BCDM architects

1015 North 98th Street
Suite 300
Omaha, NE 68114-2334

architecture
landscape architecture
interior design
construction management

OPS Mills Electrical Service Replacement

4311 North 30th Street
Omaha, NE 68111

Project Manual
Combined Contract

BCDM Project Number: 5444-02
June 9, 2024

TABLE OF CONTENTS

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 00 01 07
SEALS PAGE

1.01 OWNER

A. Omaha Public Schools
4041 North 72nd Street
Omaha, Nebraska 68134-4470
Phone: 402-299-01800

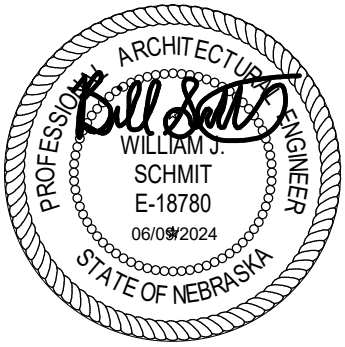
1.02 DESIGN PROFESSIONALS OF RECORD

A. Coordinating Professional and Architect:

BCDM Architects
1015 North 98th Street, Suite 300
Omaha, Nebraska 68114-2334
Phone: 402-391-2211
Nebraska Certificate of Authorization #CA-0271

1. I, Alec Eastman, am the Coordinating Professional and Architect Coordinating Professional for the OPS Mills Electrical Service Replacement dated June 9, 2024.
2. Responsible for Divisions 08 and 09.

B. Electrical Engineer:



Morrissey Engineering
4940 North 118th Street
Omaha, Nebraska 68164
Phone: 402-491-4144
Nebraska Certificate of Authorization #CA-0835
Responsible for Division 26

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

DIVISIONS 02 THROUGH 07 – NOT USED

DIVISION 08 – OPENINGS

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire-rated hollow metal doors and frames.

1.02 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware.

B. Section 099000, Field painting.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames; 2022.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2022.

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021a.

G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.

H. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2016.

I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

J. ITS (DIR) - Directory of Listed Products; Current Edition.

K. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

L. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

M. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2017.

N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.

O. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

P. UL (DIR) - Online Certifications Directory; Current Edition.

Q. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

D. Provide a schedule of doors and frames using same reference numbers for details and openings as those on the Drawings.

E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Supplier of Hollow Metal Doors shall be responsible for all coordination and preparation of hardware and hollow metal doors and frames as they relate to each other.

B. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies whose fire resistance characteristics have been determined per ASTM E2074 and which are labeled and listed by UL, Factory Mutual, Warnock Hersey, or other testing and inspecting organizations acceptable to the authorities having jurisdiction.

C. Hardware Templates: Templates shall be furnished to the fabricator by the hardware manufacturer. The fabricator shall drill and tap all holes, and make all cutouts and reinforcement in frames and doors to receive hardware in a neat and proper manner.

D. Maintain at project site copies of reference standards relating to installation of products specified.

1.06 PREINSTALLATION MEETING

A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Delivery and Storage: Doors shall be shipped individually packed. Frames shall be shipped with angle spreaders at door opening bottoms. Doors and frames shall be stored on the building site, in an upright position, under cover, on wood sills or floors, in a manner that will prevent rust or damage. Ventilate canvas or plastic covers to avoid humidity build-up.

C. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

D. Inspect hollow metal work upon delivery for damage or manufacturing defects. Minor damages and defects may be repaired provided items are equal in all respects to new work and acceptable to the Architect. Rejected work shall be replaced with new items.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Doors:
   1. Amweld Building Products, Inc.: www.amweld.com.
   2. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
   3. Curries, an Assa Abloy Group company: www.assaabloydss.com.
   4. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
   5. Steelcraft, an Allegion brand: www.allegion.com/us.

2.02 PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors:
   1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
   2. Accessibility: Comply with ICC A117.1 and ADA Standards.
   3. Door Edge Profile: Manufacturers standard for application indicated.
   4. Typical Door Face Sheets: Flush.
   5. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements

conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

A. Fire-Rated Doors:
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 3 - Extra Heavy-duty.
      b. Model 2 - Seamless.
      c. Door Face Metal Thickness: 20 gauge, 0.032 inch, minimum.
   2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
   3. Provide units listed and labeled by UL (DIR) or ITS (DIR).
      a. Attach fire rating label to each fire rated unit.
   4. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
   5. Door Finish: Factory primed and field finished.

2.04 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Reinforcing: High Frequency Hinge reinforcing at all hinge locations at exterior and vestibule doors. High Frequency Hinge reinforcing at top hinge only at all other doors. All other door reinforcing and hardware preparation to be in accordance with ANSI A115 (where applicable) and SDI 107.

C. Face: Standard 2-inch face.

D. Install 1-inch x 2-inch x length required, foam insulation, where grouted frame must be penetrated by machine screws for attachment of hardware. Attach securely with tape or adhesive as required.

E. Stops shall be 5/8-inch high unless noted otherwise on the Drawings or required to achieve specified fire ratings.

F. Jamb Anchors: Jamb anchors shall be standard steel stud anchors for metal stud/gypsum board partitions. Each jamb shall be anchored to the floor with an adjustable base anchor. Other types of anchors shall be provided when required for other conditions. Provide a minimum of 3 anchors per jamb.

G. Frame Finish: Factory primed and field finished.

H. Door Frames, Fire-Rated: Full profile/continuously welded type.
   1. Fire Rating: Same as door, labeled.

2.05 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

A. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

2.07 FABRICATION

A. Fabricate metal doors to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Grind and fill all visible projection welds as required to make welded areas smooth, flush and invisible on exposed faces. No visible grind marks from fabrication will be allowed. The level of surface grinding prior to prime painting shall be as sufficient so that all grinding is invisible on exposed faces regardless of the sheen of the painted finish. The Owner reserves the right to reject any surface where visible grinding marks are found after final finish regardless of whether surface preparation was done according to manufacturer's standard practices or SDI standards.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated. Comply with provisions of ANSI/SDI A250.11 "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.

B. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Install door hardware as specified in Section 08 71 00.

E. Coordinate installation of electrical connections to electrical hardware items.

F. Touch up damaged factory finishes.

3.03 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.04 ADJUSTING

A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 71 00
FINISH HARDWARE

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Section 08 11 13 - Hollow Metal Doors and Frames.

1.02 QUALITY ASSURANCE

A. Supplier: The firm supplying hardware for this project shall employ a member of the American Society of Architectural Hardware Consultants, or a person of equivalent capability who is approved by the Architect. The Consultant shall be available during all phases of construction for consultation and technical assistance. The firms bidding on this project must understand all of the requirements of their jobsite work. If they aren't certified to perform all work associated with this contract then they need to make certain they make arraignments with people that are able to perform the technical aspects of this contract defined below.
   1. All door hardware low voltage wires provided and installed by the access control/security contractor.
   2. Door hardware power supplies provided by the door hardware subcontractor and installed by the electrician.

B. Coordination with Steel Door and Frame Supplier: The hardware supplier shall coordinate all hardware items to be installed in or on steel doors and frames with the supplier of those items to assure proper fit, reinforcing and operation.

C. Electrical System Rough-In: There is to be a coordination meeting set up by the General Contractor, with the Architect, the Owner's representative, the aluminum frame subcontractor, the electrician, the metal door/frame and hardware subcontractor as well as the access controls contractor to review all electrical products being installed and to make certain everyone understands their role in the process. This meeting needs to be held very early in the construction process, before any frames are installed, to eliminate any conflicts during the installation phase. The General Contractor shall keep meeting minutes and distribute copies to the above described.

D. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local building code requirements. Provide only hardware which has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of door and door frame labels.

1.03 SUBMITTALS

A. Hardware Schedule: Submit hardware schedule to the Architect/Engineer. The hardware schedule shall list the type, manufacturer's name and number, finish, size, function and location. All abbreviations and symbols used on the schedule shall be explained. Catalog cuts and information covering each item of hardware shall be attached to the hardware schedule. No hardware shall be ordered, or delivered to the job, until approval of the schedule has been received from the Architect. Approval of the schedule does not relieve the hardware supplier of fulfilling all terms of the specifications.

B. Maintenance Manual: Supply 1 paper and 1 digital copy of installation instructions, maintenance instructions for each operating item, maintenance instructions for finishes, and parts manuals for all locksets, closers, exit devices and other operating devices to the Prime Contractor for inclusion in the overall project maintenance manual.

C. Installation and Adjustment Tools: Supply 2 complete sets of all installation and adjustment tools for transmittal to the Owner by the Prime Contractor for each different style, type and series of lockset, latch, lock, exit device, closer or other adjustable hardware item provided and installed at this project.

D. Keying Schedule: Verify keyway requirements and establish core mark, control, grand master, master, submaster divisions and individual passage keying requirements with the Owner's representative. Verification shall include keying for miscellaneous locks on other items listed at the beginning of this Section. Submit separate detailed schedule indicating clearly how the

Owner's final instructions on keying of locks has been fulfilled.

1.04 SUBMITTAL SEQUENCE

A. Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., steel and aluminum doors and frames) which are critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by builders of hardware, and other information essential to the coordinated review of hardware schedule.

1.05 PRODUCT HANDLING

A. Packaging and Marking: Package hardware in individual containers on a set by set basis with set numbers which correspond to the approved hardware schedule. Each set shall contain each item of hardware required for that set including necessary screws, keys and installation instructions, and installation templates for spotting mortising tools. Two or more identical sets may be packaged in the same container. Mark each container clearly with hardware set numbers. All keys shall be tagged according to their corresponding locks and delivered to the Owner or his authorized representative as described hereinafter. All construction keys for new exterior locks shall be delivered to the Prime Contractor or his/her authorized representative.

1.06 TEMPLATES

A. Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of finish hardware. Upon request, check the shop drawings of such other work, to confirm that adequate provisions are made for the proper installation of hardware.

PART 2 PRODUCTS

2.01 HARDWARE

A. Finish Hardware shall be as hereinafter specified and scheduled. Provide additional items of hardware which are necessary to make a complete workable and workmanlike installation even though such items are not herein specifically scheduled. Such miscellaneous items shall be equal in quality and finish to items which are specified.

B. Approved Products: Brands and models designated in this Section are intended to define the exact standards of quality, function and design required. Substitution in the brands noted as acceptable shall be equivalent in every respect. Substitutions, other than as below noted, will not be permitted unless given prior approval via addendum, as described in the Instructions to Bidders.

