

SECTION 26 00 00 - GENERAL PROVISIONS FOR ELECTRICAL WORK

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work in this Section includes the providing of labor, materials, equipment and services necessary for a complete and safe installation in accordance with the contract documents and all applicable codes and authorities having jurisdiction for the following:
1. Electrical work covered by all Sections within DIVISION 16 of the Specifications, including, but not limited to electrical systems and equipment.
 2. RACEWAY
 3. CABLE TRAY (CENTER SPINE TYPE)
 4. WIRE AND CABLE
 5. LOW VOLTAGE DISTRIBUTION EQUIPMENT
 6. MOTOR CONTROLLERS
 7. ELECTRIC SERVICE
 8. POWER, CONTROL AND ALARM WIRING SYSTEMS
 9. GROUNDING SYSTEM
 10. DEVICES
 11. LIGHTING FIXTURES
 12. TELEPHONE CONDUIT SYSTEM
 13. BUILDING LIGHTNING PROTECTION SYSTEM
 14. ISOLATED POWER AND EQUIPOTENTIAL GROUNDING SYSTEMS
 15. CENTRALIZED NURSES CALL AND INFORMATION SYSTEM
 16. ELECTRICAL PROVISIONS FOR SECURITY AND BUILDING AUTOMATION SYSTEMS
 17. ELECTRICAL PROVISIONS FOR FIRE AND LIFE SAFETY
 18. FIRE ALARM SYSTEM
 19. MULTIPLEXED FIRE AND LIFE SAFETY SYSTEM (FLSS)
 20. SYNCHRONOUS WIRED CLOCK SYSTEM
 21. ELECTRONIC CLOCK SYSTEM
 22. ELECTRONIC CLOCK AND PROGRAM SYSTEM
 23. TESTING
 24. UNIT PRICES
 25. ALTERNATE PRICES
 26. ALLOWANCES
- B. Provide cutting and patching, except as noted in "AIA document A201" and "Supplementary Condition for Mechanical and Electrical Work".
- C. Related Work and Requirements
1. Requirements of GENERAL CONDITIONS and Division No. 1.
 2. Requirements noted under HVAC, Plumbing, Fire Protection, Transportation and Automated Monitoring & Control Division of Work.

1.2 WORK NOT INCLUDED:

- A. Providing temporary light and power.
- B. Providing finished painting.
- C. Providing access doors and filler.
- D. Installing access doors and providing filler.
- E. Cutting and patching, except as noted in "AIA Document A210" and "Supplementary Conditions for Mechanical and Electrical Work."
- F. Supplying and setting motors.
- G. Excavating and backfilling under building.
- H. Excavating and backfilling.

1.3 DESCRIPTION OF BID DOCUMENTS

- A. Specifications describe quality and character of materials and equipment.
- B. Drawings are diagrammatic and indicate general arrangement of systems and work. Follow drawings in laying out work and check drawings of other trades to verify space conditions. Maintain headroom and space conditions.
- C. Scaled and figured dimensions are approximate and are for estimate purposes only. Before proceeding with work, check and verify all dimensions.
- D. Make adjustments that may be necessary or requested in order to resolve space problems, preserve headroom, and avoid architectural openings, structural members and work of other trades.
- E. Typical details, where shown on the drawings, apply to each item of the project where such items are applicable. Typical details are not repeated on the plans.
- F. If Specifications or Drawings appear unclear or contradictory, consult the Architect and/or Engineer for interpretation as early as possible during bidding period. Do not proceed with work without Architect's and/or Engineer's decision.

1.4 DEFINITIONS

- A. "Provide": to supply, install, and make complete, safe, and operable, the particular work referred to unless specifically indicated otherwise.
- B. "Install": to erect, mount, and make complete with all related accessories.
- C. "Furnish" or "supply": to purchase, procure, acquire, and deliver complete with related accessories.

