
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  - 1. Fire.
  - 2. Flood.
  - 3. Gas leak.
  - 4. Water leak.
  - 5. Power failure.
  - 6. Water outage.
  - 7. System, subsystem, or equipment failure.
  - 8. Chemical release or spill.
  
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
  
- D. Emergency Procedures: Include the following, as applicable:
  - 1. Instructions on stopping.
  - 2. Shutdown instructions for each type of emergency.
  - 3. Operating instructions for conditions outside normal operating limits.
  - 4. Required sequences for electric or electronic systems.
  - 5. Special operating instructions and procedures.

## 2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  - 2. Performance and design criteria if Contractor is delegated design responsibility.
  - 3. Operating standards.
  - 4. Operating procedures.
  - 5. Operating logs.
  - 6. Wiring diagrams.
  - 7. Control diagrams.
  - 8. Piped system diagrams.
  - 9. Precautions against improper use.
  - 10. License requirements including inspection and renewal dates.
  
- B. Descriptions: Include the following:
  - 1. Product name and model number. Use designations for products indicated on Contract Documents.
  - 2. Manufacturer's name.
  - 3. Equipment identification with serial number of each component.
  - 4. Equipment function.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

#### 2.4 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
1. Product name and model number.
  2. Manufacturer's name.
  3. Color, pattern, and texture.
  4. Material and chemical composition.
  5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
  2. Types of cleaning agents to be used and methods of cleaning.
  3. List of cleaning agents and methods of cleaning detrimental to product.
  4. Schedule for routine cleaning and maintenance.
  5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

## 2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard maintenance instructions and bulletins.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- F. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

## PART 3 - EXECUTION

### 3.1 MANUAL PREPARATION

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.



POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original project record documents as part of operation and maintenance manuals.

END OF SECTION 017823

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
- B. Related Requirements:
  - 1. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit copies of record Drawings as follows:
    - a. Initial Submittal:
      - 1) Submit PDF electronic files of scanned record prints and one set(s) of file prints.
      - 2) Owner will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
    - b. Final Submittal:
      - 1) Submit PDF electronic files of scanned record prints and one set(s) of prints.
      - 2) Print each drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit one paper copy and annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy and annotated PDF electronic files and directories of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Record data as soon as possible after obtaining it.
    - c. Record and check the markup before enclosing concealed installations.
  - 2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  - 3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Owner. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Annotated PDF electronic file with comment function enabled.
  2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
  3. Refer instances of uncertainty to Owner for resolution.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file with comment function enabled.
  3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
  4. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Owner.
    - e. Name of Contractor.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as annotated PDF electronic file.

## 2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as annotated PDF electronic file.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Owner's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 09 01 90.52 - MAINTENANCE REPAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes maintenance repainting as follows:
  - 1. Patching substrates.
  - 2. Surface preparation.
  - 3. Repainting.
- B. Substrates to be repainted include but are not limited to:
  - 1. Concrete.
  - 2. Steel.

1.2 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product and in each color and gloss of topcoat.
- B. Samples: For each type of paint system and each pattern, color, and gloss.
  - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
  - 2. Label each coat of each sample.
  - 3. Label each Sample for location and application and application area.
- C. Product List: For each product indicated, include the following:
  - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  - 2. VOC content.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

1.5 CLOSEOUT SUBMITTALS

- A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used. Use same designations indicated on drawings / schedules.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: Provide 1 gal. of each coating type in each color applied.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer's label with the following information:
  - 1. Product name and type (description).
  - 2. Batch date.
  - 3. Color number.
  - 4. VOC content.
  - 5. Surface preparation requirements.
  - 6. Application instructions.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage and work areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Lead Paint: It is not expected that lead paint will be encountered in the Work.
  - 1. If suspected lead paint is encountered, do not disturb; immediately notify Owner.
- D. Lead Paint: Lead paint may be present in buildings and structures to be painted. A report on the presence of lead paint is on file for review and use. Examine report to become aware of locations where lead paint is present.
  - 1. Do not disturb lead paint or items suspected of containing hazardous materials except under procedures specified.
  - 2. Where applicable, perform preparation for painting of substrates known to include lead paint in accordance with EPA Renovation, Repair and Painting Rule and additional requirements of authorities having jurisdiction.

## PART 2 - PRODUCTS

### 2.1 PREPARATORY CLEANING MATERIALS

- A. Water: Potable.
- B. Hot Water: Water heated to a temperature of 140 to 160 deg F.
- C. Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 1/2 cup of laundry detergent that contains no ammonia, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of warm water for every 5 gal. of solution required.
- D. Mildewcide: Commercial proprietary mildewcide or a job-mixed solution prepared by mixing 1/3 cup of household detergent that contains no ammonia, 1 quart of 5 percent sodium hypochlorite bleach, and 3 quarts of warm water.
- E. Abrasives for Ferrous Metal Cleaning: Aluminum oxide paper, emery paper, fine steel wool, steel scrapers, and steel-wire brushes of various sizes.

### 2.2 PAINT, GENERAL

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content: Comply with current State of Illinois Regulations regarding VOC (Volatile Organic Compounds).
- C. Colors: Specified on Drawings.

### 2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
  - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  - 2. Testing agency will perform tests for compliance with product requirements.
  - 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible. Contractor responsible for substrate damage identified, resulting from removal of rejected materials based on compliance testing.

### 2.4 PAINT MATERIALS, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- B. Transition Coat: Paint manufacturer's recommended coating for use where a residual existing coating is incompatible with the paint system.

2.5 PAINT MATERIAL MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated in construction documents or Owner-approved equal from one of the following:
  1. Sherwin-Williams Company.
  2. Benjamin Moore & Co.
  3. Glidden Professional, Division of PPG Architectural Finishes, Inc.
  4. PPG Architectural Finishes, Inc.
  5. Pratt & Lambert.

2.6 PATCHING MATERIALS

- A. Metal-Patching Compound: Two-part, polyester-resin, metal-patching compound; knife-grade formulation as recommended in writing by manufacturer for type of metal repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be produced for filling metal that has deteriorated from corrosion. Filler shall be capable of filling deep holes and spreading to feather edge.
- B. Cementitious Patching Compounds: Cementitious patching compounds and repair materials specifically manufactured for filling cementitious substrates and for sanding or tooling prior to repainting; formulation as recommended in writing by manufacturer for type of cementitious substrate indicated, exposure to weather and traffic, the detail of work, and site conditions.

PART 3 - EXECUTION

3.1 MAINTENANCE REPAINTING, GENERAL

- A. Execution of the Work: In repainting surfaces, disturb them as minimally as possible and as follows:
  1. Remove failed coatings and corrosion and repaint.
  2. Verify that substrate surface conditions are suitable for repainting.
- B. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use gentle methods, such as scraping and lightly hand sanding, that will not abrade softer substrates, reducing clarity of detail.
- C. Heat Processes: Do not use torches, heat guns, or heat plates.