ITEM	SPECIFIED	ACCEPTABLE
Hinges	McKinney	Stanley, Hager, Ives
Continuous Hinges	Pemko	ABH
Locks	Best 45H 15J	Schlage L9000 BD 06N* *Supplied with cylinders that accept “Best” style small format interchangeable cores.
Cylinders	Best	No Substitutions
Exit Devices	Von Duprin 99 Series	Detex Advantex
Overhead Stops	Rixon	Glynn Johnson
Closers	LCN 4111	No Substitutions
Flat Goods & Stops	Rockwood	Ives, Don-Jo
Weatherproofing	Pemko	National Guard
Door Cords	Securitron	Schlage Electronics
Exit Alarms	Detex	No Substitutions
Door Position Switches	Securitron	Schlage Electronics
Motion Sensors	Securitron	Schlage Electronics

2.02 LOCK CYLINDERS, KEYING AND SMART CARDS

A. General:

1. Supplier must obtain in writing from Owner's Representative, authorization to purchase cylinders and upper level keys.
2. Supplier shall meet with Owner's Representative to finalize keying requirements and obtain final keying instructions in writing.
3. KEY TO EXISTING SCHLAGE, FACTORY REGISTERED MASTER KEY SYSTEM.
    a. Exterior cylinders to be new Schlage keyway as directed by the Owner at the time of the shop drawing review.
    b. Interior cylinders to be new Schlage keyway as directed by the Owner at the time of shop drawing review.
    c. All cylinders are to be full size interchangeable core.

B. All new exterior locks shall be provided with keyed alike construction cores; supply minimum of 6 construction core pass keys to the Contractor.

C. Conversion to final keying from construction keying to permanent building keying shall be performed by the Contractor. The cost of all cylinders and keys shall be included in this Combined Contract.

D. Keying arrangement shall be coordinated directly between the Hardware Subcontractor and the Owner for all locks, including those to be installed in miscellaneous items listed later in this Section.

E. Key quantities shall consist of (2) change keys for each lock, (5) master keys for each master system, (5) grandmaster keys for grandmaster system and 2 control keys.

2.03 MISCELLANEOUS REQUIREMENTS

A. Mounting of Closers: Closers on all doors shall be mounted with sex bolts and finishing washers. Grommet nuts will not be acceptable Provide all drop plates, spacers and mounting brackets to facilitate secure mounting to all door and frame conditions.

B. Closers shall be of the parallel arm configuration where possible. Closer arms shall be heavy duty type for all closers.

C. Door Silencers at Steel Frames: All steel frames shall receive Glynn Johnson GJ64 silencers as required. Provide 3 silencers on strike jambs of frames of single swing doors and 2 silencers on heads of frames of double-swing doors. At existing metal frames to remain, remove any existing silencers and provide new silencers as required. This latter requirement shall apply only to doors listed in the Schedule to receive a new hardware set; doors shown to have all existing hardware shall not require new silencers. Silencers shall also be provided at the tops in the metal frame door pocket enclosures at cross-corridor doors.

D. Overhead Stops: Provide overhead stops wherever wall conditions will not allow use of standard wall stops.

E. Deadstop Angles for closers and overhead stops shall be accurately determined to prevent doors from contacting adjoining walls or other doors while still affecting the hold-open point at the greatest possible angle.

F. Note: Finish of all cylinders and keys shall be 626.

PART 3 EXECUTION

3.01 QUALITY CONTROL

A. Pre-Installation Meeting: There is to be a coordination meeting set up by the General Contractor, with the Architect, the hardware installer, the Owner’s representative and the hardware manufacturer to review all products being installed. This meeting needs to be held very early in the construction process, before any hardware is installed, to eliminate any conflicts during the installation phase. The General Contractor shall keep meeting minutes and distribute copies to above the described.

B. Post-Installation Review: The General Contractor shall notify the Architect, Owner’s representative and the hardware manufacturer upon completion of the hardware installation to review the work. The hardware manufacturer shall review and document the work and distribute copies to the above described.

3.02 HARDWARE LOCATIONS

A. Hardware locations (height above finish floor) shall be in accordance with the Steel Door Institute Standards except for the following modifications:

Leversets/Latchsets	36-inches to centerline of strike
Exit Devices	35-3/4-inches (plus or minus) to centerline of push pad, (center in door rail); verify with Architect/Engineer.

3.03 INSTALLATION OF HARDWARE - GENERAL

A. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrate.

B. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

C. Drill, tap, and countersink units for surface applied hardware and other items which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards and manufacturer's recommendations.

3.04 INSTALLATION OF WEATHERSTRIPPING AND SEALS

A. Provide metal fasteners of type which will not work loose as a result of normal door use, and which are compatible with metal of the stripping, and the frame or the door. Provide only smooth exposed fastener heads, which do not constitute a snagging hazard to clothing of building occupants.

B. Set units plumb and level, accurately centered at optimum location for maintaining a permanent seal.

C. Adjust doors, frames, and hardware, as necessary, to achieve proper operation of seals and stripping.

3.05 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace any unit which cannot be adjusted to operate freely and smoothly as intended for the application made.

3.06 HARDWARE

A. See attached document for partial hardware sets to be coordinated with Access Control documents. Coordinate remainder of hardware sets with Owner/Architect.

END OF SECTION

Hardware Set 1 (Door # 142V, 142V.1)

3	Each	Hinge	FBB179 4 ½” x 4 ½”	US26D	BE
1	Each	Exit Device	F 10 09D S	630	DE
1	Each	Cylinder	1E74 C4 Patented	626	BE
1	Each	Closer	EHD9016 DS90	689	BE
1	Each	Kick Plate	K1050 8” x 2” LDW	US32D	RO
1	Each	Gasket	S88BL		PE

DIVISION 09 – FINISHES

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Metal channel ceiling framing.

D. Acoustic insulation.

E. Cementitious backing board.

F. Gypsum wallboard.

G. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).

B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.

C. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015, with Errata (2020).

D. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2018.

E. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019.

F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2022.

G. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.

H. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2019.

I. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).

J. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2020).

K. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.

L. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.

M. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2020.

N. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.

O. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.

P. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.

Q. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2017.

R. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

S. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019, with Editorial Revision (2020).

T. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

U. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.

V. GA-216 - Application and Finishing of Gypsum Panel Products; 2021.

W. GA-600 - Fire Resistance and Sound Control Design Manual; 2021.

X. UL (FRD) - Fire Resistance Directory; Current Edition.

Y. SSMA - Steel Stud Manufacturers Association; Current Edition.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
   1. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

C. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.

1.05 QUALITY ASSURANCE

A. Fire-Resistance Ratings: Where gypsum wallboard systems with fire-resistance ratings are indicated or are required to comply with governing regulations, provide materials and installations identical with applicable assemblies which have been tested for fire resistance per ASTM E119 by a testing and inspection agency acceptable to authorities having jurisdiction. Products used in the assembly shall carry a classification label from a testing laboratory acceptable to the authority having jurisdiction.

B. Allowable Tolerances: On faces of work exposed in occupied spaces, including stairwells (if any), limit offsets between planes of board faces to 1/8-inch, and limit variations from plumb and location (including warp and bow) not to exceed 1/4-inch in 8'-0".

C. Install gypsum board on walls, partitions and furring to within 1/8-inch of floor to provide full backing for resilient base.

1.06 DELIVERY STORAGE AND HANDLING

A. Delivery: Gypsum wallboard shall not be delivered to the project site until immediately before application is to begin. All gypsum drywall materials shall be delivered in original packages, containers or bundles bearing brand name and identification nomenclature.

B. Storage: Gypsum wallboard boards shall be stored inside under cover and stacked flat in a manner to keep material flat, dry, protected from weather, direct sunlight, surface contamination, traffic or other construction damage. Other materials and accessories shall remain in their original wrappings or containers, sorted flat and protected from damage or bending until ready for actual use.

C. Handling: Handle gypsum boards in a manner to prevent damage to edges, ends and surfaces. Damaged gypsum boards and accessories shall not be incorporated within the work and shall be immediately removed from the site.

D. Steel framing and related accessories shall be stored and handled in accord with A.I.S.I. "Code of Standard Practice".

1.07 JOB CONDITIONS

A. Environmental Requirements, General: Comply with requirements of referenced gypsum board application standards and recommendations of gypsum board manufacturer, for environmental conditions before, during, and after application of gypsum board.

B. Temperature: When outside temperatures are below 55F, maintain continuous interior temperature in the range of 55F to 70F for minimum period of 48 hours prior to, during, and

following application of gypsum board, joint and finishing treatment materials or bonding of adhesives.

C. Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent drying too rapidly.

D. Protection: Protect all adjacent surfaces and work by suitable means from splatter or overspray from texture surface application.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
   1. See PART 3 for finishing requirements.

B. Fire Rated Assemblies: Provide completed assemblies complying with applicable code.
   1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.02 METAL FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.

B. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com/#sle.
   2. MBA Metal Framing: www.mbastuds.com.
   3. Marino: www.marinoware.com/#sle.
   4. Phillips Manufacturing Co: www.phillipsmfg.com/#sle.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

C. Structural Steel Framing for Application of Gypsum Board: See Section 05 40 00.

D. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
   1. Framing and Suspension Materials: When 20-gauge and 25-gauge materials are specified below, they shall be fabricated from commercial quality galvanized steel with a minimum yield point of 33,000 psi. 20-gauge material shall have a design thickness of .0312-inch and the 25-gauge material shall have a design thickness of .0188-inch as defined by SSMA (Steel Stud Manufacturers Association).
   2. Studs: "C" shaped with flat or formed webs consisting of 25-gauge and 20-gauge galvanized steel, 1-5/8 inch, 3-5/8 inch, 4 inch and 6 inch screw type studs and track or as may otherwise be indicated on the Drawings.
      a. 25-gauge studs shall be used throughout, except 20-gauge shall be used at the following locations:
         1) All interior studs that are over 12-feet total height.
         2) All 4-inch and 6-inch interior studs.
         3) All interior studs which support wall-mounted cabinets and plumbing fixtures.
   3. Runners: 20-gauge galvanized U shaped, sized to match studs with 1-1/2-inch minimum legs placed at the top of all walls abutting structural members above as indicated on the Drawings.
   4. Ceiling Channels: C-shaped.
   5. Furring: Hat-shaped sections, minimum depth of 7/8 inch fabricated from 0.021-inch hot dipped galvanized steel..
   6. Z-Channel: 2 inches.

E. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection and prevent rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.

2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.

F. Non-structural Framing Accessories:
1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

G. Fastenings Shall be as Follows:

Studs to track	3/8-inch drywall, type S, pan head screws
Track to masonry	1/4-inch diameter hooked anchor bolts
Track to concrete floor and furring studs and channel to masonry	Cartridge driven studs or concrete nails
Track to metal deck	Self-tapping screws (toggle bolts required to hang heavy bulkheads in tension)

2.03 SUSPENSION SYSTEM

A. Grid Suspension System: ASTM C645 , manufacturer's standard grid suspension system composed of main beams and cross furring members which interlock to form a modular supporting network.

B. Wire for Hangers and Ties: ASTM A641/A641M , soft, Class 1 zinc coated (galvanized).
1. Hanger Wire: No. 11 gauge galvanized wire.
2. Tie Wire: No. 16 gauge galvanized wire.