- D. "Work": labor, materials, equipment, services, and all related accessories necessary for the proper and complete installation of complete systems.
 - E. "Piping": pipe, tube, fittings, flanges, valves, controls, strainers, hangers, supports, unions, traps, drains, insulation and all related accessories.
 - F. "Wiring": raceway, fittings, wire, boxes and all related accessories.
 - G. "Concealed": not in view, installed in masonry or other construction, within furred spaces, double partitions, hung ceilings, trenches, crawl spaces, or enclosures.
 - H. "Exposed": in view, not installed underground or "concealed" as defined above.
 - I. "Indicated," "shown," or "noted": as indicated, shown, or noted on drawings or specifications.
 - J. "Similar" or "equal": of base bid manufacture, equal in quality materials, weight, size, performance, design, and efficiency of specified product, conforming with "Base Bid Manufacturers."
 - K. "Reviewed" "satisfactory," "accepted," or "directed": as reviewed, satisfactory, accepted, or directed by Architect and/or Engineer.
 - L. "Motor Controllers": manual or magnetic starters with or without switches, individual pushbuttons or hand-off-automatic (HOA) switches controlling the operation of motors.
 - M. "Control or Actuating Devices": automatic sensing and switching devices such as thermostats, pressure, float, flow, operation of equipment.
- 1.5 QUALITY ASSURANCE
- A. All work shall combine with National Electrical Code and all applicable local codes.
 - B. Furnish all materials and equipment new, free from defects and with listings or labels of Underwriter's Laboratories, Inc. or other nationally approved testing laboratory.
 - C. All items of a given type shall be the product of the same manufacturer.
 - D. All materials and equipment shall be the product of manufacturers regularly engaged in their manufacture.
 - E. Current characteristics:
 - 1. Provide the following distribution:
 - a. 120/208 volt, 3 phase, 4 wire, 60 Hz with grounded 4W distribution.
 - b. 277/480 volt, 3 phase, 4 wire, 60 Hz with grounded 4W distribution.

- F. Equipment ampere ratings shall be for continuous operation in 104°F (40°C) ambient temperature unless otherwise indicated.
- G. Provide the following heights of outlets and verify with Architect and/or Engineer prior to installation:
 - 1. From finished floor to centerline of outlets for:
 - a. Receptacles and telephones:
 - 1) Generally 1'-6"
 - 2) Over work benches 3'-6"
 - b. Wall switches:
 - 1) Generally 4'-0"
 - c. Wall fixtures 7'-0"
 - d. Motor controllers 5'-0"
 - e. Speaker/Strobes 6'-8" or 6 in below ceiling (whichever is lower)
 - f. Fire alarm stations 3'-6"
 - g. Clocks 7'-6"
 - h. Strobe lights 6'-8" or 6 in below ceiling (whichever is lower)
 - 2. Provide outlets to match existing.
 - 3. The following are exceptions to specified height of outlets:
 - a. At junction of different wall finish materials.
 - b. On molding or break in wall surface.
 - c. In violation of Code.
 - d. As noted or directed.

1.6 JOB CONDITIONS

- A. Inspection of Site Conditions.
 - 1. Before starting work, visit the site and examine the conditions under which the work has to be performed. Report in writing any conditions which might adversely affect the work
- B. Connections to existing work:
 - 1. Install new work and connect to existing work with minimum interference to existing facilities.
 - 2. Provide temporary shutdowns of existing services at no additional charges and only with written consent of Owner. Schedule shutdowns not to interfere with normal operation of existing facilities.
 - 3. Alarm and emergency systems shall not be interrupted.
 - 4. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.

5. Connect new work to existing work in neat and acceptable manner. Restore existing disturbed work to original condition including maintenance of wiring continuity required.
6. Perform the following work only after regular working hours:
 - a. with Construction Manager

C. Removal and relocation of existing work:

1. Disconnect, remove, or relocate electrical material, equipment, and other work noted and required by alterations, modifications, or changes in existing construction.
2. Provide new material and equipment required for relocated equipment.
3. Disconnect load and line end of conductor feeding existing equipment.
4. Tape both ends of abandoned conductors and cap outlets and abandoned raceways.
5. Remove any raceway no longer required for removed or relocated equipment.
6. Cut and cap abandoned floor raceways flush with concrete floor or behind walls and ceilings.
7. Return removed electrical equipment to owner as directed, and dispose of other equipment.
8. Dispose of removed electrical equipment as directed.

