

DIVISION 26 0000 ELECTRICAL

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26 0501 GENERAL ELECTRICAL REQUIREMENTS
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26 2000 ELECTRICAL RACEWAY, WIRE AND DEVICES
26 2100 RACEWAYS
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26 2726 WIRING DEVICES

DIVISION 26 000 ELECTRICAL

SECTION 26 0501 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Provide labor, materials, and equipment necessary for completion of work of this Division as described in Contract Documents.
- B. Furnish and install firestopping material at penetrations through fire rated structures and draft stops.
- C. Provide a complete working installation with all equipment called for in proper operating condition. Documents do not undertake to show or list every item to be provided. When an item not shown or listed is clearly necessary for proper operation of equipment, which is shown or listed, provide the item, which will allow the system to function properly at no increase in Contract Sum.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit shop drawings on following equipment:
 - 2. Wiring devices
 - 3. Lighting fixtures
 - 4. Do not purchase equipment before completion of shop drawing review.
- B. Project Record Drawings:
 - 1. Provide complete set as required by Contract General and Supplementary Conditions.
- C. Operations & Maintenance Manual Data:
 - 1. Provide following information for each item of equipment:
 - 2. Catalog Sheets.
 - 3. Assembly details or dimension drawings.
 - 4. Installation, operating, and maintenance instructions.
 - 5. Manufacturer's name and catalog number
 - 6. Name of local supplier.
- D. Furnish such information for following equipment:
 - 1. Section 26 2726 - Wiring Devices.
 - 2. Section 26 5100 - Lighting Fixtures.

1.4 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
 - 2. Material and equipment provided shall be new, meet standards of NEMA or UL, and bear their label wherever standards have been established and label service is available.

1.5 GUARANTEE

- A. All work under this section shall be guaranteed in writing to be free of defective work, materials, or parts for a period of one year, except lamps which shall be guaranteed for thirty days after acceptance of the contract. Repair, revision or replacement of any and all such defects, failure or inoperativeness shall be done by this section at no cost to the Owner. Under this section, submit a letter, including this paragraph, and with blanks for date of acceptance and dates of expiration of guarantee, as part of the final inspection packet.

1.6 OWNER'S PERSONNEL INSTRUCTIONS

- A. Prior to final inspection, the contractor shall conduct an on-site instructional tour of the entire project. The personnel designated by the Owner shall be instructed in: operation of all electrical systems, elementary trouble shooting procedures, preventive maintenance procedures, uses of operation and maintenance manuals, relamping and cleaning of lighting fixtures. A letter from the contractor acknowledging such has been done shall be submitted to the Architect with the final inspection packet.

PART 2 - EXECUTION

2.1 EXAMINATION

- A. Confirm dimensions, ratings, and specifications of equipment to be installed and coordinate these with site dimensions and with other Sections.

2.2 FIELD QUALITY CONTROL

- A. Test systems and demonstrate equipment as working and operating properly. Notify Architect prior to test. Rectify defects at no additional cost to Owner.

END OF SECTION 26 0501

SECTION 26 0518 - DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Furnish labor, materials, and equipment necessary for completion of work as described in Contract Documents.

1.3 SECTION INCLUDES

- A. Electrical demolition.

1.4 RELATED SECTIONS

- A. 16055 - General Electrical Requirements.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Coordinate utility service outages with Utility Company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Architect/Engineer at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of this Section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets, which are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- I. Repair adjacent construction and finishes damaged during demolition and extension work.
- J. Maintain access to existing electrical installations, which remain active. Modify installation or provide access panel as appropriate.
- K. Extend existing installations using materials and methods as specified.

3.4 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment, which remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
- C. Luminaires: Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps and broken electrical parts.

3.5 INSTALLATION

- A. Install relocated materials and equipment under the provisions of this Section.

END OF SECTION 26 0518

SECTION 26 2100 - RACEWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. See Sections specifying individual electrical systems for additional requirements.

1.2 SUMMARY

- A. Quality of material and installation procedures for conduit and fittings used on Project.