C. Runner Channels: 20 gauge galvanized channels. Size shall be 1-1/2-inches deep by 19/32-inch wide. Also, provide 25-gauge studs for ceiling/bulkhead suspension where shown on the Drawings.

D. Furring Channels: 25 gauge electrogalvanized steel.
1. Products:
a. Same manufacturers as other framing materials.

E. Furring Channel Clips: For clipping to furring channels shall be of galvanized wire and of the same manufacturer as the furring channels.

F. At the Contractor's Option: In lieu of the above specified tie wire, runner channels, furring channels and furring channel clips, provide pre-engineered suspension system including main tees and cross channels manufactured by United States Gypsum Company, or equal system by any other manufacturer listed above, or Drywall Grid System or Shortspan Drywall Grid (as appropriate to the location as manufactured by Armstrong).

2.04 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
1. American Gypsum Company: www.americangypsum.com/#sle.
2. CertainTeed Corporation: www.certainteed.com/#sle.
3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
4. National Gypsum Company: www.nationalgypsum.com/#sle.
5. USG Corporation: www.usg.com/#sle.
6. Substitutions: See Section 01 60 00 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
2. Glass mat faced gypsum panels, as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
3. Unfaced fiber-reinforced gypsum panels as defined in ASTM C1278/C1278M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
4. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.

b. Mold resistant board is required at the interior face of all exterior walls as noted on Sheet A0-0.

5. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
6. Thickness:
   a. Vertical Surfaces: 5/8 inch.
   b. Ceilings: 5/8 inch.
7. Paper-Faced Products:
   a. CertainTeed Corporation; Type X Drywall: www.certainteed.com/#sle.
   b. USG Corporation; Sheetrock Brand Firecode X Panels 5/8 in. (15.9 mm): www.usg.com/#sle.
   c. Substitutions: See Section 01 60 00 - Product Requirements.
8. Mold-Resistant, Paper-Faced Products:
   a. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Gypsum Board: www.goldbondbuilding.com/#sle.
   b. Substitutions: See Section 01 60 00 - Product Requirements.
9. Glass Mat Faced Products:
   a. USG Corporation; Sheetrock Brand Glass-Mat Panels Mold Tough Regular 5/8 in. (15.9 mm): www.usg.com/#sle.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 GYPSUM BOARD ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 3 1/2 - 6 inches.

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

C. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
1. Corner Beads: Low profile, for 90 degree outside corners.
   a. Products:
      1) ClarkDietrich: www.clarkdietrich.com/#sle.
2. Corner Beads at High Traffic Areas: Low profile, for 90 degree outside corners.
   a. Products:
      1) Pittcon Industries Inc.; SO-HSN-90 High Strength Corner:
3. Expansion Joints:
   a. Type: 1/4-inch by 7/16-inch deep V-shaped metal with factory-installed protective tape.
   b. Products:
      1) ClarkDietrick; 093 Zinc Control Joint (ZNCJ): www.clarkdietrich.com.

D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
1. Tape: 2 inch wide, creased paper tape for joints and corners.

E. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

F. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

G. Screws shall be 1-inch, Type S, drywall screws for securing gypsum board to metal studs and 1-1/4-inch, Type W drywall screws for securing gypsum board to wood furring. Longer screws, as recommended by the gypsum board manufacturer, shall be utilized to secure the exposed layer of gypsum board to the framing and suspension systems through the concealed layer at double layer walls, ceilings and bulkheads, and to attach and secure accessories. Provide other screws as recommended by the manufacturer for attachment of tile backer board to metal studs.

H. Fasteners for Glass-Mat Gypsum Sheathing Board: 1-5/8" (41 mm), No. 8 (4.2 mm diameter) wafer-head steel drill screws complying with ASTM C 954, with an organic-polymer coating or other corrosion-protective coating having a salt-spray resistance of more than 500 hours per ASTM B117.

I. Nails for Attachment to Wood Members: Annular ring nails, 1-1/2-inches long, GWB 54, ASTM C514.

J. Adhesive for direct lamination of gypsum board panels at double layer walls, ceilings and bulkheads, and direct lamination of gypsum board to other substrates shall be selected as recommended by the gypsum board manufacturer for the specific applications and as approved by the Architect/Engineer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with AISI S220 and manufacturer's instructions.

B. Studs: Space studs at 16 inches on center.
   1. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
   2. Align track at floor, top of masonry walls, frames and overhead structure as indicated on the Drawings. Secure base track at 24-inch centers and at ends with power-driven fasteners as specified above. Head track to be held within the down turn legs of special formed 20-gauged galvanized steel slip runner track welded or secured to bottom side of structure above for lateral support with deflection allowance of 1/2-inch or as indicated on the Drawings. Bulkhead or other similar construction which is to be hung under tension shall have head track secured to structure at 16-inch centers minimum. Butt weld or splice track at joints.
   3. Set studs at partition ends, corners, and intersections, at jambs of openings and at 16-inch centers in between unless shown otherwise on Drawings. Seat studs squarely into track and plumb or align. Secure studs to track as required.
   4. If the partition is of such height that the studs must be spliced, do so by installing 2 horizontal runner channels back-to-back (one for the top of the lower wall and one for the bottom of the upper wall). Fasten the runner channels to each other and then install 3-5/8-inch metal stud diagonal knee braces at 8-feet maximum centers from on face of the studs to the structure.
   5. Install horizontal stiffener channels through studs at cut-out locations at maximum 6-foot centers in partitions which do not have GWB installed in both faces.
   6. Install knee braces for metal frames and for walls which terminate above the ceiling as required to provide lateral support.

C. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

D. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.

E. Furring for Fire-Resistance Ratings: Install as required for fire-resistance ratings indicated and to GA-600 requirements.

F. Blocking: Install wood blocking for support of:
   1. Framed openings.
   2. Wall-mounted door hardware.
   3. Other items as indicated

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   1. Place one bead continuously on substrate before installation of perimeter framing members.
   2. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.04 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board of maximum practical length with long dimensions at right angles to furring, cross channels, and studs, with ends and edges occurring over firm bearing.

C. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

D. Cementitious Backing Board: Install over steel framing members where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

E. Openings: End joints may occur not closer than 8-inches form either side of openings in walls. No joint shall align with edges of openings, and joints above openings shall be centered over openings.

F. Fastenings: Panels shall be held in firm contact with the support member while the nails and screws are being driven. Fastenings shall proceed from the central portion of the board toward ends and edges. Fastenings shall proceed from the central portion of the board toward ends and edges. Fastenings shall be driven home with the heads slightly below the surface of the board. Care shall be taken to avoid breaking the paper face. Improperly driven fastenings shall be removed. Space screws at 15-inch centers and locate 3/8-inch to 1/2-inch from edges of panels. At double layer walls and bulkheads, install finish layer with longer screws and adhesive as noted above for ceilings.

G. Checking Fasteners: After installation, pound on walls and ceilings to detect loose fastenings and push on board adjacent to fasteners to see if there is movement. If loose fasteners are detected, drive them tight. Whenever fastenings have punctured paper, hold board tight against framing and install another fastener properly, approximately 1-1/2-inches from fastener head which punctured paper, and remove faulty fastener. When fastenings wallboard to second side of a partition, check the opposite side for fasteners loosened by pounding and drive them tight again.

3.05 GROUT

A. Grout all hollow metal door frames which occur in stud walls by spot-grouting at the jamb anchor clips prior to inserting the gypsum board into the frame. Grout tightly to assure solid anchorage of the frames. Do not fill metal jambs full of grout. Spot grouting will not be required at metal frames that have jamb anchors welded to the frames.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long and in continuous lengths with fasteners spaced at 6-inch centers.

B. Casing Beads: Casing beads shall be applied to all exposed edges and ends of gypsum wallboard, and wherever indicated on the Drawings with nails at 6-inch centers.

C. Aluminum Corners and Bullnose Terminations: Shall be placed where shown on the Drawings in continuous jointless lengths and screw secured to metal stud framing at 6-inch centers to a true and straight alignment. Install ceiling trim in coordination with finish ceiling trim installation.

D. Corner Beads: Install at external corners, using longest practical lengths with nails at 9-inch centers maximum of each flange of the bead with nailing staggered.

3.07 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
   2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   3. Level 3: Walls to receive textured wall finish.
   4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   5. Level 1: Ceiling plenum areas above finished ceilings, whether or not accessible in the completed construction.
   6. Level 0: Temporary partitions.
   7. Level 0: Surfaces indicated to be finished in later stage of project.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Taping: A uniformly thin layer of joint compound, approximately 4-inches wide, shall be applied over the joint. Tape shall be centered over the joint and embedded into the compound, leaving sufficient joint compound under the tape to provide proper bond. Wall angles, corners, returns and inside corner angles shall be reinforced with tape to conform to the angle and embedded into the compound. Taping and finishing shall be required for all below ceiling line exposed joints, and all joints behind tackwall surfaces. Taping only without finishing will be required for all fire rated partitions above the ceiling line, and for all gypsum board which covers steel structure members at return air plenum.
   2. Joint compound combinations to be utilized at gypsum board locations shall be as follows (note: use portland based product at cement board locations):
      a. Embedding and First Coat: Ready-mixed or job-mixed, drying-type, all-purpose or taping compound.
      b. Fill (Second) Coat: Ready-mixed or job-mixed, drying-type, all-purpose or topping compound.
      c. Finish (Third) Coat: Ready-mixed or job-mixed, drying-type, all-purpose or topping compound.
   3. Finishing Joints: After compound is thoroughly dry, the tape shall be covered with a coat of joint compound or taping compound spread over the tape approximately 3-inches on each side of the tape and feathered out at the edge. After thoroughly dry, another coat of joint compound or taping compound shall be applied with a slight, uniform crown over the joint. This coat shall be smooth and the edges feathered approximately 3-inches beyond the preceding coat.
   4. Finishing Corners: All inside corners shall be coated with at least one coat of joint compound or topping compound with the edges feathered out. Flanges of wallboard corner bead shall be concealed by at least 2 coats of compound. The first coat shall be joint compound, and the second coat may be joint compound or topping compound feathered out approximately 9-inches on both sides of the exposed metal nose.
   5. Finish Nail or Screw Heads and Dimples: Apply three coats of joint compound or taping compound to all exposed gypsum board surfaces below the ceiling, and concealed behind tackwall locations. This may be applied as each coat is applied to the joints. Allow 24 hours drying time between coats, sanding between if necessary. Caution shall be used to avoid roughing of wallboard paper.

D. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.08 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.09 PROTECTION

A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient base.

1.02 REFERENCE STANDARDS

A. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.