D. Hazardous locations:

1. Provide required material, equipment and installation for hazardous locations.
2. Provide material, equipment, and installation as required for Class, Division and Group noted.
3. Provide material, equipment, and installation meeting requirements of National Electric Code Class, Division and Group, except Division 1 requirements apply to Division 2.

1.7 REFERENCE STANDARDS

- A. Published specifications, standards, tests, or recommended methods of trade, industry or governmental organizations apply to work in all sections as noted below:
1. NEMA - National Electrical Manufacturers' Association.
 2. ANSI - American National Standard Institute.
 3. IEEE - Institute of Electrical & Electronics Engineers.
 4. NFPA - National Fire Protection Association
 5. UL - Underwriter's Laboratories, Inc.
 6. OSHA - Occupational Safety and Health Administration Regulations.

1.8 SUBMITTAL

- A. Submit shop drawings and samples in accordance with "AIA Document 201" and "Supplementary Conditions for Mechanical and Electrical Work."

- B. Operating instructions, equipment maintenance manuals and parts lists.
 - 1. Before requesting acceptance of work, submit one set for review by the Architect and/or Engineer.
 - 2. Provide sets of manufacturers' equipment brochures and service manuals consisting of the following:
 - a. Descriptive literature for equipment and components.
 - b. Model number and performance data.
 - c. Installation and operating instructions.
 - d. Maintenance and repair instructions.
 - e. Recommended spare parts lists.
 - 3. Assemble manufacturers' equipment manuals in chronological order following the specifications alpha-numerical system using heavy duty three ring binders.
 - 4. Submit three detailed and simplified one line, color coded wiring diagrams.
 - 5. Submit field test reports.

1.9 ELECTRONIC COPIES OF AKF DRAWINGS

- A. Upon award of contract, contractor shall submit list of drawings that they will require. AKF will provide drawings in (.PDF format only).
- B. If the contractor requires (.dwg) format, after preparation the drawings will be forwarded only upon receipt of signed acceptance of terms form. Permission from the architect must first be obtained for AKF to include the architectural background as reference. The contractor is to obtain the architects latest drawings directly from the architect.
- C. These files are being issued for the convenience of the contractor and the contractor remains responsible for all contract requirements related to the normal shop drawing preparation process.

1.10 SUBMISSIONS:

- A. Provide all coordination drawings and shop drawings in 'AutoCad" format, version compatible with owner. All catalog cuts and submittals to be provided in electronic "PDF" format the architect will forward all submissions to the engineer.
- B. If paper submissions are to be provided the following shall be adhered to.
 - 1. Submissions 11 in. X 17 in. or smaller: If the submission is a catalog cut, then the contractor shall submit one original and one copy. Otherwise, they shall submit two copies. The architect will forward the original and one copy (two copies when no original is received) to the engineer. All catalog cuts shall be complete.
 - 2. Submissions larger than 11 in. X 17 in.: submit two copies to the architect. The architect will forward to the engineer.

- C. Indicate on each submission: project name and location, architect and engineer, item identification and approval stamp of prime contractor, subcontractor names and phone numbers, reference to the applicable design drawing or specification article, date and scale.
- D. The work described in all shop drawing submission shall be carefully checked for all clearances (including those required for maintenance and servicing), field conditions, maintenance of architectural conditions and proper coordination with all trades on the job.
- E. Each submitted shop drawing is to include a certification that all related job conditions have been checked and verified and that there are no conflicts.
- F. All shop drawings are to be submitted to allow ample time for checking in advance of field requirements. All submittals to be complete and contain all required and detailed information. Shop drawings with multiple parts shall be submitted as a package.
- G. If submittals differ from the contract document requirements, make specific mention of such difference in a letter of transmittal, with request for substitution, together with reasons for same.