3.2 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for maximum moisture content and other conditions affecting performance of painting work. Comply with paint manufacturer's written instructions for inspection.
- B. Maximum Moisture Content of Substrates: Do not begin application of coatings unless moisture content of exposed surface is below the maximum value recommended in writing by paint manufacturer and not greater than the following maximum values when measured with an electronic moisture meter appropriate to the substrate material:
  1. Concrete: 12 percent.
- C. Existing finished surfaces: Verify existing finish is adequate or made ready to receive new finish



POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- D. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.
- E. Alkalinity: Do not begin application of coatings unless surface alkalinity is within range recommended in writing by paint manufacturer. Conduct alkali testing with litmus paper on exposed plaster, cementitious, and masonry surfaces.

### 3.3 PREPARATORY CLEANING

- A. General: Use the gentlest, appropriate method necessary to clean surfaces in preparation for painting. Clean all surfaces, corners, contours, and interstices.
- B. Detergent Cleaning: Wash surfaces by hand using clean rags, sponges, and bristle brushes. Scrub surface with detergent solution and bristle brush until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet. Rinse with water applied by clean rags or sponges.
- C. Solvent Cleaning: Use solvent cleaning to remove oil, grease, smoke, tar, and asphalt from painted or unpainted surfaces before other preparation work. Wipe surfaces with solvent using clean rags and sponges. If necessary, spot-solvent cleaning may be employed just prior to commencement of paint application, provided enough time is allowed for complete evaporation. Use clean solvent and clean rags for the final wash to ensure that all foreign materials have been removed. Do not use solvents, including primer thinner and turpentine, that leave residue.
- D. Mildew: Clean off existing mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. Scrub mildewed areas with mildewcide. Rinse with water applied by clean rags or sponges.
- E. Mechanical Rust Removal:
  - 1. Remove rust with specified abrasives for ferrous-metal cleaning. Clean to bright metal.
  - 2. Wipe off residue with mineral spirits and either steel wool or soft rags.
  - 3. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
  - 4. Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

### 3.4 SUBSTRATE REPAIR

- A. General: Repair substrate surface defects that are inconsistent with the surface appearance of adjacent materials and finishes.
- B. Cementitious Material Substrate:
  - 1. General: Repair defects including dents and chips more than 1/4 inch in size and all holes and cracks by filling with cementitious patching compound and sanding smooth. Remove protruding fasteners.
  - 2. Concrete, Cement Plaster, and Other Cementitious Products: Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. If surfaces are too alkaline to paint, correct this condition before painting.
- C. Metal Substrates:
  - 1. Preparation: Treat repair locations by wire-brushing and solvent cleaning. Use mechanical rust removal method to clean off rust.
  - 2. Defects in Metal Surfaces: Repair non-load-bearing defects in existing metal surfaces, including dents and gouges more than 1/16 inch deep or 1/2 inch across and all holes and cracks by filling with metal-patching compound and sanding smooth. Remove burrs and protruding fasteners.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

3. Priming: Prime iron and steel surfaces immediately after repair to prevent flash rusting. Stripe paint corners, crevices, bolts, welds, and sharp edges. Apply two coats to surfaces that are inaccessible after completion of the Work.

3.5 PAINT APPLICATION, GENERAL

- A. Prepare surfaces to be painted according to the Surface-Preparation Schedule and with manufacturer's written instructions for each substrate condition.
- B. Apply a transition coat over incompatible existing coatings.
- C. Metal Substrates: Stripe paint corners, crevices, bolts, welds, and sharp edges before applying full coat. Apply two coats to surfaces that are inaccessible after completion of the Work. Tint stripe coat different than the main coating and apply with brush.
- D. Blending Painted Surfaces: When painting new substrates patched into existing surfaces or touching up missing or damaged finishes, apply coating system specified for the specific substrate. Apply final finish coat over entire surface from edge to edge and corner to corner.

3.6 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 SURFACE-PREPARATION SCHEDULE

- A. General: Before painting, prepare surfaces for painting according to applicable requirements specified in this schedule.
  1. Examine surfaces to evaluate each surface condition according to paragraphs below.
  2. Where existing degree of soiling prevents examination, preclean surface and allow it to dry before making an evaluation.
  3. Repair substrate defects according to "Substrate Repair" Article.
- B. Surface Preparation for MPI DSD 0 Degree of Surface Degradation:
  1. Surface Condition: Existing paint film in good condition and tightly adhered.
  2. Paint Removal: Not required.
  3. Preparation for Painting: Wash surface by detergent cleaning; use solvent cleaning where needed. Roughen or degloss cleaned surfaces to ensure paint adhesion according to paint manufacturer's written instructions.
- C. Surface Preparation for MPI DSD 1 Degree of Surface Degradation:
  1. Surface Condition: Paint film cracked or broken but adhered.
  2. Paint Removal: Scrape by hand-tool cleaning methods to remove loose paint until only tightly adhered paint remains.
  3. Preparation for Painting: Wash surface by detergent cleaning; use other cleaning methods for small areas of bare substrate if required. Roughen, degloss, and sand the cleaned surfaces to ensure paint adhesion and a smooth finish according to paint manufacturer's written instructions.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- D. Surface Preparation for MPI DSD 2 Degree of Surface Degradation:
  - 1. Surface Condition: Paint film loose, flaking, or peeling.
  - 2. Paint Removal: Remove loose, flaking, or peeling paint film by hand-tool methods.
  - 3. Preparation for Painting: Wash surface by detergent cleaning; use solvent cleaning where needed. Use other cleaning methods for small areas of bare substrate if required. Sand surfaces to smooth remaining paint film edges. Prepare bare cleaned surface to be painted according to paint manufacturer's written instructions for substrate construction materials.
  
- E. Surface Preparation for MPI DSD 3 Degree of Surface Degradation:
  - 1. Surface Condition: Paint film severely deteriorated.
  - 2. Paint Removal: Completely remove paint film by hand-tool methods. Remove rust.
  - 3. Preparation for Painting: Prepare bare cleaned surface according to paint manufacturer's written instructions for substrate construction materials.
  
- F. Surface Preparation for MPI DSD 4 Degree of Surface Degradation:
  - 1. Surface Condition: Missing material, small holes and openings, and deteriorated or corroded substrate.
  - 2. Substrate Preparation: Repair, replace, and treat substrate according to "Substrate Repair" Article.
  - 3. Preparation for Painting: Sand substrate surfaces to smooth remaining paint film edges and prepare according to paint manufacturer's written instructions for substrate construction materials. Remove rust.
  - 4. Painting: Paint as required for MPI DSD 2 degree of surface degradation.

3.8 INTERIOR MAINTENANCE REPAINTING SCHEDULE

- A. Concrete Substrates:
  - 1. Epoxy System MPI INT 3.1F:
    - a. Prime Coat: Epoxy, matching topcoat.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss, MPI #77.
  
- B. Steel Substrates:
  - 1. Pigmented Polyurethane over Epoxy Zinc-Rich and Epoxy System MPI INT 5.1J:
    - a. Prime Coat: Primer, zinc rich, epoxy, MPI #20.
    - b. Intermediate Coat: Epoxy, gloss, MPI #77.
    - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6), MPI #72.

END OF SECTION 09 01 90.52

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Ceramic tile on indicated existing metal stairs and landings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples:
1. Each type and composition of tile and for each color and finish required.
  2. Assembled samples, with grouted joints, for each type and composition of tile and for each color and finish required.