1.03 SUBMITTALS

A. See Front End Documents for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Verification Samples: Submit two samples, 2 by 2 inch in size illustrating color and pattern for each resilient flooring product specified.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Materials and Methods, for additional provisions.
   2. Extra Wall Base: 10 linear feet of each type and color.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F and 90 degrees F, or as recommended by manufacturers of resilient flooring products.

D. Protect roll materials from damage by storing on end.

1.05 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 RESILIENT BASE

A. Vinyl Base: (VB) ASTM F1861, Type TV, vinyl, thermoplastic; top set Style B, Cove.
   1. Manufacturers:
      a. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Height: 4 inch.
   3. Thickness: 0.125 inch.
   4. Finish: Satin.
   5. Length: Roll.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

3.03 INSTALLATION - GENERAL

A. Install in accordance with manufacturer's written instructions.

B. Spread only enough adhesive to permit installation of materials before initial set.

C. Fit joints and butt seams tightly.

3.04 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.05 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

END OF SECTION

SECTION 09 91 23
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished. Prefinished items include the following factory-finished components:
      a. Wood Doors
      b. Finished mechanical and electrical equipment
      c. Light fixtures
   2. UL, FMG or other code-required labels, equipment serial number and capacity labels.
   3. Operating parts include moving parts of operating equipment and the following;
      a. Valve and damper operators
      b. Linkages
      c. Sensing devices
      d. Motor and fan shafts
   4. Stainless steel, anodized aluminum, bronze, brass, copper, copper alloys, and chromium plate.
   5. Glass.
   6. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
      a. Ceiling plenums
      b. Pipe spaces
      c. Duct shafts

1.02 REFERENCE STANDARDS

A. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

B. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

C. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.03 SUBMITTALS

A. See Front End Documents for submittal procedures.

B. Samples: Submit two paper "draw down" samples, 8-1/2 by 11 inches in size, for each finishing product specified and/or color.
   1. Where sheen is specified, submit samples in only that sheen.

C. Maintenance Data: Submit data including product technical data sheets and material safety data sheets (MSDS).

D. Upon completion of Project, contractor to leave at least one full gallon of each finish material and/or color, clearly labeled and in usable condition.

1.04 QUALITY ASSURANCE

A. Pre-Painting Conference: Prior to the start of painting and after approval of required shop drawings and samples, the General Contractor shall arrange a Pre-painting Conference at the project site at a pre-arranged time approved by the Architect/Owner. The conference shall include in attendance the painting subcontractor and his/her jobsite foreperson. The Contractor shall record discussions and agreements that are made which are not specifically addressed in

the Contract Documents, and shall furnish a copy to all involved participants.

B. Applicator Qualifications
   1. This contractor shall have a minimum of five (5) years proven satisfactory experience and shall show proof before commencement of work that he will maintain a qualified crew of painters throughout the duration of the work. When requested, contractors shall provide a list of the last three comparable jobs including: name and location, specifying authority/project manager, start/completion dates and value of painting work.

C. Products and Manufacturers
   1. All materials, preparation and workmanship shall conform to the requirement of the LATEST EDITION of the architectural painting specification manual by the Master Painters Institute (MPI) (hereafter referred to as the MPI Painting Manual.
   2. All paint manufacturers and produtcs used shall be listed under the approved produt list section of the MPI Painting Manual.

D. Single Source Responsibility
   1. Provide primer and undercoat in accordance with manufacturers recommendations for selected MPI approved topcoat.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Minimum Application Temperatures for Waterborne Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes from the same manufacturer.

B. Paints:
   1. Benjamin Moore & Co: www.benjaminmoore.com.
   2. Diamond Vogel Paints: www.diamondvogel.com/#sle.
   3. PPG Paints: www.ppgpaints.com/#sle.
   4. Pratt & Lambert Paints: www.prattandlambert.com/#sle.
   5. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
   6. Tnemec: www.tnemec.com.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each paint material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

2.03 PAINT SYSTEMS - INTERIOR

A. Gypsum Board – Walls and Ceilings (where Ceilings are noted to be Epoxy)
   1. 1. Surface Preparation: Clean and Dry
   2. 2. (1 Coat): MPI Category: Sealer, Latex, interior
      a. Sherwin Williams ProMar 200 Zero VOC Interior Latex Primer, B28W2600
      b. PPG Paints 6-2 Latex Primer/Sealer
      c. Benjamin Moore & Co., N023 Benjamin Moore & Co.
   3. Finish: (2 Coats): MPI Category: Light industrial coating, water based, Gloss Level 3
      a. Sherwin Williams: Pro-Industrial Precatylized Water based Epoxy Eg-Shel, K45 Series
      b. PPG Paints:Pitt-Glaze WB1 Precatylized Epoxy. 16-310
      c. Benjamin Moore & Co., V450 Corotech Coatings

B. Hollow Metal Doors, Frames, and Miscellaneous Metals
   1. Surface Preperation: Clean and Dry
   2. (1 Coat): MPI Category: Rust Inhibitive, Water based
      a. Tnemec Series 10 Tnemec Primer at 2.5 to 3.0 mils
      b. PPG Paints: Pitt-Tech Plus DTM Primer. 90-912. 2-4dft
      c. Sherwin Williams: Pro-Industrial Pro-Cryl Universal Acrylic Primer B66-310 Series
   3. Finish: (2 Coats): MPI Category: Light industrial coating, Water based
      a. Tnemec Series 1029 (color) Enduratone
      b. PPG Paints: Pitt-Tech Plus DTM Satin. 90-1110
      c. Sherwin Williams: Pro-Industrial DTM Acrylic Eg-Shel, B66W1250 Series

C. Existing Interior CMU Walls
   1. Surface Preparation: Clean and Dry. Remove all existing paint not tightly bonded to the surface
   2. (1 Coat): MPI Category: Alkali resistant, water based
      a. Tnemec Series 151 @ 200 to 300 sq. ft. per gallon.
      b. MPI #17 PPG Paints Seal Grip Universal Primer. 17-921.
   3. Finish (2 Coats): MPI Category: Light industrial coating, water based, Gloss Level 3
      a. Tnemec Series 113 (color) @ 200 to 250 sq. ft. per
      b. MPI #151 PPG Paints: Pitt-Glaze WB 1 Precatylized Epoxy. 16-310.
      c. MPI #151 Sherwin Williams: Pro-Industrial Precatylized Water Based Epoxy, Eg-Shel, K45 Series.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for paint application.

C. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

D. Start of painting will be constured as Applicator's acceptance of surfaces and conditions within a particular area.

E. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

F. Test shop-applied primer for compatibility with subsequent cover materials.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

D. Mechanical items to be painted include, but are not limited to, the following:
   1. Uninsulated metal piping.
   2. Uninsulated plastic piping.
   3. Pipe hangers and supports.
   4. Tanks that do not have factory-applied final finishes.
   5. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
   6. Duct, equipment and pipe insulation having "all-service jacket" or other paintable jacket material.
   7. Mechanical equipment that is indicated to ahve a factory-primed finish for field painting.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

B. Owner reserves the right to invoke field inspection and testing at any time and as often as Owner deems necessary during the periord when paint is being applied.
   1. Owner may engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed and certified in the presence of Contractor.
   2. Owner may direct Contractor to stop paintin if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying paint from Project side, pay for testing and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

C. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 09 99 90
COLOR SCHEDULE

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This section covers color selections of paint and other building finishes and components which are specified in other Sections. Color is considered of prime importance for all aspects of this Project. Obtain colors for items not specifically noted herein from applicable Sections or Architect.

B. Colors selected are those of the brand specified. Colors of items proposed as substitutes shall match those specified subject to approval of Architect.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Materials to be used and installation thereof are specified in other Sections of this Specification.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 INTERIOR COLOR SCHEDULE

A. Resilient Flooring (Section 09 65 00)
   1. Vinyl Base
      a. VB-1, color: Johnsonite - 29 Moon Rock.

B. Painting and Coating (Section 09 90 00)
   1. Paint Color
      a. P-1, color: Sherwin Williams - SW7631 City Loft (typical walls - light beige).
      b. P-2, color: Sherwin Williams - SW9169 Chatura Gray (hollow metal - light brown).

END OF SECTION

DIVISIONS 10 THROUGH 23 – NOT USED

DIVISION 26 - ELECTRICAL

SECTION 26 01 00
GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.02 SUMMARY

A. This Section includes general electrical requirements and shall apply to all phases of the work specified, indicated on the drawings or required to provide for complete installation of electrical systems.

1.03 WARRANTIES

A. All materials, workmanship and equipment shall be warranted against defects or against injury from proper and usual wear for a period of one year after the date of substantial completion. Certain equipment shall be warranted beginning at the time of final acceptance or for longer periods of time as specified in those sections of the Project Manual. Any item which becomes defective within the warranty period shall be repaired or replaced, at no additional cost to the Owner.

B. All manufactures warranties shall run to the benefit of the Owner. No manufacturer's warranties shall be voided or impaired.

C. Warranty shall include repair of faulty workmanship.

1.04 INTERPRETATION OF DOCUMENTS

A. Any questions regarding the meaning of any portion of the contract documents shall be submitted to the Architect/Engineer for interpretation. Addenda or supplemental information will publish definitive interpretations or clarification. Verbal interpretation not issued by addendum or supplemental information shall not be considered part of the contract documents.

B. The Architect/Engineer shall be the sole judge of interpretations of discrepancies within the contract documents.

C. If ambiguities should appear in the contract documents, the Contractor shall request clarification from the Architect/Engineer before proceeding with the work. If the Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out the work in a manner satisfactory to the Architect/Engineer. Should a conflict occur within the contract documents, the Contractor is deemed to have estimated the more expensive way of doing the work unless a written clarification from the Architect/Engineer was requested and obtained before submission of proposed methods or materials.

1.05 DEFINITIONS ABREVIATIONS

A. The following shall apply throughout the contract documents

1.	Code	All applicable national state and local codes
2.	Furnish	Supply and deliver to site ready for installation
3.	Indicated	Noted, scheduled or specified
4.	Provide	Furnish, install and connect complete and ready for final use by Owner
5.	ADA	Americans with Disabilities Act
6.	ANSI	American National Standards Institute
7.	ASTM	American Society for Testing and Materials
8.	FM	Factory Mutual System
9.	IRI	HSB Industrial Risk Insurers
10.	NEC	National Electric Code (NFPA 70)
11.	NEMA	National Electrical Manufacturers Association
12.	NFPA	National Fire Protection Association

13. UL Underwriters Laboratories Inc.

1.06 CODES AND STANDARDS

A. All work shall be performed by competent craftsmen skilled in the trade involved and shall be done in a manner consistent with normal industry standards.

B. All work shall conform to the currently adopted edition of the National Electric Code (NEC), Local Building Code, and all other applicable state and local codes or standards.

C. Where there is a conflict between the code and the contract documents, the code shall have precedence only when it is more stringent than the contract documents. Items that are allowed by the code but are less stringent than those specified shall not be substituted.