1.11 AS-BUILTS AND EQUIPMENT OPERATION INSTRUCTIONS

- A. Provide all coordination drawings and shop drawings in AutoCad format, version compatible with owner. All catalog cuts and submittals to be provided in electronic "PDF" format the architect will forward all submissions to the engineer.
- B. On completion and acceptance of work, this contractor shall furnish written instructions, equipment manuals and demonstrate to the owner the proper operation and maintenance of all equipment and apparatus furnished under this contract.
- C. The contractor shall give one copy of the instructions to the owner and one copy to the engineer. .
- D. Final "as-built" drawings indicating as installed conditions shall be provided to the architect and engineer after completion of the installation.

1.12 PRODUCT DELIVERY, HANDLING, AND STORAGE

- A. Ship materials and equipment in crated sections of sizes to permit passing through available space, where required.
- B. Receive and accept materials and equipment at the site, properly handle, house, and protect them from damage and the weather until installation. Replace equipment damaged in the course of handling without additional charge.
- C. Arrange for and provide storage space or area at the job site for all materials and equipment to be received and/or installed in this project.

1.13 ACCESSIBILITY

- A. Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Minor deviations from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made without written approval.
- B. Install equipment requiring access so as to be freely accessible through access doors.

1.14 CUTTING AND PATCHING:

- A. Provide all carpentry, cutting and patching required for proper installation of material and equipment specified. Do not cut or drill structural members without consent of architect and structural engineer.
- B. All cutting and patching will be performed under General Construction Work, except as noted in "AIA Document A201" and "Supplementary Conditions for Mechanical and Electrical Work."

1.15 PROTECTION OF MATERIALS

- A. Protect from damage, water, dust, etc. all material, equipment and apparatus provided under this trade both in storage and installed.

1.16 GUARANTEE

- A. The Contractor shall furnish a written guarantee to replace or repair promptly and assume responsibility for all expenses incurred for any workmanship and equipment in which defects develop within one year from the date of final certificate for payment and/or from date of actual use of equipment or occupancy of spaces by Owner included under the various parts of the work, whichever date is earlier. This work shall be done as directed by the Owner. This guarantee shall also provide that where defects occur, the Contractor will assume responsibility for all expenses incurred in repairing and replacing work of other trades affected by defects, repairs or replacements in equipment supplied by the Contractor.

1.17 PERMITS AND FEES

- A. The Contractor shall give necessary notice, file drawings and specifications with the department having jurisdiction, obtain permits or licenses necessary to carry out this work and pay all fees therefor. The Contractor shall arrange for inspection and tests of any or all parts of the work if so required by authorities and pay all charges for same. The Contractor shall pay all costs for, and furnish to the Owner before final billing, all certificates necessary as evidence that the work installed conforms with all regulations where they apply to this work.
- B. This contractor shall prepare or hire the necessary consultants to prepare and file all plans, calculation, forms, etc.. required for filing with all agencies required for this work. including but not limited to Portland Fire Department.

- C. The electrical contractor shall prepare the as-built drawings to comply with the Portland Fire Department requirements and send electronic copy to AKF for use in preparing the as-built Portland Fire Department drawing as the engineer of record. The electrical contractor shall sign and seal the AKF drawing, for the functional statement part of the as-built requirements. AKF will sign and seal for the engineer of record.

1.18 INSPECTIONS / TESTING

- A. Independent testing and inspections shall be provided by this contractor who shall hire the inspector or testing agency

PART 2 - PRODUCTS

2.1 BASE BID MANUFACTURERS

- A. Base bid on materials or equipment are specified by name of manufacturer, brand or trade name and catalog reference.
- B. The choice will be optional with bidder where two or more manufacturers are named.
- C. Manufacturers, other than specified, will only be considered if at the time of bid, manufacturers' names and proposed substitutions are named and stated and the difference in base bid is indicated including changes in the cost of all affected work.
- D. Submission of equipment of manufacturers other than specified shall detail equality and difference item by item. Delay in ordering of equipment will not be considered a valid cause for substitution.
- E. The following are base bid manufacturers for items under this Section:
 - 1. Access doors: Karp Associates, Inc., Higgins Mfg. Co., Milcor Steel Co. and Walsh-Spencer Co.
 - 2. Inserts: F and S Mfg. Co., Fee and Mason and Grinnell.