PART 2 - PRODUCTS

2.1 TILE PRODUCTS

- A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. Tile products are specified on Drawings.

2.2 SETTING MATERIALS

- A. Improved Modified Dry-Set Cement Mortar: ANSI A118.15.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. C-Cure.
    - b. Custom Building Products.
    - c. Laticrete International, Inc.
    - d. MAPEI Corporation.
- B. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

2.3 GROUT MATERIALS

- A. Polymer-Modified Tile Grout: ANSI A118.7.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. C-Cure.
    - b. Custom Building Products.
    - c. Laticrete International, Inc.
    - d. MAPEI Corporation.

2.4 ELASTOMERIC SEALANTS

- A. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

3.2 INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

3.3 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Stair Installations, Metal Stairs:
  - 1. Tile Installation S151-20: Cement mortar bed (thickset) without cleavage membrane; TCA F111.
    - a. Mortar: A118.15 mortar. 95% mortar coverage, with metal reinforcing mesh.
    - b. Grout: Polymer-modified unsanded grout.
    - c. Silicone soft joint around the tile perimeter isolating it from the metal stair components.

END OF SECTION 09 30 00

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, and coordinated with each other, using input from installers of the items involved.
- B. Product test reports.
- C. Research reports.
- D. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Class A according to ASTM E 1264.
  - 2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL PANELS

- A. Acoustical Panel Product: Specified on Drawings.

2.3 METAL SUSPENSION SYSTEM

- A. Metal Suspension System: Specified on Drawings.
- B. Metal Suspension-System Standard: Manufacturer's corrosion-resistant, direct-hung, metal suspension system, recommended in writing by manufacturer for natatorium environment, and accessories according to ASTM C 635/C 635M.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

2.4 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

2.5 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.
- B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
  - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

END OF SECTION 09 51 13

SECTION 26 05 00 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

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

1.2 DEFINITIONS

- A. Provide all required products and execution for a complete and fully operational Electrical System. Such work includes, but is not limited to, that which is identified on the contract documents. For the purpose of this specification, the following terms are defined:
  - 1. "Contract documents" include the most current project drawings and specification.
  - 2. "Provide" includes furnishing and installation.
  - 3. "Furnish" includes purchasing and transporting new equipment, as specified, to the job site.
  - 4. "Install" includes mounting or setting equipment in place, in specified location, making all required electrical connections for a working product.
  - 5. "Electrical System" includes all distribution of power, lighting, fire protection, life safety, communications, security, special systems, and any other information, electrical in nature, identified on the Contract Documents, from the point(s) of service to utilization device(s).
  - 6. "Connecting" means providing a power source, overcurrent devices, raceways, conductors, terminations, insulation supports, and other materials and equipment required for the operation and control of the relevant operation.
- B. Provide materials, equipment, installation or testing identified on the drawings but not specified herein; or that which is specified herein, but not identified on the drawings shall be provided at no additional cost to the Owner.
- C. Provide materials or equipment including minor items, accessories, or devices reasonably inferable as necessary for the completion and proper operation of any systems or products identified on the Contract Documents.

1.3 QUALITY ASSURANCE

- A. Discovery of any conflicting design information or any design intentions which are not readily interpreted shall be referred to the Architect/Engineer for further description or illustration prior to any product selection or execution of work.
- B. Discovery of any materials or equipment which are damaged, unsuitable, incompatible, or non-compliant with any applicable codes, laws, ordinances, or other regulations shall be brought to the direct attention of the Architect/Engineer.
- C. Generally, the Drawings establish the location, quantity and relationship of the parts of the work, and the specifications define the type and quality of materials and workmanship. Work shown in the drawings and not mentioned in the specifications, or required by the specifications and not shown on the drawings, shall be provided as if fully provided for in both. In the case of conflicts between the drawings and specifications, or within either document, the Architect/Engineer shall determine the intent. In such cases, in general, the more stringent requirement concerning greater quantity, quality, and/or resulting in a higher cost shall govern without further cost to the Owner.



- D. The equipment list contained in this specification includes only the major equipment requirements. Verify the completeness and suitability of device to meet the intent of the specifications. Any additional equipment required, even if not specifically mentioned herein, shall be provided without claim for additional payment; it being understood that a complete operating system, satisfactory to the Engineer and the Owner, is required in all cases.

#### 1.4 REGULATORY REQUIREMENTS

- A. Where governing codes indicate the Drawings and Specifications do not comply with the minimum requirements of applicable codes, the Contractor shall either notify the Architect/Engineer in writing during the bidding period identifying the revisions required to meet code requirements or provide an installation which will comply with the code requirements.
- B. All material, equipment, installation and testing should be in accordance with all applicable codes, laws, and ordinances of Federal, State and local governing bodies having jurisdiction.
- C. In case of differences between building codes, Federal and State laws, local ordinances and utility company regulations and the Contract Documents, the most stringent shall govern.
- D. Where any materials, equipment or installation is not in compliance with the more stringent of the applicable codes, laws, ordinances, regulations and contract documents, they shall be entirely removed, replaced, modified or otherwise corrected at no additional cost to the Owner.
- E. Materials, equipment, installation and testing shall conform to the latest editions of the applicable following codes:
  - 1. NEC National Electrical Code.
  - 2. State of Illinois Building Code.
  - 3. NFPA 72 National Fire Protection Association.
  - 4. IBC International Building Code.
  - 5. City of Rockford Amendments.
- F. All product materials and work shall comply with all local codes, including but not limited to the following codes and standards as applicable, in addition to any codes and standards referenced within individual specification sections. These codes and standards shall apply to all Division 26 Sections as applicable.
  - 1. ANSI American National Standards Institute.
  - 2. ASTM American Society for Testing Materials.
  - 3. CBM Certified Ballast Manufacturers.
  - 4. ETL Electrical Testing Laboratories.
  - 5. IEEE Institute of Electrical and Electronic Engineers.
  - 6. NBS National Bureau of Standards.
  - 7. NEMA National Electrical Manufacturer's Association.
  - 8. NFPA National Fire Protection Association.
  - 9. OSHA Occupation Safety and Health Act.
  - 10. UL Underwriters Laboratories.
  - 11. ADA Americans with Disabilities Act.
  - 12. NEC National Electrical Code.
  - 13. IBC International Building Code.
  - 14. IEC International Electrical Code.
  - 15. IFC International Fire Code.
- G. Where a UL standard is available, the equipment supplied for the project shall be UL listed and shall bear the UL label.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- H. Notify the Architect/Engineer of any materials or apparatus believed to be inadequate, unsuitable, in violation of laws, ordinances, rules or regulations of authorities having jurisdiction.

1.5 APPROVALS

- A. Prepare shop drawings and obtain approvals from inspection authorities for emergency and exit lighting, fire alarm and life safety systems, and other electrical installations requiring specific approval..
- B. Prepare shop drawings and obtain approvals from governmental agencies and utility companies for applicable electrical installations requiring approval.
- C. Copies of the final approved drawings shall be delivered to the Architect/Engineer. Approvals shall be obtained before commencement of related work.