PART 2 - PRODUCTS

2.1 CONDUIT

- A. 1/2 inch unless indicated otherwise and use restricted as indicated by product.
- B. Galvanized rigid steel or galvanized intermediate metallic conduit (IMC):
 - 1. Permitted for use in all areas.
- C. Galvanized Electrical Metallic Tubing (EMT):
 - 1. Permitted for use only in indoor dry locations where it is:
 - 2. Not subject to damage.
 - 3. Not in contact with earth.
 - 4. Not in concrete.
- D. Schedule 40 Polyvinyl Chloride (PVC):
 - 1. Permitted for use only underground or below concrete.
 - 2. Use galvanized rigid steel or IMC elbows and risers.
- E. Flexible Steel Conduit - 1/2 inch minimum
 - 1. Required for final connections to indoor mechanical equipment, not to exceed 36 inches with a ground conductor.
 - 2. Also permitted for use in indoor dry locations:
 - a. Inaccessible ceilings not to exceed 72 inches.
 - b. Where concealed in walls and inaccessible floors and ceilings with grounding conductor run where length exceeds 72 inches.
- F. Listed, Liquid-Tight Flexible Metallic Conduit:
- G. Prewired 3/8 inch flexible fixture whips shall be permitted only for connection to recessed lighting fixtures in lengths not to exceed 6 feet.

2.2 FITTINGS

- A. Rigid & IMC conduit fittings shall be threaded and designed for conduit use.
- B. Compression or set-screw type for EMT conduits. Set-screw fittings shall have steel housings, no malleable iron.
- C. PVC:
 - 1. PVC fittings shall be PVC type. Use PVC adapters at all boxes.
 - 2. Brush apply PVC cement.

3. All PVC components, (conduit, fittings, cement) shall be from same Manufacturer.
- D. Screw-in type for flexible steel conduit.
- E. Sealtite type for liquid-tight flexible conduit.

2.3 PROHIBITED MATERIALS

- A. Aluminum conduit.
- B. Crimp-on, tap-on, indenter type fittings.
- C. Malleable iron or cast set-screw fittings for EMT.
- D. Spray (aerosol) PVC cement.
- E. ENT conduit.
- F. Type AC (BX) cable
- G. Type MC cable

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Conceal raceways within ceilings, walls and floors except where exposed raceways are specifically permitted.
- B. Keep raceway runs 6 inches minimum from hot water pipes.
- C. Run two 3/4 inch spare conduits from each panel to ceiling access area and cap so no foreign matter will enter conduit while not in use.
- D. Install PVC conduit below concrete slabs and use rigid steel or IMC conduit risers through slab.
- E. Support conduit and boxes in an approved manner by:
 1. Expansion shields in concrete or solid masonry.
 2. Toggle bolts on hollow masonry units.
 3. Wood screws on wood.
 4. Metal screws on metal.
- F. Secure conduit with approved supports within 3 feet of every outlet box, junction box, gutter, panel, fitting, etc. Do not space supports further apart than 10 feet.
- G. Cap conduit ends during construction.
- H. Clean or replace conduits in which water or foreign matter have accumulated.
- I. Install insulated bushings on each end of conduit 1-1/4 inches in diameter and larger.
- J. Install grounding conductor in PVC conduit.
- K. Bending of PVC shall be by hot box bender and, for PVC 2 inches in diameter and larger, expanding plugs.
- L. Do not bore holes in floor and ceiling joists outside center third of member depth or within 2 feet of bearing points. Holes shall be one inch diameter maximum.

- M. Wrap rigid or IMC steel conduit and fittings below grade with 3M "Scotchrap" 50 or 51 tape.

3.2 PROHIBITED PROCEDURES

- A. Use of wooden plugs inserted in concrete or masonry units as base for fastening conduits, tubing, boxes, cabinets, or other equipment.
- B. Installation of conduit or tubing, which has been crushed or deformed.
- C. Use of torches for bending PVC conduit.
- D. Boring holes in truss members.
- E. Notching of structural members.