1.07 PERMITS

A. Contractor shall become familiar and comply with all requirements regarding permits, fees, licenses, etc. All permits, licenses, inspections and arrangements required for the work shall be obtained by Contractor's effort and expense. All utilities shall be installed in accordance with the local rules and regulations and all charges shall be paid by the Contractor. Capital facilities fees will be paid by Owner.

1.08 SUBMITTALS

A. Division 1 section "Submittals" shall be adhered to if more stringent than this section.

B. Shop drawings shall be submitted to Architect/Engineer for review when required by other sections of this specification and **for all equipment scheduled or specified on drawings.**
   1. A letter of transmittal shall accompany each submittal. Submittals shall be numbered consecutively and list products covered.
   2. Unless otherwise noted, submit a minimum of six (6) copies of shop drawing and product data for review.

C. Shop Drawings
   1. Shop drawings include fabrication and installation drawings, diagrams, schedules of other data specifically prepared for the project. Include dimensions and notations showing compliance with specified standards.
   2. Drawing sheet size shall be at least 8 ½" x 11" and no longer than 30" x 42". For sheets larger than 11" x 17", submit one sheet of reproducible media and one blue-line or photocopy print. Architect/Engineer action will be returned on reproducible media.

D. Product Data
   1. Product data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, rough-in diagrams, wiring diagrams and performance curves.
   2. Each copy shall clearly indicate conformance with specified capacities, characteristics, dimensions and details. Mark all equipment with same item number as used on drawings. Mark each copy to clearly indicate applicable choices and options.

E. Architect/Engineer will review or take appropriate action for submittals. Review is only to determine general conformance with design shown in contract documents.

F. Architect/Engineer review of submittals shall not relieve contractor of responsibility for deviation from requirements of the contract documents or from errors or omissions within submittals.

G. No portion of the work requiring submittals shall be commenced until the Architect/Engineer has reviewed the submittal.

H. See "Submittal Schedule" at the end of Section 26 01 00 – General Electrical Requirements.

1.09 OPERATION AND MAINTENANCE MANUALS

A. Assemble three (3) complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data:
    a. Emergency instructions and procedures.
    b. System, subsystem, and equipment descriptions, including operating standards.
    c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
    d. Description of controls and sequence of operations.
    e. Piping and wiring diagrams.
2. Maintenance Data:
    a. Manufacturer's information, including list of spare parts.
    b. Name, address, and telephone number of installer or supplier.
    c. Maintenance procedures.
    d. Maintenance and service schedules for preventive and routine maintenance.
    e. Maintenance record forms.
    f. Sources of spare parts and maintenance materials.
    g. Copies of maintenance service agreements.
    h. Copies of warranties and bonds.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.10 PROJECT RECORD DOCUMENTS

A. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
1. Mark Record Prints to show the actual installation where installation varies from that shown originally.
2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Mark important additional information that was either shown schematically or omitted from original Drawings.
4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

C. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials and equipment used in the construction of the project shall be new unused and undamaged unless otherwise specified. Materials and equipment shall be of latest design standards of manufacturer specified.

B. Materials and equipment are limited by the requirements of the contract documents. Material and equipment shall be provided in accordance with the following:
1. Basis of Design Products: Basis of Design Products are those products around which the project was designed in terms of capacity, performance, physical size and quality. Basis of Design Products shall be provided unless substitutions are made in accordance with this specification.
2. Substitutions: Substitutions are product of manufacturers other than listed as Basis of Design. Substitutions shall meet each of the following requirements and shall be subject

to prior approval. Submissions requesting prior approval shall be received by the engineer no less than ten (10) days prior to project bid date.

a. The product shall be manufactured by one of the acceptable manufacturers listed in the contract documents.
b. The product shall meet or exceed the requirements of the contract documents in terms of quality, performance, suitability, appearance and characteristics.
c. The contractor providing the substitution shall bear the total cost of all changes due to substitutions. These may include but are not limited to redesign costs and increased work by other contractors or the Owner.
d. The Architect/Engineer shall be the sole judge of the suitability of the substitution items.

C. Verify installation details and requirements for materials and equipment furnished by others and installed under this contract.

PART 3 - EXECUTION

3.01 STARTING AND ADJUSTING

A. Start and test all equipment and operating components to confirm proper operation. Test and adjust all systems to achieve designed capacity and performance.

B. Provide three (3) copies of all test report to the Architect/Engineer for review prior to date of substantial completion.

C. All equipment and systems discrepancies shall be corrected prior to final acceptance.

3.02 TEMPORARY POWER AND LIGHTING

A. Electric Power Service: Provide temporary electric power from Owner’s electric system without payment of use charges.

B. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and construction equipment.

C. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.

ELECTRICAL SUBMITTAL SCHEDULE [**EDIT SCHEDULE FOR REQUIRED TEST REPORTS, O&M's AND TRAINING**]
Refer to individual specification sections for additional requirements and detail on each submittal.

Section	Section Name	Product Data	Shop Dwgs	Test Reports / Quality Control	Warranty	Extra Materials	O&M Data	Record Docs	Demonstration / Training
260100	General Electrical Requirements	√	√						
260500	Basic Electrical Materials and Meth	√	√						
262200	Dry Type Transformers	√			√		√		
262413	Switchboards	√	√		√		√		√
262416	Panelboards	√	√		√		√		
264313	Surge Protective Devices (SPD's)	√			√		√		

END OF SECTION

SECTION 26 05 00
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following basic electrical materials and methods and shall apply to all phases of the work specified, indicated on the drawings or required to provide for complete installation of electrical systems.
   1. Conduits.
   2. Building wire and connectors.
   3. Supporting devices for electrical components.
   4. Outlet boxes.
   5. Electrical identification.
   6. Electrical demolition.
   7. Work in existing buildings.
   8. Cutting and patching for electrical construction.
   9. Fire Stopping.
   10. Touchup painting.

1.03 MATERIAL 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.

1.04 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
   1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.

B. Sequence, coordinate, and integrate installing of electrical materials and equipment with other trades.

C. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces.

D. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

E. Where electrical identification markings and devices will be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Each contractor shall make provisions for delivery and safe storage of materials. Materials shall be delivered in a timely manner to expedite the work.

B. Protect stored piping, supplies and equipment from cold, moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.

PART 2 - PRODUCTS

2.01 CONDUITS

A. Electrical metallic tubing (EMT): ANSI C80.3 and UL 797, zinc-coated steel with steel or die cast, set-screw or compression type fittings.
   1. Color coded exterior for system identification:

a. Fire Alarm – Red.
b. Power – Silver.
c. Security – Orange.
d. Communications – Blue.

B. Flexible metal conduit (FMC): UL 1, Zinc-coated steel.

C. Intermediate metal conduit (IMC): ANSI C80.6 and UL 1242, zinc-coated steel, with threaded fittings.

D. Liquidtight flexible metal conduit (LFMC): Flexible steel conduit with PVC jacket and complying with UL 360.

E. Rigid nonmetallic conduit (RNC): NEMA TC 2 and UL 651, EPC-40 (schedule 40) PVC, with NEMA TC3 fittings.

F. Installation location shall determine conduit type permitted.
1. For indoor installations:
a. Exposed: EMT.
b. Concealed: EMT.
c. Connection to vibrating equipment: FMC; except in wet or damp locations, use LFMC.
d. Boxes and enclosures: NEMA 250, Type 1, unless otherwise indicated.
2. Use the following conduits for outdoor installations:
a. Exposed: IMC.
b. Underground: RNC.
c. Boxes and enclosures: NEMA 250, Type 3R or Type 4.

G. Conduit fittings: Specifically designed for the conduit type with which used. Comply with NEMA FB 1 and UL 514B.

2.02 CONDUCTORS

A. Conductors and conductor insulation: Comply with NEMA WC 70.

B. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.

C. Conductors, larger than No. 10 AWG: Stranded copper.

D. Insulation: thermoplastic, rated at 75 deg C minimum.
1. Feeders: Type THHN/THWN insulated conductors in conduit.
2. Underground Feeders and Branch Circuits: Type THWN in conduit.
3. Branch Circuits: Type THHN/THWN insulated conductors in conduit.
4. Circuits over 100 feet from GFCI devices and all circuits from line isolation panels: Low-leakage XHHW in conduit.

E. Wire connectors and splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

F. Unless otherwise indicated on the drawings, circuits are to be 20 amps with #12 AWG wire.

G. **A green ground shall be installed with all branch and feeder circuits.** Unless otherwise indicated on the drawings, ground wires are to be #12 AWG.

H. Provide a dedicated neutral conductor for each 120V and 277V branch circuit unless otherwise indicated on drawings.

2.03 SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.

B. Metal items for use outdoors or in damp locations: Hot-dip galvanized steel.

C. Slotted-steel channel supports: Flange edges turned toward web, and 9/16-inch- diameter slotted holes at a maximum of 2 inches o.c., in webs.

D. Conduit and cable supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.
   1. In general, use the following support methods for outdoor conduit installations:
      a. Individual exposed conduit: 1” and smaller; 2 hole straps.
      b. Individual exposed conduit: 1-1/4” and larger; Minerallac.
      c. Paired individual exposed conduit: Minerallac.
      d. Rack exposed conduit: Unistrut with strut straps.
      e. Concealed in concrete pour: Approved iron tie wire.
   2. In general, use the following support methods for indoor conduit installations:
      a. Individual exposed conduit: 1” and smaller; 2 hole straps.
      b. Individual exposed conduit: 1-1/4” and larger; Minerallac.
      c. Individual lighting and power above lay-in ceilings: Dedicated ceiling wire with Caddy clips.
      d. Racked exposed or concealed conduit: Unistrut with strut straps.

E. Pipe sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

F. Expansion anchors: Carbon-steel wedge or sleeve type.

G. Toggle bolts: All-steel springhead type.

H. Powder-driven threaded studs: Heat-treated steel.

2.04 BOXES

A. Hollow wall and ceiling spaces: Outlet boxes for concealed applications shall be 4” square with single or multiple gang plaster ring in round or square configuration to match the device or fixture being installed. Depth of ring shall be selected so that face of ring is recessed back from face of finished surface by approximately 1/8”.

B. Masonry walls: Outlet boxes in masonry walls shall be 4” square with single or multiple gang masonry rings with square edges. Masonry boxes may also be used where 4” square boxes are impractical. Slush boxes in place to prevent movement within walls. **Flush mounted boxes and conduit are to be used unless otherwise indicated**.

C. Exposed exterior boxes: Where exposed boxes are required, they shall be the cast type with threaded hubs and gasketed covers. **Use of these boxes is by approval only. Flush mounted boxes and conduit are to be used unless otherwise indicated**.

D. Interior junction boxes: Interior junction boxes shall be 4” square minimum with knock outs as required. Larger boxes may be required and shall be sized per NEC. Provide a flat steel coverplate.