1.6 PERMIT AND INSPECTION

- A. Permit: Obtain and pay for all permits, bonds, license, tap-in fees, etc. required by the City, State, or other authority having jurisdiction over the work.
- B. Inspections: Arrange and pay for all inspections required by the above when they become due as part of the work of sections affected. Conceal no work until approved by these governing authorities.
- C. Engineer inspections include one above ceiling review and report before ceiling conceal work, one substantial review report and one final review report.

1.7 FEES

- A. Pay fees and other charges incidental to electrical work and obtain and pay for required insurance, permits, licenses, inspections and taxes. Arrange for required inspections and delivery certificates and approvals for same to the Architect/Engineer.

1.8 SUBMITTALS

- A. Shop Drawings: As soon as practical and before any material or equipment is purchased, the Contractor shall submit shop drawings. A complete list in one category (example: all fixtures) of all shop drawings catalog cuts, material lists, etc. are to be submitted by this Contractor at one time. No consideration will be given to partial shop drawings submitted from time to time.
  - 1. Extended time for submitting special shop drawings may be requested; however, any extension of time approved does not relieve this Contractor of his responsibility of executing his work in accordance with this contract.
  - 2. Any listed materials, fixtures, apparatus, or equipment that are not in accordance with specifications requirements can and will be rejected for use in this installation and construction. Substitutions will not be permitted.
  - 3. Any materials, fixtures, apparatus or equipment installed without stamped or written approval shall be removed by the Contractor and replaced with specified equipment at the direction of the Architect/Engineer and without recourse for additional compensation.
  - 4. Review of shop drawings does not relieve the Contractor from any responsibility for deviation from the Contract Documents unless the deviation is specifically identified on the shop drawings.
  - 5. Contractor shall review and coordinate all shop drawings prior to submitting them for Architects/ Engineer's review. Contractor shall stamp each shop drawing to certify that all MEP related contractors have coordinated and reviewed it. Engineer will not check any

shop drawings that Contractor has not stamped with his review certification. Shop drawings will be reviewed once.

6. Prior to ordering any switchboard, distribution panels, panelboards, or transformers, the contractor shall submit dimension drawings showing the switchboard will fit in the location shown on the drawings. In the event of conflicts, the contractor shall request a written clarification from the Architect/Engineer.

- B. As Built Drawings:
  1. Provide "as-built" drawings.

#### 1.9 OVERTIME WORK

- A. All construction work shall be done on regular working hours and days, unless otherwise specified. If overtime work, other than specified, is required on the project, it shall be performed as indicated.
- B. System shutdown shall occur during off business hours and shall be done on over-time basis.
- C. The base bid shall include overtime work specified. No compensation shall be made for other work done on overtime basis, unless authorized.

#### 1.10 ALTERNATES

- A. Accepted alternates, if any, may affect portions of the Base Bid Work.
- B. Acceptance of alternates shall include provisions necessary to alter, adjust or otherwise modify work affected by the alteration.
- C. Shop drawings shall include alternate work and shall reflect changes necessitated to other work.

#### 1.11 GUARANTEE

- A. Electrical work shall be guaranteed for both materials and labor for a period of one year.
- B. On-the-premises maintenance shall be provided at no cost to the purchaser for one year from the date of an operational and accepted installation unless damage is caused by misuse or abuse.
- C. Guarantee all wiring and equipment to be free from inherent and mechanical defects due to workmanship and materials used for the period of one full year from date of operational and accepted installation. Replacement of all or part of the equipment and/or correction of such defects, including labor, shall be rendered without cost to the Owner with the guarantee period.
- D. Manufacturer's equipment guarantees or warranties for periods of more than one year shall be included in the Operation and Maintenance Data

#### 1.12 WARRANTY

- A. Warranty period shall be one year after final acceptance of the system. Repairs or replacements made under the warranty shall bear an additional 1-year warranty dated from final acceptance of the repair or replacement. The Owner shall receive the benefit of all warranties furnished by manufacturers.

1.13 PROJECT/SITE CONDITIONS

- A. Carefully examine the contract documents, visit the site, and thoroughly become familiar with the local conditions relating to the work prior to bidding. Failure to do so will not relieve the contractor of the obligations of the Contract.
- B. Install Work in locations shown on Drawings, unless prevented by Project conditions.
- C. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Architect/Engineer before proceeding.

1.14 CONTRACTOR'S RESPONSIBILITY TO VERIFY EQUIPMENT DIMENSIONS

- A. The drawings, schedules and specifications have been prepared using one manufacturer for each piece of equipment as the basis for dimensional design. If the Contractor purchases equipment listed as a specified Acceptable Manufacturer but is not the scheduled manufacturer used for the base design, the Contractor shall be responsible for checking all the dimensions of the equipment to verify that it will fit in the space shown on the Drawings. Minor deviations in dimensions will be permitted, provided the ratings meet what was shown on the drawings and equipment will physically fit into the space allocated with suitable access around equipment for operation and maintenance on the equipment.
- B. Contractor and/or manufacturer shall verify that the capacity and duty specified meets the characteristics of the equipment he submits for review.
- C. If equipment is submitted for review and does not meet the physical size or arrangement of what was scheduled and specified, Contractor shall pay for all alternations required to accommodate such equipment at no additional cost to the Owner. Contractor shall also pay all costs for additional work required by other Contractors, Owner, Architect or Engineer to make changes which would allow the equipment to fit in the space.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Proposal shall be based upon the furnishing of all materials and equipment as specified, which in every case shall be new and, where not specifically referred to by manufacturer's name, of the best grade and quality available.
- B. Equipment and material shall be without blemish or defect and shall not be used for temporary light or power purposes, including lamps, without the Architect/ Engineer's written authorization.
- C. Items of equipment of one generic type (such as fuses), except conduit, conduit fittings, outlet boxes, wiring and cable, shall be the product of one manufacturer throughout, unless otherwise indicated or accepted by the Architect/Engineer.
- D. Where two or more makes or kinds of materials or equipment are specified, indicate which of these choices will be used. This information shall be included with the list of manufacturers for equipment and materials to be submitted to the Architect/Engineer.
- E. Manufacturers of equipment shall be firms regularly engaged in manufacturing factory-fabricated systems and equipment whose products have been in satisfactory use in similar service for not less than 5 years.

## 2.2 MANUFACTURERS NAMEPLATES

- A. Each major electrical component such as panelboards, circuit breakers, disconnect switches, etc. shall have the manufacturer's name, address, catalog number, model number, rating, and any other required specified markings on a plate or label located inside the cover or otherwise inconspicuously but readily accessible.

## PART 3 - EXECUTION

### 3.1 DELIVERY AND STORAGE

- A. Receive, handle, and store electrical items and materials at the project site. Materials and electrical items shall be so placed that they are protected from damage and deterioration.
- B. Existing equipment which is to be reused shall be cleaned and protected against damage. Equipment which is removed and stored for reuse shall be stacked, boxed or crated in such a manner as to prevent damage. The cost to repair/replace this equipment due to damage incurred during its removal, storage or reinstallation shall be borne by the Contractor.
- C. The Contractor shall bear full responsibility for equipment judged unacceptable due to his failure to comply with these specifications.