END OF SECTION 26 2100

SECTION 26 2122 - WIRE AND CABLE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Cables for auxiliary systems specified on Drawings.
- C. See Sections specifying auxiliary systems for additional requirements.

1.2 SUMMARY

- A. Furnish labor, materials, and equipment necessary for completion of work as described in Contract Documents.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Copper.
- B. Minimum size shall be No. 12 except where specified otherwise.
- C. Conductor size No. 8 and larger shall be stranded.

2.2 INSULATION

- A. Conductor size No. 10 and smaller - 600V type THWN or THHN (90 deg C)
- B. Conductor Size No. 8 and larger - 600V Type THW, THWN, or XHHW (75 deg C).
- C. Higher temperature insulation as required by NEC or local codes.
- D. Any wiring or cable not in an enclosed raceway shall be plenum rated.

2.3 CONNECTORS

- A. Steel spring wire connectors or pressure type terminal lugs as specified.
- B. Use terminal blocks for tapping conductors for condensing unit disconnect switches. Terminals shall be suitable for use with 75 deg C copper conductors.
 - 1. Approved Manufacturers & Models:
 - a. Square-D LBA363106
 - b. Bussman 16323

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install conductors in raceway unless indicated otherwise.
- B. Pulling Conductors:
 - 1. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.

2. Do not use heavy mechanical means for pulling conductors.
 3. Only wire pulling lubricant may be used.
- C. Conductors shall be continuous from outlet to outlet.
- D. Make splices for conductors No. 8 and smaller with steelspring wire connections. Splice larger conductors with pressure type terminal lugs.
- E. Route circuits at own discretion, however, grouping of circuits in homeruns to panels shall be as shown on Drawings.
- F. Where common neutral is run for two or three home run circuits, connect phase conductors to breakers in panel, which are attached to separate phase legs in order that neutral conductors will carry only unbalanced current. Neutral conductors shall be of same size as phase conductors unless specifically noted otherwise.
- G. Run conductors of different voltage systems in separate conduits.
- H. Conductors size #10 and smaller shall be colored throughout. Color code conductors as follows:
1. Black - Phase A
 2. Red - Phase B
 3. Blue - Phase C
 4. Green - Ground
 5. White - Neutral

END OF SECTION 26 2122

SECTION 26 2130 - BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Furnish and install outlet boxes as described in Contract Documents.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

- A. Galvanized steel of correct size and shape.
- B. Provide metal supports and other accessories for installation of each box.
- C. Equip ceiling and bracket fixture boxes with fixture studs where required.
- D. Equip outlets with extensions as required to bring box flush with finish surface.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Boxes shall be accessible and installed with approved cover.
- B. Sectional boxes shall not be used in concrete.
- C. Locate boxes so outlets are not obstructed by pipes, ducts, or other items.
- D. Install outlets flush or 1/4 inch maximum behind finished surface and level and plumb.
- E. Boxes for switches shall generally be located within 6 inches of door jamb.
- F. Properly center single outlets in each room. Where two or more outlets occur, space them uniformly and in straight lines with each other.

END OF SECTION 26 2130

26 2726 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Furnish and install wiring devices complete with plates as described in Contract Documents.
- B. Furnish and install cover plates for sound system devices.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Faces shall be nylon where available.
- B. Devices of single type shall be of same Manufacturer.
- C. Devices are listed as Ivory. Use Ivory devices on light colored walls and brown on dark walls unless directed otherwise by Architect.