E. Specialty junction boxes larger than 4 11/16”: Junction and pull boxes shall be sized per NEC and arranged to facilitate pulling or splicing. Boxes shall be steel without knock outs, with hinged or screw on cover plates.

2.05 ELECTRICAL IDENTIFICATION

A. Underground warning tape: Permanent, bright-colored, continuous-printed, vinyl tape with the following features:
   1. Not less than 6 inches wide by 4 mils thick.
   2. Compounded for permanent direct-burial service.
   3. Embedded continuous metallic strip or core.
   4. Printed legend that indicates type of underground line.

B. Tape markers for wire: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

C. Engraved-plastic labels, signs, and instruction plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners 1/16-inch minimum thickness for signs up to 20 sq. in. and 1/8-inch minimum thickness for larger sizes. Engraved legend in black letters on white background.

2.06 ACCESS DOORS

A. Prime coated 14 gauge steel, flush, with screw driver operated cam lock. Frame to accommodate construction type; size as indicated.

PART 3 - EXECUTION

3.01 UTILITY COORDINATION

A. Utility locations indicated on drawings are approximate and the most accurate information available at the time of design. Prior to equipment and conduit installation, the contractor shall coordinate exact installation details and modify work plan accordingly to meet utility requirements. Correspond with utility company prior to any site development that may impact the installation such as irrigation installation, concrete or asphalt installation, landscaping, etc.

B. Contact utility locating services prior to digging.

3.02 ELECTRICAL EQUIPMENT INSTALLATION

A. Quality of workmanship: A neat and workmanlike installation shall be provided as defined in the National Electrical Installation Standards (NEIS) established by the National Electrical Contractors Association (NECA). NEIS standards shall be followed for all work including that which is concealed by construction.

B. Neatness and craftsmanship shall be a priority. Installations shall be subject to regular observations performed by the Engineer or the Engineer's Representative. If an installation is deemed unsatisfactory by the Engineer or the Engineer's Representative due to quality of workmanship, code conflicts or deviations from the Construction Drawings or Specifications, the Contractor shall remedy the installation to the satisfaction of the Engineer.

C. Inspect installed components for damage and faulty work, including the following:
   1. Conduits.
   2. Building wire and connectors.
   3. Supporting devices for electrical components.
   4. Electrical identification.
   5. Cutting and patching for electrical construction.
   6. Touchup painting.

D. Headroom maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.

E. Materials and components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

F. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

G. Right of way: Give to conduits and piping systems installed at a required slope.

3.03 CONDUIT AND CABLE INSTALLATION

A. Conceal conduit and cables, unless otherwise indicated, within finished walls, ceilings, and floors.

B. Install conduit and cables at least 6 inches away from parallel runs of flues or hot-water pipes. Locate horizontal conduit runs above water piping.

C. Use temporary conduit caps to prevent foreign matter from entering.

D. Make conduit bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.

E. Use conduit and cable fittings compatible with conduit and cables and suitable for use and location.

F. Make bends in exposed parallel or banked runs from same centerline to make bends parallel. Use factory elbows where elbows can be installed parallel; otherwise, provide field bends for exposed parallel conduits.

G. Install pull wires in empty conduits. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of the pull wire.

H. Utilize sweep elbows for all telephone and signal system conduits 2” and larger.

I. All **conduits routed through unfinished spaces** shall be routed as high as allowable to avoid future conflicts with build out.

J. Route conduits parallel to building structural members in a neat and orderly manner.

3.04 CONDUIT SUPPORT INSTALLATION

A. Install support devices to securely and permanently fasten and support electrical components.

B. Install individual and multiple conduit hangers and riser clamps to support conduits. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.

C. Size supports for multiple conduits so capacity can be increased by **a 25 percent minimum** in the future.

D. Install 1/4-inch diameter or larger threaded steel hanger rods, unless otherwise indicated.

E. Simultaneously install vertical conductor supports with conductors.

F. Separately support cast boxes that are threaded to conduits and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to conduits on opposite sides of the box and support the conduit with an approved fastener not more than 24 inches from the box.

G. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength. Use factory hardware for all connections and assemblies including 45 and 90 degree attachment hardware.

H. Install sleeves for cable and conduit penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and conduit penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

I. Install PVC sleeves for grounding cable riser penetrations of concrete slabs. Where ground wires are run through metal sleeves use grounding bushings on both ends of the conduit or sleeve.

J. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:
   1. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
   2. New concrete: Concrete inserts with machine screws and bolts.
   3. Light steel: Sheet-metal screws.
   4. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.05 WIRING INSTALLATION

A. Install splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

B. Install wiring at outlets with at least 12 inches of slack conductor at each outlet.

C. Connect outlet and component connections to wiring systems and to ground. Tighten electrical connectors and terminals, according to manufacturer's published torque-tightening values.

3.06 POSITION OF DEVICE OUTLETS

A. Outlets shall be installed at the height indicated below unless otherwise noted. All heights of outlets are measured from finished floor to centerline of device. Heights may be adjusted as

necessary to clear wall mounted cabinets, fin tube convectors, unit heaters, etc. Where installed in masonry walls, mounting heights may be adjusted to correspond to block coursing. In no case shall outlets be mounted below 15” or switches above 48”:

1. Wall switches 44”.
2. Receptacle outlet (general) 16”.

3.07 ELECTRICAL IDENTIFICATION

A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.

C. Self-Adhesive Identification Products: Clean surfaces before applying.

D. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.

E. Install warning markers directly above power and communication lines during trench backfilling for underground power, control, signal, and communication lines. Locate marker 6 to 8 inches below finished grade unless required otherwise by NEC. Markers shall be continuous and detectable with a metal detector from above ground after backfilling. Provide one strip of marker for each 16 inches of width if multiple lines are installed in a common trench or concrete envelope.

F. Color-code 208/120-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
   1. Phase A: Black.
   2. Phase B: Red.
   3. Phase C: Blue.
   4. Neutral: White.
   5. Ground: Green.

G. Color-code 480/277-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
   1. Phase A: Brown
   2. Phase B: Orange
   3. Phase C: Yellow
   4. Neutral: White with a colored stripe or gray
   5. Ground: Green.

3.08 FIRESTOPPING

A. Apply firestopping to cable and raceway penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly and to resist passage of smoke and other gases. Products designed to achieve a fire or smoke resistance rating shall not be used in locations where such ratings are not required by AHJ. Coordinate location requirements with other disciplines and AHJ prior to installation.
   1. Limit air leakage to 5.0cfm per square foot tested in accordance with UL 1479.
   2. Materials labeled by a qualified testing agency acceptable to AHJ.
   3. Comply with manufacturer's written installation instructions and published drawings
   4. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
      a. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
      b. Contractor's name, address, and phone number.

c. Designation of applicable testing and inspecting agency.
d. Date of installation.
e. Manufacturer's name.
f. Installer's name.

B. All firestopping assemblies shall be from one manufacturer. Match manufacturer used by other trades or as directed by general contractor.

C. Where electrical outlets are to be installed in fire rated walls, provide FlameSafe FSP1077 putty pads or equal to maintain adequate fire rating.

D. Where lighting fixtures or other electrical devices are to be installed in fire rated ceilings, provide Tenmat Fire Rated Light Covers or equal to maintain adequate fire rating.

3.09 HOUSEKEEPING PADS

A. Provide a 3-1/2 inch tall concrete housekeeping pad for all floor mounted interior electrical equipment as follows:
1. Pad shall extend 4-6” beyond all sides of equipment, except in the back for switchboards mounted tight against the wall.
2. Constructed of 3000 psi concrete.
3. Provide 6” x 6” #4 welded wire mesh.
4. Securely bond pad to floor by roughing the floor and coating with cement grout.

3.10 DEMOLITION

A. Disconnect, demolish, and remove construction indicated in specifications and drawings.

B. The Owner shall have first salvage rights to all fixtures, devices and equipment removed. Present removed materials to owner’s representative. Materials not retained by owner’s representative shall be removed from project site.

C. If equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

D. Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

E. Power to existing areas not being remodeled shall be maintained at all times except for short term outages necessary for reconnection of existing circuits. Coordinate and schedule outages with owner.

F. Coordinate demolition with the work of other trades. Provide temporary power as required to allow the work of other trades to proceed or as required to allow the owner to occupy the space.

G. See architectural plans to determine project phasing requirements. Electrical circuits serving areas not under construction shall remain active until those areas are turned over to the contractor for construction.

H. Work abandoned in place: Cut and remove underground conduit a minimum of 2 inches beyond face of adjacent construction. Cap and patch surface to match existing finish.

3.11 WORK IN EXISTING BUILDINGS

A. Partial Owner Occupancy: The Owner may occupy completed areas of the building before Substantial Completion. Cooperate with the Owner to minimize conflicts with the Owner's operations.

B. Schedule all work in advance with the owner. Do not proceed with work without the Owner’s written approval.

C. Notify Owner of noisy operations and schedule in advance.

D. The Owner shall have the right to direct work to secure safe and proper progress and quality of work.

E. Do not interrupt utilities without Owner's written approval of time and duration. Interruptions shall be the minimum required for completion of work and performed during the hours of 10:00 PM-6:00 AM Monday through Friday or 6:00 PM Saturday through 6:00 AM Monday.

F. The existing fire alarm system shall remain functional throughout the project. The Owner and the Fire Marshal shall approve required outages.

G. The Owner shall be notified before starting welding or cutting. Fire extinguishers shall be immediately accessible when welding or cutting with an open flame or arc. Welding or cutting with an open flame or arc shall be stopped not less than one hour before leaving the premises.

H. Existing electrical items that interfere with the proper installation new work shall be removed or relocated as required or as directed by the Architect/Engineer.

I. Maintain downstream circuit continuity to equipment to remain active.

J. Where breakers are indicated to be installed in existing panelboards, remove panel covers and verify all connection details prior to ordering of breakers. Provide all required hardware for installation of breakers in existing panels.

3.12 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.13 CONSTRUCTION LAYOUT

A. Layout work in advance of installation using data and measurements from the site, the appropriate architectural and structural drawings and shop drawings.

B. Confirm adequate clearance for installation, operation, maintenance and code required clearance including items installed by other contractors.

C. If layout to provide clearance is not possible, promptly notify Architect/Engineer for clarification.

3.14 DATA AND MEASUREMENTS

A. The data given herein and on the drawings is as accurate as could be secured. The existence and location of construction as indicated is not guaranteed. Before beginning work investigate and verify the existence and location of items affecting work. Obtain exact locations, measurements, levels, etc., at the site and adapt work to actual conditions.

B. Only Architectural drawings, Structural drawings, and site measurements may be utilized in calculations. Mechanical and electrical drawings are diagrammatic or schematic.

3.15 REFINISHING AND TOUCHUP PAINTING

A. Refinish and touch up paint.
   1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
   2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
   3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
   4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.16 CLEANING AND PROTECTION

A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.