### 3.2 INSTALLATION

- A. The Drawings for work under Division 26 are diagrammatic and are intended to convey the scope of work and indicate the general arrangement of conduit, boxes, equipment, fixtures and other work included in the Contract.
- B. Location of items required by the Drawings or specifications not definitely fixed by dimensions are approximate only and exact locations necessary to secure the best conditions and results shall be determined at the site and shall be subject to the approval of the Architect/Engineer.
- C. Follow Drawings in laying out work, check drawings of other trades to verify spaces in which work will be installed, and maintain maximum headroom and space conditions at all points.
  - 1. Where headroom or space conditions appear inadequate, the Architect/Engineer shall be notified before proceeding with installation.
  - 2. Minor conduit rerouting and changes shall be made at no additional cost to the Owner.
- D. Perform all work with skilled mechanics of the particular trade involved in a neat and workmanlike manner.
- E. Perform all work in cooperation with other trades and schedule.
- F. Perform all work in accordance with the manufacturer's recommendations.
- G. Furnish other trades advance information on locations and sizes of frames, boxes, sleeves and openings needed for the work, and also furnish information and shop drawings necessary to permit trades affected to install their work properly and without delay.
- H. Where there is evidence that work of one trade will interfere with the work of other trades, all trades shall assist in working out space allocations to make satisfactory adjustments and shall be prepared to submit and revise coordinated shop drawings.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- I. With the approval of the Architect/Engineer and without additional cost to the Owner, make minor modifications in the work as required by structural interferences, by interferences with work of other trades or for proper execution of the work.
- J. Work installed before coordinating with other trades so as to cause interference with the work of such other trades shall be changed to correct such condition without additional cost to the Owner and as directed by the Architect/Engineer.
- K. Architect/Engineer reserves the right to change location of electrical equipment or device within 10'-0" radius before work is installed without extra charge.
- L. Electrical Contractor shall cooperate with other trades and coordinate work so that conflicts with other work are eliminated.
- M. Equipment shall be installed with adequate space allowed for removal, repair or changes to equipment. Ready accessibility to removable parts of equipment and to wiring shall be provided without moving other equipment which is to be installed or which is in place. Electrical Contractor shall verify measurements. Discrepancies shall be brought to the Architect/Engineer's attention for interpretation.
- N. Determine temporary openings in the buildings that will be required for the admission of apparatus furnished under this Division, and notify the Architect/Engineer accordingly. In the event of failure to give sufficient notice in time to arrange for these openings during construction, assume all costs of providing such openings thereafter.
- O. Location of electrical outlets, fixture, panels, cabinets, equipment, etc. is approximate and exact locations shall be determined at the project.
- P. Electrical Contractor shall refer to contract documents for details, reflected ceiling plans, and large scale drawings.
- Q. Apparatus, lighting fixtures, material or work not shown on the drawings, but mentioned in the project specifications, or vice versa or any included accessories such as wiring, relays, switches, transformers (line voltage or low voltage), etc., necessary to make the work complete and ready for operating, even though not specified or shown on the electrical drawings shall be furnished and installed without additional expenses to the Owner. It is the Contractor's responsibility prior to bids to review all project documents.
- R. Verify final locations for rough-ins with field measurements of the actual equipment to be connected. Refer to equipment specifications in Division 2 through 26 for rough-in requirements.
- S. Equipment specified under other divisions and requiring electrical supply shall be erected, aligned, leveled and prepared for operation. Provide required controls and accessories along with installation instructions, diagrams, dimensions and supervision of installation and start-up. Provide the required electrical rough-ins and connections and confirm the electrical controls and accessories furnished under the specifications for the other divisions. Install those controls and accessories not located in the mechanical piping and ductwork. Provide additional electrical controls, accessories, fittings and devices not specified under the equipment but required for a finished, operating job. Make all final electrical connections. Participate in the start-up and test procedure.
- T. Electrical Contractor shall weatherproof all openings and penetrations through foundations and exterior walls created by fixtures and conduits to prevent moisture from entering through.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- U. Contractor shall furnish other trades advance information and/or shop drawings on locations and sizes of conduits, raceways, equipment, frames, boxes, sleeves and openings, etc. needed for their work to install their work properly and without delay.
- V. The locations shown for all lighting fixtures and ceiling mounted electrical equipment are diagrammatic. Exact location shall be determined from the reflected ceiling plans and/or on the job site by the construction manager. It shall be the contractor's responsibility to maintain code required spacing for items such as fire alarm devices.
- W. Contractor shall be required to maintain the fire rated integrity of floors and/or wall partitions. All penetrations through fire rated building elements shall be effectively sealed using approved materials and methods.
- X. This contractor shall be responsible for furnishing all labor and material required to patch all openings in existing floors, walls, ceilings and fire separations created by the removal of this trades material and equipment where these openings are not to be reused.

3.3 COOPERATION

- A. Where jurisdictional rules require the assistance of electrical mechanics in the moving and setting of electrically power equipment, provide such assistance.
- B. Where work covered by this section connects to equipment furnished under other sections, verify electrical work involved in the field and make proper connection to such equipment.

3.4 CUTTING AND PATCHING

- A. Do drilling, cutting, fitting and patching necessary for the installation of conduits, wireways, and other electrical equipment, and provide supports necessary for same and for bracing and anchorage of work. No cutting of structural work or of fireproofing shall be done without the written consent of the Architect/Engineer.
- B. Conduits passing through roofs or other surfaces exposed to weather shall be properly flashed as specified in roofing and waterproofing sections. This flashing work shall be paid for as part of the electrical work.

3.5 EXECUTION, CORRELATION AND INTENT OF DOCUMENTS

- A. In the event that conflicts, if any, cannot be settled promptly and amicably between the affected trades, with work proceeding in a workmanlike manner, then the Architect/Engineer shall decide which work is to be relocated and his judgment shall be final and binding on this Contractor.

3.6 ADJUSTMENTS

- A. The primary adjustments of the system(s) shall be accomplished by the Contractor to the complete satisfaction of the Owner and Architect/Engineer at the time of completion of the installation.

3.7 TESTING

- A. General: Furnish meters, instruments, cable connections, equipment or apparatus necessary for making all tests.
- B. Insulation Tests:

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

1. After being pulled in place and before being connected, test all service and feeder cables with 1000 volt, 60 Hz insulation tester for one minute to determine that conductor insulation resistance to ground is not less than that recommended by the manufacturer. Test all branch circuit conductors for lighting, receptacle and miscellaneous loads prior to connection of loads. Tests shall not register less than one megohm to ground during an insulation test as described above for service and feeder cables. Remove, replace and retest all cable failing insulation test.
  2. Measure insulation resistance of electrical wiring with a self-contained instrument such as direct-indicating ohmmeter of the generator battery or electronic type.
  3. When using any type of d-c voltage source, it is essential that the output voltage is steady to prevent fluctuations in charging current. Where protective resistors are used in test instruments, take into account their effect on the magnitude of the voltage applied to the insulation under test. Properly maintain the instrument used in insulation resistant testing. Make periodic checks to insure that rated voltage is delivered and that the instrument is in calibration.
  4. Unless otherwise specified, the insulation resistance shall be approximately one megohm for each 1000 volts of operating voltage with a minimum value of one megohm.
- C. Documentation: Keep records of all tests, in tabulated, permanent, reproducible form, completely indexed and explained, indicating the specific test performed, environmental conditions such as temperature and humidity, date of performance, results obtained, corrective actions taken (if any), final results, and comments, if required. Copies of all tests shall be delivered to the Architect/Engineer prior to this final project review.