2.2 SWITCHES

- A. Standard Style.
 - 1. Verified by UL to meet Fed Spec WS-896E.
 - 2. Approved Manufacturers & Models:
 - a. 20 amp, single pole
 - 1) Hubbell - 1221-I
 - 2) Pass & Seymour - 20AC1-I
 - 3) Leviton - 1221-2I
 - 4) Bryant - 4901-I
 - b. Two Pole:
 - 1) Hubbell - 1222-I
 - 2) Pass & Seymour - 20AC2-I
 - 3) Leviton - 1222-2I
 - 4) Bryant - 4902-I
 - c. Three Way:
 - 1) Hubbell - 1223-I
 - 2) Pass & Seymour - 20AC3-I
 - 3) Leviton - 1223-2I
 - 4) Bryant - 4903-I
 - d. Four Way:
 - 1) Hubbell - 1224-I
 - 2) Pass & Seymour - 20AC4-I
 - 3) Leviton - 1224-2I
 - 4) Bryant - 4904-I
 - e. Pilot Switch:
 - 1) Hubbell - 1224-PL
 - 2) Pass & Seymour - 20AC1-RPL
 - 3) Leviton - 1221-PLR
 - 4) Bryant - 4901-PLR120
 - f. Lighted Toggle Switch:
 - 1) Single Pole:

- a) Hubbell - 1221-IL
 - b) Pass & Seymour - 20AC1-ICL
 - c) Leviton - 1221-LHI
 - d) Bryant - 4901-GLI
- 2) Three Way:
- a) Hubbell - 1223-IL
 - b) Pass & Seymour - 20AC3-ICL
 - c) Leviton - 1223-LHC
 - d) Bryant - 4903-GLI

B. Timer Switches:

- 1. Approved Manufacturers & Models:
 - a. Exhaust Fans, Rest Rooms:
 - 1) 0-15 minute, no hold position.
 - 2) Intermatic FD15M
 - 3) Tork A515M
 - b. Exhaust Fans, Serving Area:
 - 1) 0-60 minute, no hold position.
 - 2) Intermatic FD60M
 - 3) Tork A560M
 - c. Electric Wall Heater Timer Switches:
 - 1) Intermatic FF46H
 - 2) Tork 506H

C. Dimmer Switches:

- 1. Vertical slide control with faceplate.
- 2. Preset, ON-OFF switch, 1000VA
- 3. Approved Manufacturers & Models:
 - a. Leviton - 81000-I
 - b. Lightolier - MP1000-I
 - c. Lutron - NTV-1000I
 - d. Pass & Seymour - 91180-I

2.3 RECEPTACLES

A. Standard Style:

- 1. 20 amp, specification grade, Back and side wired, self grounding.
- 2. Verified by UL to meet Fed Spec WC-596F.
- 3. Approved Manufacturers & Models:
 - a. Hubbell - 5262-I
 - b. Leviton - 5362-I
 - c. Pass & Seymour - BR20-I
 - d. Bryant - CBR20-I

B. Ground Fault Circuit Interrupter:

- 1. 20 amp, specification grade, Back and side wired, self grounding
- 2. Approved Manufacturers & Models:
 - a. Hubbell - GF5262-I
 - b. Leviton - 6899-I
 - c. Pass & Seymour - 2091-S-I
 - d. Bryant - GFR53FT-I

2.4 PLATES

A. Standard Cover Plates:

- 1. Nylon or high impact resistant thermoplastic.
- 2. Color shall match wiring device.
- 3. Ganged switches shall have gang plates.
- 4. Approved Manufacturers:

- a. Hubbell
 - b. Leviton
 - c. Pass & Seymour
 - d. Bryant
- B. Weatherproof Receptacle Covers:
- 1. Complete with corrosion resistant plate, spring lid cover, and weatherproof mats.
 - 2. Cast metal or stainless steel.
 - 3. Compatible with GFCI receptacles.
 - 4. Approved Manufacturers & Models:
 - Indoor use:
 - a. Hubbell - CWP26H, horizontal; WP26, vertical
 - b. Leviton - 4990, horizontal; 4992, vertical
 - c. Pass & Seymour - CA26-H, horizontal; CA26-v, vertical
 - Outdoor use:
 - d. Intermatic:
 - 1) WP1010HMC, horizontal
 - 2) WP1010MC, vertical
 - e. Arlington:
 - 1) DBAH1, horizontal
 - 2) DBAV1, vertical
 - f. Hubbell:
 - 1) WP26MH, horizontal
 - 2) WP26M, vertical
 - g. Taymac - MX3200, vertical

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install devices flush with walls, straight, and solid to box.

END OF SECTION 26 2726

END OF DIVISION 26