B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 26 22 00
DRY-TYPE TRANSFORMERS (1000 V AND LESS)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes dry-type distribution and specialty transformers rated 1000 V and less.

1.03 SUBMITTALS

A. Product Data: Include data on features, components, ratings, and performance for each type of transformer specified including the following:
   1. Outline dimensions
   2. Weight
   3. Impedance
   4. Temperature rating
   5. Quantity of voltage taps
   6. Noise levels

B. Maintenance Data: For transformers to include in the maintenance manuals specified in Division 1.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit throughout periods during which equipment is not energized and is not in a space that is continuously under normal control of temperature and humidity.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide transformers by one the following:
   1. Acme Electric Corp.; Transformer Division.
   2. Challenger Electrical Equipment Corp.
   3. Cutler-Hammer/Eaton Corp.
   4. GE/ABB.
   5. MagneTek Inc.
   6. Siemens Energy & Automation, Inc.
   7. Square D; Groupe Schneider.

2.02 TRANSFORMERS, GENERAL

A. Description: Factory-assembled and -tested, air-cooled units of types specified, designed for 60-Hz service.

B. Cores: Grain-oriented, nonaging silicon steel.

C. Coils: Continuous windings without splices, except for taps.

D. Internal Coil Connections: Brazed or pressure type.

E. Enclosure: Class complies with NEMA 250 for the environment in which installed.

F. Energy Efficiency: DOE 2016 rated.

G. Sound levels (measured at 1 foot):
   1. 25 to 50 kva, 45 db
   2. 51 to 150 kva, 50 db
   3. 151 to 300 kva, 55 db
   4. 301 to 500 kva, 60 db

2.03 GENERAL-PURPOSE DISTRIBUTION AND POWER TRANSFORMERS

A. Comply with NEMA ST 20 and list and label as complying with UL 1561.

B. Cores: One leg per phase.

C. Windings: One coil per phase in primary and secondary.
   1. Internal Coil Connections: Brazed or pressure type.
   2. Coil Material: Aluminum

D. Enclosure: Indoor, ventilated.

E. Insulation Class: 185 or 220 deg C class for transformers 15 kVA or smaller; 220 deg C class for transformers larger than 15 kVA.
   1. Rated Temperature Rise: 115 deg C maximum rise above 40 deg C. for transformers 300 kVA and smaller.
   2. Rated Temperature Rise: 150 deg C maximum rise above 40 deg C, for transformers larger than 300 kVA.

F. Taps: For transformers 3 kVA and larger, full-capacity taps in high-voltage windings are as follows:
   1. Taps, 3 through 15 kVA: Two 5-percent taps below rated high voltage.
   2. Taps, 15 through 300 kVA: Six 2.5-percent taps, 2 above and 4 below rated high voltage.
   3. Taps, 301 kVA and Above: Four 2.5-percent taps, 2 above and 2 below rated high voltage.

G. Electrostatic Shielding: Each winding is independently single shielded with a full-width copper electrostatic shield arranged to minimize interwinding capacitance.
   1. Coil leads and terminal strips are arranged to minimize capacitive coupling between input and output connections.
   2. Shield Terminal: Separate; marked "Shield" for grounding connection.
   3. Capacitance: Shield limits capacitance between primary and secondary to a maximum of 33 picofarads over a frequency range of 20 Hz to 1 MHz.
   4. Common-Mode Noise Attenuation: Minus 120 dB minimum, 0.5 to 1.5 kHz; minus 65 dB minimum, 1.5 to 100 kHz.
   5. Normal-Mode Noise Attenuation: Minus 52 dB minimum, 1.5 to 10 kHz.

2.04 FINISHES

A. Indoor Units: Manufacturer's standard paint over corrosion-resistant pretreatment and primer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. All connections to transformers shall be made with flexible metal conduit. Do not connect conduits to the top of transformers.

B. Arrange equipment to provide adequate spacing for access and for circulation of cooling air.

C. Label transformers in accordance with Basic Materials and Methods.

D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.02 GROUNDING

A. Separately Derived Systems: Comply with NFPA 70 requirements for connecting to grounding electrodes and for bonding to metallic piping near the transformer.

B. Ground core of transformer to enclosure using braided grounding strap sized in accordance with NEC.

3.03 CLEANING

A. On completion of installation, inspect components. Remove paint splatters and other spots, dirt, and debris. Repair scratches and mars on finish to match original finish. Clean components internally using methods and materials recommended by manufacturer.

3.04 ADJUSTING

A. After installing and cleaning, touch up scratches and mars on finish to match original finish.

B. Adjust transformer taps to provide optimum voltage conditions at utilization equipment throughout normal operating cycle of facility. Record primary and secondary voltages and tap settings and submit with test results.

C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in readjusting transformer tap settings to suit actual occupied conditions. Provide up to 2 visits to Project site for this purpose without additional cost.
   1. Voltage Recordings: Contractor performed. Provide up to 48 hours of recording on the low-voltage system of each medium-voltage transformer.
   2. Point of Measurement: Make voltage recordings at load outlets selected by Owner.

END OF SECTION

SECTION 26 24 13
SWITCHBOARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes service and distribution switchboards, overcurrent protective devices, and associated auxiliary equipment rated 600 V and less.

B. Related Sections include the following:
   1. Division 26 Section "General Electrical Requirements."
   2. Division 26 Section "Basic Electrical Materials and Methods."
   3. Division 26 Section "Surge Protective Devices (SPDs)."

1.03 SUBMITTALS

A. Product Data: For each type of switchboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each switchboard and related equipment.
   1. Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
      a. Enclosure types and details for types other than NEMA 250, Type 1.
      b. Bus materials, configuration, current, and voltage ratings.
      c. Short-circuit current rating of switchboards and overcurrent protective devices.
      d. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices, and auxiliary components.
      e. SPD devices when integrated into equipment.
   2. Wiring Diagrams: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.

C. Maintenance Data: For switchboards and components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section "Contract Closeout," include the following:
   1. Routine maintenance requirements for switchboards and all installed components.
   2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
   3. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver in sections of lengths that can be moved past obstructions in delivery path.

B. Store indoors in clean dry space with uniform temperature to prevent condensation. Protect from exposure to dirt, fumes, water, corrosive substances, and physical damage.

1.06 PROJECT CONDITIONS

A. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Architect/Engineer not less than seven days in advance of proposed utility interruptions. Identify extent and duration of utility interruptions.
   2. Indicate method of providing temporary utilities.
   3. Proceed with utility interruptions only after receiving Architect/Engineer's written authorizations.

1.07 COORDINATION

A. Coordinate layout and installation of switchboards and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.

PART 2 - PRODUCT

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Switchboards, Overcurrent Protective Devices, and Accessories:
      a. Eaton Corp.; Cutler-Hammer Products.
      b. GE/ABB
      c. Siemens Energy & Automation, Inc.
      d. Square D Co.

2.02 MANUFACTURED UNITS

A. Front-Connected, Front-Accessible Switchboard: Fixed, individually mounted main device, panel-mounted branches, and sections rear aligned.

B. Nominal System Voltage: 480Y/277 V

C. Main-Bus Continuous: 2000 A

2.03 FABRICATION AND FEATURES

A. Enclosure: Steel, NEMA 250, Type 1

B. Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.

C. Service Equipment Label: Labeled for use as service equipment for switchboards with one or more service disconnecting and overcurrent protective devices.

D. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.

E. Buses and Connections: Three phase, four wire, unless otherwise indicated. Include the following features:
   1. Phase- and Neutral-Bus Material: Tin-plated, high-strength, electrical-grade aluminum alloy with copper or tin-plated, aluminum circuit-breaker line connections.
   2. Load Terminals: Insulated, rigidly braced, silver-plated, copper runback bus extensions equipped with pressure connectors for outgoing circuit conductors. Provide load terminals for future circuit-breaker positions at full ampere rating of circuit-breaker position.
   3. Ground Bus: 1/4-by-2-inch minimum size, drawn-temper copper of 98 percent conductivity, equipped with pressure connectors for feeder and branch-circuit ground conductors. For busway feeders, extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.
   4. Contact Surfaces of Buses: Silver plated.
   5. Horizontal Main Phase Buses, Neutral Buses, and Equipment Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.

6. Vertical Main Phase Buses, Neutral Buses: Extend vertical bus from top to bottom of each distribution section to allow maximum mounting of current and future devices.
7. Neutral Buses: 100 percent of the ampacity of the phase buses, unless otherwise indicated, equipped with pressure connectors for outgoing circuit neutral cables. Bus extensions for busway feeder neutral bus is braced.

F. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.

2.04 SURGE PRORTECTIVE DEVICE (SPD)

A. Panelboard configured to physically accommodate integration of a SPD.

B. Panelboard phase, neutral, and ground busses configured to accommodate an integral SPD with leads for each mode no longer than 12”.

2.05 OVERCURRENT PROTECTIVE DEVICES

A. Main Device: Molded-Case Circuit Breaker.

B. Branch Devices: Molded-Case Circuit Breakers.

C. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Electronic Trip Unit Circuit Breakers for breaker frame sizes 800 A and larger: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
   a. Instantaneous trip.
   b. Long- and short-time pickup levels.
   c. Long- and short-time time adjustments.
   d. Ground-fault pickup level, time delay, and I^2t response.
3. Molded-Case Circuit-Breaker Features and Accessories:
   a. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.
   b. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

D. Arc Energy Reducing Maintenance Switch: For each circuit breaker rated 1200A or higher, provide a selector switch to switch the circuit breaker instantaneous tripping characteristics to an alternate setting temporarily during maintenance activity. Switch shall be lockable in either the OFF or ON (maintenance mode) position. Provide with an LED indicator light to indicate that switch is in maintenance mode. Provide with NO and NC contact for connection to building management or alarm system.

2.06 INSTRUMENTATION

A. Instrument Transformers: NEMA EI 21.1, IEEE C57.13, and the following:
1. Current Transformers: IEEE C57.13; 5 A, 60 Hz, secondary; wound or bushing type; single or double secondary winding and secondary shorting device. Burden and accuracy shall be consistent with connected metering and relay devices.

B. Multifunction Digital-Metering Monitor: Microprocessor-based unit suitable for three- or four-wire systems equal to GE Power Leader Panel-Mount EPM and with the following features:
1. Switch-selectable digital display of the following values with maximum accuracy tolerances as indicated:
   a. Phase Currents, Each Phase: Plus or minus 1 percent.
   b. Phase-to-Phase Voltages, Three Phase: Plus or minus 1 percent.
   c. Phase-to-Neutral Voltages, Three Phase: Plus or minus 1 percent.
   d. Kilowatts: Plus or minus 2 percent.
   e. Kilovars: Plus or minus 2 percent.
   f. Power Factor: Plus or minus 2 percent.

g. Frequency: Plus or minus 0.5 percent.
h. Kilowatt Demand: Plus or minus 2 percent; demand interval programmable from 5 to 60 minutes.
i. Accumulated Energy, Kilowatt Hours: Plus or minus 2 percent. Accumulated values unaffected by power outages up to 72 hours.