END OF SECTION 26 05 00



SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

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 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

1.4 QUALITY ASSURANCE

- A. 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.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Alcan Products Corporation; Alcan Cable Division.
  - 2. American Insulated Wire Corp.; a Leviton Company.
  - 3. General Cable Corporation.
  - 4. Senator Wire & Cable Company.
  - 5. Southwire Company.
- B. Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN.

2.2 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Hubbell Power Systems, Inc.
  - 3. O-Z/Gedney; EGS Electrical Group LLC.
  - 4. 3M; Electrical Products Division.
  - 5. Tyco Electronics Corp.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 ADDITIONAL ACCESSORIES

- A. In the event that conduit and wire sizes increase beyond the motor or equipment manufacturer's normal provisions for conduit and wire terminations, due to voltage-drop or other considerations in motor branch-circuit designs, provide necessary auxiliary termination facilities with adequate boxes, lugs, terminals, and other components as may be required. Consult with the suppliers of motors and other items to insure that the equipment is furnished with suitable components to accept the required conduits and wires.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Branch Circuit and Feeder: Type THHN-THWN, single conductors in raceway.
- B. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- C. Class 2 Control Circuits: Power-limited cable, concealed in building finishes.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- B. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- C. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- D. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

### 3.5 INSTALLATION

- A. Completely and thoroughly swab raceway before installing wire.
- B. Install cable in accordance with the NECA "Standard of Installation."
- C. Pull all conductors into raceway at same time.
- D. Feeders shall be installed as continuous conductors without splices whenever possible. Where feeder splices are required, the contractor shall submit a request for approval in writing to the engineer indicating the feeder and splice location. Where splices are installed without written approval, the engineer reserves the right to have the contractor replace the spliced conductors with continuous conductors at no additional cost to the Owner.
- E. Support signal cables above accessible ceiling, using cable ties to support cables from structure. Do not rest cable on ceiling grid.
- F. Use suitable cable fittings, connectors, and supports.
  - 1. Cable supports shall be as required by Code and shall be compatible with the wire and cable type and the associated conduit size.
    - a. Manufacturer: OZ/Gedney or Thomas & Betts.
- G. Increase conductor size as required due to availability. Minimum feeder conductor sizes are shown on Drawings. If increased, be responsible for associated feeder conduit size and increased ground conductor size per NEC.
- H. Provide conductors of the same size from the protective device to the last load.
- I. Make conductor length identical for parallel feeders.
- J. Provide slack wire for all future connections with ends of wires taped and blank box covers installed.
- K. Do not bend cables, either permanently or temporarily during installation, to radii less than that recommended by the manufacturer.
- L. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- M. Splices, Taps and Terminations:
  - 1. Make splices and taps in wiring #10 AWG and smaller mechanically and electrically secure with mechanical pressure type splicing devices.
  - 2. Make splices and taps of conductors #8 AWG or larger and all splices in motor terminal boxes using compression connectors requiring the use of compression tools for securing the conductors in the connectors. Termination of conductors at all distribution equipment, except transformers, shall be made using mechanical lugs. Connectors shall be of high conductivity, corrosion-resistant material and have actual contact area that shall provide at least the current carrying capacity of the wire or cable. For conductors #1/0 and larger, connector lugs shall be of the two-hole type. Connector lugs shall be bolted to bussing using Belleville washers in combination with flat washers and nuts.
  - 3. Each conductor lug or bus shall be individually made with separate lug and/or bolt as required for the termination.

4. Provide insulated connectors for splices and taps with a self-fusing rubber insulating tape that is non-corrosive to the connector and the conductor. Insulation tape shall have a minimum of 350 volts per mil dielectric strength. Friction or vinyl tape shall be applied directly over rubber insulating tape equal to 3M Scotch 88 type.

N. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connector and terminals to comply with tightening torques specified in UL Standards 486A and B.

O. Identify and color code wire and cable under provisions of Section 26 05 53. Identify each conductor with its circuit number or other designation indicated. Wire color coding shall be as follows or as required by local codes:

Normal Power  
120/208 Volts:  
Phase A – Black  
Phase B – Red  
Phase C – Blue  
Neutral – White  
Ground – Green

#### MAXIMUM BRANCH CIRCUIT LENGTHS

P. The following indicates maximum installed length a circuit can have and still maintain an adequate voltage level at the last point of use for 20 amp circuit. If the 20 amp circuit length exceeds the length listed, use the next larger wire sized. Multiple circuit runs in the same raceway shall have all conductors sizes the same based on worst case circuit lengths.

#### BRANCH CIRCUIT LENGTH (IN FEET)

Wire Size	2 Wire 120 V	1 Phase 208 V	3 Phase 208 V
12	0 to 61'	0 to 105'	0 to 122'
10	62' to 97'	106' to 168'	123' to 194'
8	98' to 154'	169' to 267'	195' to 309'
6	155' to 246'	268' to 426'	310' to 491'

### 3.6 PENETRATIONS

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

B. Apply joint sealants to cable penetrations of non-fire rated floor and wall penetrations using sealants specified in Section 07 92 00 – Joint Sealants.

### 3.7 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Perform tests and inspections and prepare test reports.

C. Testing: Upon installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification, Section 7.3.1. Certify compliance with test parameters.
- D. Correct malfunctioning products at site, where possible, and retest to demonstrate compliance; otherwise remove and replace with new units, and retest.
- E. Inspection: Inspect wire and cable for physical damage and proper connection.
- F. Insulation Resistance Test: Prior to energization of circuitry, check installed wires and cables with megohm meter to ensure insulation resistance requirements are fulfilled.
- G. Continuity Test: Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections. Correct if necessary.
- H. Branch Circuits with Receptacles: Branch circuit receptacle wiring shall be tested using a Daniel Woodhead Co. circuit tester Model #1750.
- I. Test Reports: Prepare a written report to record the following:
  1. Test procedures used.
  2. Test results that comply with requirements.
  3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- J. Remove and replace malfunctioning cables and retest as specified above.