2.2 INSERTS AND SUPPORTS

- A. Inserts:
 - 1. Inserts will be provided under General Construction Work.
 - 2. Provide additional acceptable means of support attachments as required, after review.
 - 3. Provide cutting and patching required to install additional attachments.
- B. Support all electrical work from building construction by providing inserts, beam clamps, steel fishplates (in concrete fill only), and acceptable brackets. Submit all methods for review. Inserts shall be steel slotted type, factory painted.
 - 1. Single rod shall be similar to Grinnell Fig. 281.

2. Multi-rod shall be similar to Fee Mason Series 9000 with end caps and closure strips.
 3. Clip form nails flush with inserts.
 4. Maximum loading including conduit, contents and covering shall not exceed 75% of rated insert capability.
- C. Provide smooth wall, non-self-drilling internal plug expansion type anchors constructed of AISC 12L14 steel and zinc plated in accordance with Fed. Spec. QQ-A-325 Type 1, Class 3.
 - D. Provide trapeze hangers of bolted angles or channels for grouped lines and services.
 - E. Provide additional framing where building construction is inadequate. Submit for review.
 - F. Do not exceed 1/4 of average values for a specific anchor size using 2000 psig (13,800 kpa) concrete only, for maximum working loads.
 - G. Provide spacing and install anchors in accordance with the manufacturer's recommendations.
 - H. Provide supports from building construction including inserts, beam clamps steel fishplates (in concrete fill only) cantilever brackets or other means. Submit for review.
- 2.3 SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS
- A. Furnish supplementary steel, channels, and supports required for proper installations, mounting, and support of electrical work.
 - B. Connect supplementary steel and channels firmly to building construction in an accepted manner.
 - C. Determine type and size of supporting channels and supplementary steel. Supplementary steel and channels shall be of sufficient strength and size to allow only a minimum deflection in conformance with manufacturers' requirements of loading.
 - D. Install supplementary steel and channels in a neat and workmanlike manner parallel to walls, floors, and ceiling construction.
 - E. All supplementary steel, channels and supports shall be submitted to the Structural Engineer for review.
- 2.4 ACCESS DOORS
- A. Access doors will be provided under General Construction Work.

- B. Supply access doors as required for complete access. Installation shall be under General Construction Work. Minimum size shall be 12 in. x 12 in. Locating and setting will be performed after review.
 - C. Provide for access doors as required for complete access. Minimum size shall be 12 in. x 12 in. Locating and setting will be performed after review.
 - D. Flush type access doors shall be similar to Karp Type DSC-211 for wall installation, with No. 13 USSG steel doors and trim and No. 15 USSG steel frame, metal wings for keying into construction, concealed hinges and screwdriver operated stainless steel cam lock. Lift off type access door shall be similar to Karp Type DSC-212 where door cannot swing open.
 - E. Factory finished white access doors shall be similar to Karp Type DSC-210 in acoustic tile ceilings, with NO. 13 USSG steel frame, No. 16 USSG steel pan door suitable for receiving tile thickness and hinges that are not visible when door is closed. Access doors shall be screwdriver operated, stainless steel cam locks finishing flush with tile with a minimum of (2) per door.
 - F. Access doors shall be similar to Karp DSC-210-PL in plaster ceilings, with recess to receive plaster.
 - G. Fire rated access doors shall be similar to Karp KRP-150-FR, in accordance with applicable code requirements.
 - H. Access doors shall be shop-painted zinc chromate primer.
- 2.5 ACCESS TILE IDENTIFICATION:
- A. Provide buttons, tabs or markers in removable ceiling tiles to identify location of concealed work. Submit for review.
- 2.6 GUARDS AND RAILINGS
- A. Guards and railings will be provided under General Construction Work.
 - B. Provide guards and railings as indicated and/or as required by OSHA and authorities having jurisdiction.
 - C. Provide removable type guards with clearances for motor adjustments, for belt driven and rotating equipment, with No. 18 USSG steel frames and NO. 20 USSG galvanized perforated steel fronts with covered test opening to permit rpm readings without removal. Provide galvanized steel angle or channel supports braced to maintain clearances of moving parts.
 - D. Provide removable type railings constructed of 1 1/4 in. pipe and rail fittings.
- 2.7 NAMEPLATES:
- A. Provide nameplates with inscriptions, subject to review, indicating equipment and fasten with epoxy cement and engrave black Lamicaid sheet with white lettering.