2. Mounting: Display and control unit flush or semi-flush mounted in instrument compartment door.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install switchboards and accessories according to NEMA PB 2.1.

B. Support switchboards on concrete bases, 3 1/2-inch nominal thickness. Bases should be sized to extend no more than 6” in front of equipment.

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.

3.03 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Basic Electrical Materials and Methods."

B. Switchboard Nameplates: Label each switchboard compartment and overcurrent protective device with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.04 CONNECTIONS

A. Install equipment grounding connections for switchboards with ground continuity to main electrical ground bus.

B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.05 FIELD QUALITY CONTROL

A. Perform acceptance tests as follows:
1. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

3. Test performance of ground-fault protection system per NEC 230.95(C).

B. Testing Agency: Engage a qualified independent testing agency to perform specified testing.

3.06 ADJUSTING

A. Set field-adjustable switches and circuit-breaker trip ranges as indicated.
1. Settings are based off of Square D PE and PX circuit breakers. Equivalent settings should be provided for other manufacturer’s equipment.
a. Long Time Setting = 1.0
b. Long Time Delay = 20
c. Short Time Pickup = 8
d. Short Time Delay = 0.5
e. Instantaneous = 8
f. Ground Fault = Set to comply with requirements of NEC 230.95(A).

3.07 CLEANING

A. On completion of installation, interior and exterior of switchboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION

SECTION 26 24 16
PANELBOARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes load centers and panelboards, overcurrent protective devices and associated auxiliary equipment rated 600V and less for the following types:
   1. Distribution panelboards.

B. Related Sections include the following:
   1. Division 26 Section "General Electrical Requirements."
   2. Division 26 Section "Basic Electrical Materials and Methods.

1.03 SUBMITTALS

A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.
   1. Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
      a. Enclosure types and details for types other than NEMA 250, Type 1.
      b. Panel designation (same as on drawings).
      c. Bus configuration, current, and voltage ratings.
      d. Short-circuit current rating of panelboards and overcurrent protective devices.
      e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices, and auxiliary components.
      f. Mounting (flush or surface).
   2. Wiring Diagrams: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.

C. Maintenance Data: For panelboards and components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section "Contract Closeout," include the following:
   1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
   2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.04 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:
      a. Eaton Corp.; Cutler-Hammer Products.
      b. GE/ABB.
      c. Siemens Energy & Automation, Inc.
      d. Square D Co.

2.02 FABRICATION AND FEATURES

A. Enclosures: Surface-mounted cabinets. NEMA PB 1, Type 1, to meet environmental conditions at installed location.

B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.

C. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.

D. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.

E. Bus: Tin-plated aluminum.

F. Main and Neutral Lugs: Mechanical type suitable for use with conductor material.

G. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.

H. Delete paragraph below if not required. Contactors shall be in main bus when wanting to disconnect entire panel, common application would be a kitchen panel without separate shunt trip contactors for each load.

I. Delete paragraph below if owner metering is not desired.

J. Select lug option, maintain similar lug style accepted above.

K. Feed-through Lugs: Mechanical type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

2.03 PANELBOARD SHORT-CIRCUIT RATING

A. Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.04 Delete paragraph and subparagraphs below if load centers are not utilized on project. Load centers are common for residential applications.

2.05 DISTRIBUTION PANELBOARDS

A. Doors: Front mounted, except omit in fused-switch panelboards; secured with vault-type latch with tumbler lock; keyed alike.

B. Main Overcurrent Protective Devices: Circuit breaker

C. Branch overcurrent protective devices shall be one of the following:
   1. For Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
   2. For Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.
   3. Fused switches.

D. Lighting and appliance branch-circuit panelboard construction shall not be acceptable.

2.06 OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
   1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
   2. Electronic Trip Unit Circuit Breakers for breaker frame sizes 800 A and larger: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
      a. Instantaneous trip.
      b. Long- and short-time pickup levels.
      c. Long- and short-time time adjustments.

B. Molded-Case Circuit-Breaker Features and Accessories. Standard frame sizes, trip ratings, and number of poles.

1. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.
2. Application Listing: Appropriate for application

C. Retain paragraph below for fusible distribution panelboards.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Mounting Heights:
1. General: Top of trim 74 inches above finished floor, unless otherwise indicated.

C. Mounting: Plumb and rigid without distortion of box.

D. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

E. Install filler plates in unused spaces.

F. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

3.02 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section “Basic Electrical Materials and Methods”

B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.03 CONNECTIONS

A. Install equipment grounding connections for panelboards with ground continuity to main electrical ground bus.

B. Tighten electrical connectors and terminals according to manufacturer’s published torque-tightening values.

3.04 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:
1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Testing Agency: Engage a qualified independent testing agency to perform specified testing.

C. Balancing Loads: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes as follows:
1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data-processing, computing, transmitting, and receiving equipment.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.05 ADJUSTING

A. Set field-adjustable switches and circuit-breaker trip ranges.

3.06 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION

SECTION 26 43 13
SURGE PROTECTIVE DEVICES (SPD'S)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes permanently installed, factory or field mounted, 1kV or less surge protective device (SPD) equipment.

1.03 DEFINITIONS

A. Type 1 SPD: Referred to as secondary surge arrestors prior to the 2008 NEC. These devices are designed for installation on the line side of the service entrance disconnect and must have integrated overcurrent protection.

B. Type 2 SPD: Referred to as hardwired transient voltage surge suppressors (TVSS) prior to the 2008 NEC. These devices are designed for installation at any location on the load side of the service disconnect. External overcurrent protection is allowed.

C. Type 4 SPD: SPD components intended to be part of a complete SPD.

D. VPR: Voltage protection rating.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating weights, electrical characteristics, furnished specialties, and accessories.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For SPD devices to include in emergency, operation, and maintenance manuals.

1.06 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency, and marked for intended location and application.

B. Comply with IEEE C62.41.2 and test devices according to IEEE C62.45.

C. Comply with UL 1283 2nd Edition.

D. Comply with UL 1449 3rd Edition.

E. Comply with NFPA 70, 2008 Edition.

F. Service Conditions: Rate SPDs for continuous operation under the following conditions unless otherwise indicated:
   1. Maximum Continuous Operating Voltage: Not less than 125 percent of nominal system operating voltage.
   2. Operating Temperature: 30 to 120 deg F.
   3. Humidity: 0 to 85 percent, noncondensing.
   4. Altitude: Less than 20,000 feet above sea level.

1.07 COORDINATION

A. Coordinate location of field-mounted SPDs to allow adequate clearances for maintenance.

1.08 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Designed for integration into selected switchgear/switchboard/panelboard manufacturer's equipment.
   1. Panel arrangement allowing maximum lead length to phase, neutral, and ground bus connection points of 8".

B. Subject to compliance with requirements, provide product by one of the following:
   1. Advanced Protection Technologies, Inc. (APT).
   2. Cutler-Hammer; Eaton Business Unit.
   3. GE/ABB Zenith.
   4. Innovative Technology; Eaton Business Unit.
   5. LEA International.
   6. Liebert; Emerson Network Power Business Unit.
   7. Siemens.
   8. Surgelogic/Square D; Schneider Electric Business Unit.

C. SPD for Service Entrance Equipment Location (Primary Protection)
   1. UL listed to UL 1449 3rd Edition
   2. Type 1 (installed downstream of main breaker) or Type 2.
   3. 20kA nominal discharge (In).
   4. Short-circuit current rating (SCCR) complying with UL 1449, and matching or exceeding the connected equipment short-circuit rating.
   5. 7 modes of protection (L-N, L-G, N-G).
   6. Peak surge current rating: 200kA per phase.
   7. VPR: Not to exceed 700V for 208Y/120V systems, 1200V for 480Y/277V systems.
   8. System voltage: match service entrance equipment.
   9. EMI/RFI noise rejection filter: Noise attenuation of 50 dB from 10 kHz to 100 MHz using the MIL-STD-220A insertion loss test method.
   10. LED indicator lights for power and protection status.
   11. Audible alarm, with silencing switch, to indicate when protection has failed.
   12. Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.
   13. Six-digit transient-event counter set to totalize transient surges.

2.02 ENCLOSURES

A. Indoor Enclosures: NEMA 250 Type 1

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install SPD devices at service entrance on load side of main disconnect, with ground lead bonded to service entrance ground.

B. Install SPD devices for panelboards and auxiliary panels with conductors or buses between suppressor and points of attachment as short and straight as possible. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.
   1. Comply with manufacturer's written recommendation for conductor and circuit-breaker size for connecting SPD devices to distribution system.

C. Tests and Inspections:
   1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.
   2. After installing SPD devices but before electrical circuitry has been energized, test for compliance with requirements.
   3. Complete startup checks according to manufacturer's written instructions.

4. Coordinate with commissioning agent. Supply requested product documentation.

D. SPD device will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.02 STARTUP SERVICE

A. Do not energize or connect service entrance equipment to their sources until SPDs are installed and connected.

B. Do not perform insulation resistance tests of the distribution wiring equipment with the SPD installed. Disconnect before conducting insulation resistance tests and reconnect immediately after the testing is over.

3.03 DEMONSTRATION

A. Train Owner's maintenance personnel to maintain SPD devices.

END OF SECTION

DIVISIONS 27 THROUGH 33 – NOT USED

SECTION 00 01 07
SEALS PAGE

1.01 OWNER

A. Omaha Public Schools
4041 North 72nd Street
Omaha, Nebraska 68134-4470
Phone: 402-299-01800

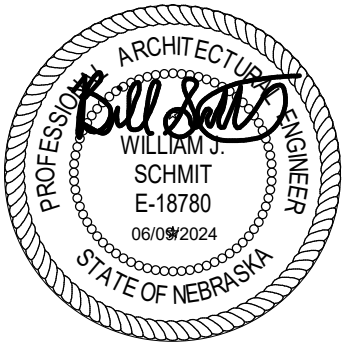
1.02 DESIGN PROFESSIONALS OF RECORD

A. Coordinating Professional and Architect:

BCDM Architects
1015 North 98th Street, Suite 300
Omaha, Nebraska 68114-2334
Phone: 402-391-2211
Nebraska Certificate of Authorization #CA-0271

1. I, Alec Eastman, am the Coordinating Professional and Architect Coordinating Professional for the OPS Mills Electrical Service Replacement dated June 9, 2024.
2. Responsible for Divisions 08 and 09.

B. Electrical Engineer:



Morrissey Engineering
4940 North 118th Street
Omaha, Nebraska 68164
Phone: 402-491-4144
Nebraska Certificate of Authorization #CA-0835
Responsible for Division 26

END OF SECTION