END OF SECTION 26 05 19

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

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 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.3 QUALITY ASSURANCE

- A. Comply with NFPA 70 and all local codes

1.4 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allied Tube & Conduit.
    - b. Cooper B-Line, Inc.; a division of Cooper Industries.
    - c. ERICO International Corporation.
    - d. GS Metals Corp.
    - e. Thomas & Betts Corporation.
    - f. Unistrut; Tyco International, Ltd.
    - g. Wesanco, Inc.
  - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  - 3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
  - 4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  - 5. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Materials and Finishes: Provide adequate corrosion resistance.
- G. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products. Design of supports and methods of fastening to building structures shall be acceptable to the Architect/Engineer.
- H. Anchors and Fasteners: For point of attachment weight of 100 pounds or less.
  - 1. Concrete Structural Elements: Use precast insert system, expansion anchors, and preset inserts.
  - 2. Steel Structural Elements: Use beam clamps.
  - 3. Concrete Surfaces: Use self-drilling anchors and expansion anchors.
  - 4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts.
  - 5. Solid Masonry Walls: Use expansion anchors and preset inserts.
  - 6. Sheet Metal: Use sheet metal screws.
  - 7. Wood Elements: Use wood screws.
- I. Anchors and Fasteners: For point of attachment weight of 100 pounds or more, obtain direction and approval from Architect/Engineer.
- J. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
  - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Hilti Inc.
      - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      - 3) MKT Fastening, LLC.
      - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
  - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
      - 2) Empire Tool and Manufacturing Co., Inc.
      - 3) Hilti Inc.
      - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      - 5) MKT Fastening, LLC.
  - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70 and local codes. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  1. Secure raceways and cables to these supports with single-bolt conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  1. To Wood: Fasten with lag screws or through bolts.
  2. To New Concrete: Bolt to concrete inserts.
  3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  4. To Existing Concrete: Expansion anchor fasteners.
  5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
  6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
  7. To Light Steel: Sheet metal screws.



POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, and other devices on slotted-channel racks attached to substrate.
  - E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.
  - F. Install products in accordance with manufacturer's instructions.
  - G. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
  - H. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
  - I. Do not use ceiling system components for support.
  - J. Connections to vibration producing equipment shall be made with flexible conduit.
  - K. Obtain permission from Architect/Engineer before using spring steel clamps.
  - L. Obtain permission from Architect/Engineer before using powder-actuated anchors.
  - M. Obtain permission from Architect/Engineer before drilling or cutting structural members.
  - N. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
  - O. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall.
  - P. Support surface or pendant lighting fixtures:
    1. From an outlet box by means of an interposed metal strap, where weight is less than 5 pounds.
    2. From an outlet box by means of a hickey or other direct threaded connection, where weight is from 5 to 50 pounds.
    3. Directly from structural slab, deck, or framing member, where weight exceeds 50 pounds.
  - Q. Support Recessed Lighting Fixtures:
    1. From ceiling suspension members, where weight is less than 60 pounds.
    2. Directly from structural slab, deck, or framing member, where weight is 60 pounds or more.
  - R. Provide weight-distributing facilities, where required, so as not to exceed the load-bearing capabilities of floors or walls that bear the weight of, or support, electrical items.
- 3.3 PAINTING
- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
    1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

END OF SECTION 26 05 29

SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

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 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. EPDM: Ethylene-propylene-diene terpolymer rubber.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquidtight flexible metal conduit.
- G. LFNC: Liquidtight flexible nonmetallic conduit.
- H. RNC: Rigid nonmetallic conduit.

1.3 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Custom enclosures and cabinets.
- C. Qualification Data: For professional engineer and testing agency.
- D. Source quality-control test reports.

1.4 QUALITY ASSURANCE

- A. 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.
- B. Comply with NFPA 70 and all other local codes.

PART 2 - PRODUCTS

2.1 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4 inch except conduits to switches and receptacles having 5 or less #12 conductors shall be 1/2" C unless noted otherwise.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- B. Flexible conduit connections to recessed lighting fixtures shall be made with UL approved flexible steel conduit, except where UL listed liquid tight flexible conduit is required by code, such as in air plenums, etc.
- C. Flexible connections, where required, shall be made with flexible metallic tubing 1/2 inch minimum size or sized in accordance with code, except in areas where such connections will be exposed to oil, grease, water, or where installed out of doors. In those areas of adverse exposure, flexible connections shall be made with UL listed liquid tight flexible steel conduit. Grounding conductors with green colored insulation shall be extended through all flexible connections including fixture "whips", and fastened to terminals within the first junction boxes on either side of the flexible length.

## 2.2 METAL CONDUIT AND TUBING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Alflex Inc.
  - 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
  - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
  - 5. Electri-Flex Co.
  - 6. Manhattan/CDT/Cole-Flex.
  - 7. Maverick Tube Corporation.
  - 8. O-Z Gedney; a unit of General Signal.
  - 9. Wheatland Tube Company.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. IMC: ANSI C80.6.
- D. EMT: ANSI C80.3.
- E. FMC: Zinc-coated steel.
- F. LFMC: Flexible steel conduit with PVC jacket.
- G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
  - 1. Fittings for EMT: Steel, compression type.

## 2.3 BUSHINGS

- A. Bushings for conduits 1 inch and smaller shall be self-extinguishing thermoplastic grounding type – 150 degrees C. and insulating type.
- B. Bushings for conduits 1 ¼ inch and larger shall be malleable iron body with 150 degree C. insulating ring and shall be grounding type. Insulating material shall be locked in place and non-removable.

## 2.4 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- a. Mono-Systems
- b. Thomas & Betts Corporation.
- c. Walker Systems, Inc.; Wiremold Company (The).
- d. Wiremold Company (The); Electrical Sales Division.

2.5 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
  2. EGS/Appleton Electric.
  3. Erickson Electrical Equipment Company.
  4. Hoffman.
  5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
  6. O-Z/Gedney; a unit of General Signal.
  7. RACO; a Hubbell Company.
  8. Robroy Industries, Inc.; Enclosure Division.
  9. Thomas & Betts Corporation.
  10. Walker Systems, Inc.; Wiremold Company (The).
  11. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
  1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
  2. Concrete Ceiling Boxes: Concrete type.
- C. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- D. Outlet boxes shall be minimum of 2 gang and shall be sized to accommodate number of wires inside the box.

PART 3 - EXECUTION

3.1 INSTALLATION - CONDUIT

- A. Arrange conduit to maintain headroom and present neat appearance.
- B. Route conduit parallel and perpendicular to walls.
- C. Do not cross conduits in slab.
- D. Maintain adequate clearance, minimum of 12 inches, between conduit and piping.
- E. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
- F. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- G. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate bends in metal conduit larger than 2 inch (50 mm) size, or provide factory elbows.
- H. Provide suitable pull string in each empty conduit except sleeves and nipples.
- I. Ground and bond conduit under provisions of Section 26 05 26.

- J. Identify conduit under provisions of Section 26 05 53.
  - K. In general, conduits shall be run concealed. Where exposed conduit runs are shown or required, they shall be run parallel to building construction and shall be suitably supported at required intervals.
  - L. In equipment spaces, such as fan rooms, plenums, etc., conduits and outlets may be exposed, but shall avoid interference with ventilating ducts, piping, etc.
  - M. Exposed conduit installed on or adjacent to ventilating ducts shall be installed after the ducts are in place, and shall be run from ceiling or wall junction boxes in such manner as to retain accessibility to junction box covers and to permit future removal or replacement of ducts.
  - N. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
  - O. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
  - P. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
  - Q. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
  - R. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
  - S. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
    - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
    - 2. Where otherwise required by NFPA 70.
  - T. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
    - 1. Use LFMC in damp or wet locations subject to severe physical damage.
    - 2. Use LFMC in damp or wet locations not subject to severe physical damage.
  - U. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
  - V. Set metal floor boxes level and flush with finished floor surface.
- 3.2 INSTALLATION FITTINGS
- A. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
  - B. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- C. Provide conduit seals for conduits and ducts entering/exiting hazardous locations.
- D. Provide suitable fittings to accommodate expansion and deflection where conduit crosses expansion joints and in each uninterrupted run of horizontal or vertical conduit in excess of 100 feet. Fittings shall be complete with bonding jumpers and clamps.
- E. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- F. Ends of conduits shall be equipped with insulating bushings for 1 inch and smaller and insulated metallic bushings for 1-1/4 inches and larger. Ends of conduit shall be temporarily capped prior to installation and during construction to exclude foreign material.
- G. Provide wall flanges and gasketing on conduits entering fan housings to minimize air leakage at points of penetration of housing.