- B. Provide nameplates for the following:
1. Disconnect switches.
 2. Individual circuit breakers.
 3. Panels.
 4. Cabinets
 5. Switchboards.
 6. Substations.
 7. Switchgear.
 8. Transformers.
 9. Busways.
 10. Motor Controllers.
 11. Motor Control Centers.
 12. Uninterruptible Power Supply Systems.
 13. Computer Power Centers.
 14. Generators.
 15. Automatic Transfer Switches.

PART 3 - EXECUTION

3.1 PAINTING

- A. Provide labor, materials and equipment necessary for field prime painting and apply in accordance with manufacturers' instructions.
- B. Apply zinc based primer with finish to match surroundings, to marred surfaces of steel equipment and raceways.
- C. Apply galvanized iron primer on panel and pull boxes, after fabrication.
- D. Apply hot dip galvanizing or dip in zinc based primer: outlet boxes, junction boxes, conduit hangers, rods, inserts, and supports.
- E. Field apply zinc based primer coat on non-galvanized steel and iron work.

3.2 FOUNDATIONS

- A. Foundations will be provided under General Construction Work.
- B. Provide foundations utilizing concrete as specified herein:
 1. Provide one part portland cement, two parts fine aggregate, and four parts coarse aggregate.
 2. Provide concrete of the same consistency as specified under General Construction Work.
 3. Provide concrete, pouted in place on roughened concrete floor, cleaned and flushed with coat of cement grout. Do not pour grout until concrete has set. Foundation shall be puddled and finished smooth with reinforcing as noted.
 4. Provide floor free foundation forms and special foundations as noted.

- C. Hold vibration isolation and anchor bolts in position during pour. Set anchor bolts in oversized sleeves with washers and nuts at bottom. Finish flush with nuts on top.
- D. Foundations shall extend 6 in. beyond equipment, except as noted, with a minimum height of 4 in.
- E. Forms:
 - 1. Forms will be provided under General Construction Work.
 - 2. Provide moisture-resistant commercial standard fir with non-staining mineral oil interior surface coating with rounded or chamfered edges.
 - 3. Provide galvanized NO. 18 USSG steel forms with welded seams & joints with bent top and bottom edges to form 2 in. integral internal angles (bend back exposed edges) and metal cross-strip bracing, welded to top and bottom angle edges, and intermediate bracing welded or riveted to sides as required.
 - a. Bottoms for floor free foundations.
- F. Provide foundations for the following:
 - 1. Switchboards.
 - 2. Substations.
 - 3. Switchgear.
 - 4. Standby power plants.
 - 5. Floor mounted transformers.
 - 6. Motor control centers.
 - 7. Outdoor lighting fixture standards.
 - 8. Uninterrupted power systems.
 - 9. As noted.

3.3 FIELD QUALITY CONTROL

- A. Perform tests as noted, and in the presence of the Architect and/or Engineer in accordance with authorities having jurisdiction.
- B. Provide required labor, materials, equipment, and connections necessary for tests and submit for review.
- C. Repair or replace defective work, as directed and pay for restoring or replacing damaged work of others, due to tests, as directed.
- D. Pay for the following required services:
 - 1. Coordinate with Construction Manager
- E. The following services will be available from owner as directed:
 - 1. Coordinate with Construction Manager

3.4 CLEANING

- A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.

Maine Medical Center
Bean 2 Roof Addition
For Construction
ADDENDUM No. 3
Issued for Permit

PERKINS+WILL
C140135461 (MMC) /152168.00 (P+W)
June 14, 2013
January 17, 2014
February 07, 2014

- B. Clean and repair painted exposed work, soiled or damaged, to match adjoining work before final acceptance.
- C. Remove debris from inside and outside of materials and equipment.

END OF SECTION