3.3 INSTALLATION – SUPPORTS

- A. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- B. Fasten conduit supports to building structure and surfaces under provisions of Section 26 05 29.
- C. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- D. Do not attach conduit to ceiling support wires.
- E. Bring conduit to shoulder of fittings; fasten securely.
- F. Conduit risers shall be rigidly supported on the building structure, using appropriate supports only.
- G. Conduits and other electrical items shall not be fastened to or supported from ventilating ducts, but shall be separately supported. The method of supporting and details of the supporting members shall be reviewed by the Architect/Engineer. In no case shall screws penetrate the sheet metal of the ducts.
- H. Exposed conduits run on surfaces shall be supported according to code and within 3 feet of each outlet, junction box, or cabinet, by galvanized malleable conduit clamps and clamp backs. Suspended conduits shall be supported every 5 feet by conduit hangers and round rods, or where 2 or more conduits are run parallel, by trapeze hangers suitably braced to prevent swaying.
- I. Screws for exposed work shall be stainless steel.
- J. Cadmium plated steel screws may be used for interior unexposed dry locations only.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 7.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation specified in Division 7.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

3.5 INSTALLATION OF BOXES

- A. Box sizes shall not be smaller than that required by Code for the number and size of wires and/or conduits to be installed.
- B. Maintain headroom and present neat mechanical appearance.
- C. Plenum Ceiling Areas: Install boxes in accordance with applicable Code.
- D. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 07 Section "Penetration Firestopping".
- E. Outlet boxes for toggle switches shall be located on the strike side of the door.
- F. Use flush mounting outlet box in finished areas.
- G. Support boxes independently of conduit.
- H. Use cast outlet box in exterior locations and wet locations.
- I. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.
- J. Adjust floor box flush with finish flooring material.
- K. Adjust flush-mounting outlets to make front flush with finished wall material.

3.6 RACEWAY PENETRATIONS

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."
- B. Apply joint sealants to electrical penetrations of non-fire rated floor and wall penetrations using sealants specified in Section 07 92 00 "Joint Sealants".

3.7 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 26 05 33

SECTION 26 51 00 - INTERIOR LIGHTING

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 DEFINITIONS

- A. CRI: Color-rendering index.
- B. CU: Coefficient of utilization.
- C. LED: Light emitting diode.
- D. LER: Luminaire efficacy rating.
- E. Luminaire: Complete lighting fixture, including ballast and driver housing.

1.3 SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
  - 1. Physical description of lighting fixture including dimensions.
  - 2. Energy-efficiency data.
  - 3. Life, output, and energy-efficiency data for lamps.
  - 4. Photometric data, in IESNA format, based on laboratory tests of each lighting fixture type, outfitted with lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.
- B. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories.
  - 1. Wiring Diagrams: Power and control wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.
- E. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

- A. 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.
- B. Comply with NFPA 70.



1.5 COORDINATION

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

- A. LED fixtures: The LED fixtures shall comply with applicable latest standards. They meet the standards established by nationally recognized testing laboratories.
- B. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.
- C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit access without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- D. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:
  - 1. White Surfaces: 85 percent.
  - 2. Specular Surfaces: 83 percent.
  - 3. Diffusing Specular Surfaces: 75 percent.
  - 4. Laminated Silver Metallized Film: 90 percent.
- E. Plastic Diffusers, Covers, and Globes:
  - 1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
    - a. Lens Thickness: At least 0.125 inch minimum unless different thickness is indicated.
    - b. UV stabilized.
  - 2. Glass: Annealed crystal glass, unless otherwise indicated.
- F. Plaster frames, angles, and channels for recessed luminaires shall be furnished under this section where required. Plaster frames shall be specifically constructed for the application by the manufacturer of the related luminaire.
- G. CRI of minimum 80.
- H. Rated lamp life of LED shall be 50000 hours.
- I. All LED fixtures shall be dimmable from 100 percent to 0 percent of maximum light output.
- J. Unless otherwise indicated in lighting fixture schedule, all LED fixtures shall have integral driver.

2.2 EXIT SIGNS

- A. Description: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
  - 1. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- C. Furnish products as scheduled and in compliance with applicable codes.
- D. Description: Exit sign fixture.
- E. Housing: Sheet steel.
- F. Face: Translucent glass face with red letters on white background.
- G. Letters: 6" high with  $\frac{3}{4}$ " stroke, minimum or as required by local codes.
- H. Directional Arrows: As indicated with letters 4-1/2" high,  $\frac{3}{4}$ " stroke, minimum or as required by local codes.
- I. Lamps, Light emitting diodes.

### 2.3 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
- B. Install suspended luminaires and exit signs directly from building structure using rigid stem pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.
- C. Install wall mounted luminaires and exit signs at height as shown.
- D. Install accessories furnished with each luminaire.
- E. Bond products and metal accessories to branch circuit separate green equipment grounding conductor.

### 3.2 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate installation of recessed luminaire frames and trims with ceiling construction.

POOL RENOVATION - WEST MIDDLE SCHOOL  
ROCKFORD PUBLIC SCHOOLS 205  
ROCKFORD, ILLINOIS

- B. Coordinate the installation of suspended luminaires with building components, verify exact locations and mounting heights.

3.3 FIELD QUALITY CONTROL

- A. The use of permanent luminaires for temporary lighting shall only be as permitted by the Architect/Engineer.
- B. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.4 ADJUSTING

- A. Adjust installed work under provisions of Division 1 General Requirements.
- B. Aim and adjust luminaires as indicated and as directed.
- C. Position exit sign directional arrows as indicated.

3.5 CLEANING

- A. Clean installed work under provisions of Division 1 General Requirements.
- B. Clean electrical parts to remove conductive and deleterious materials.
- C. Remove dirt and debris from enclosures.
- D. Clean photometric control surfaces to remove all dust and smudges with cleaning solution as recommended by manufacturer.
- E. Clean finishes and touch up damage.

3.6 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate installed work under provisions of Division 1 General Requirements.
- B. Demonstrate luminaire operation for minimum of two hours.

3.7 PROTECTION OF FINISHED WORK

- A. Protect installed work under provisions of Division 1 General Requirements.
- B. Relamp luminaires used for temporary lighting and luminaires that have failed lamps at the time of project turn-over.

END OF SECTION 26 51 00