

5.26.00 – ELECTRICAL GENERAL

DESIGN AND CONSTRUCTION STANDARD

PART 1: GENERAL

1.01 Electrical/Telecommunications Design

- A. This section of the design and construction standard outlines general requirements for electrical and telecommunications designs to be performed for the University of Texas at Austin. This standard is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. The responsibility of the engineer is to apply the principles of this section and the ones that follow such that the University may achieve a level of quality and consistency in the design and construction of their facilities.

1.02 Electrical Space Planning Guide

- B. The following requirements are to be used by architects for electrical space planning considerations at the conceptual design level. Refinements and modifications will be considered upon evaluation of the specific requirements in the building, but as a minimum, allow space according the following guidelines:

1. Main Service Entrance room shall provide for adequate equipment and maintenance clearance. Provide outside equipment access to this room.
2. Electrical rooms shall be centrally located and “stacked” so that feeder conduits and bus duct are run as straight and short as possible.
3. Doors shall swing out where possible and as required by the National Electrical Code (NEC).
4. Electrical rooms shall not share space with storage, telecommunications, janitor’s sink, and piping.
5. If possible locate electric rooms away from outside walls, elevator shafts, stairwells, HVAC duct chases, trunk runs, and other Utility Avenues so that branch circuits can fan out in all directions.
6. Locate electrical room where it is not susceptible to flood from heavy rains, broken pipes, stopped drains, or fire hose deluge.
7. Provide a separate space in the building for storage of spare lamps.

1.03 Polychlorinated Biphenyl (PCB) Remediation

- A. This section provides general guidance concerning the specific preferences of The University for abatement or removal of polychlorinated biphenyl (PCB) within buildings.

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B. Reference Standards:

Texas Hazard Communication Act chapter 502 of the Texas Health and Safety Code. Volume 40-Code of Federal Regulations, Chapter 761.

C. General Requirements:

Bulbs

Fluorescent light bulbs that do not have green end caps may contain mercury. These bulbs must be handled carefully so that they don't break, packaged in approved boxes furnished by EH&S, and given to EH&S for disposal.

Ballasts

Fluorescent lamp ballasts shall be treated as PCB waste unless labeled "no PCBs." PCB waste is regulated and must be packaged in drums furnished by EH&S, and given to EH&S for disposal.

Fixtures

Fixtures as well as green-tipped lamps and ballasts labeled "no-PCBs" will be disposed of by contractor in accordance with any applicable regulations.

PART 2: PRODUCTS

2.01 Electrical/Telecommunications Design

- A. All products used and specified in Division 26 and 27 must be UL approved and must meet all applicable ANSI, NFPA, IEEE, EIA/TIA standards as indicated in the appropriate sections of this design standard.

PART 3: EXECUTION

3.01 Electrical/Telecommunications Design

- A. In addition to the specific requirements of the sections of the standard that follow, use the following as baseline programming guidelines.
- B. A typical Division 26 design project for the University shall include, but not be limited to the design and specifications for the following items:
1. Electrical and Telecommunications Ductbank Design. Ductbank will be installed from the University specified manholes to the building electrical and telecommunications service entrance.
 2. Main Electrical Service Entrance Equipment: Double ended unit substation.

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3. Building Electrical Distribution Design: Normal and Emergency.
4. Special Systems Design: Including Fire Alarm and Security.
5. Telecommunications Systems Design: Performed by a registered telecommunications designer.

D. Main Electrical Service Entrance Equipment:

1. As a part of the project cost, the Owner will provide and terminate the necessary (15kV rated) cables from the designated manhole to the main service entrance equipment.
2. The main service entrance equipment shall be a double-ended unit substation configured according to the attached one-line diagram.

E. Building Electrical Distribution Design:

1. The low voltage distribution system shall be separately derived 3 phase, 4 wire 277/480 volt system supplying power to all fluorescent and HID lighting, all 480 volt utilization equipment and all motors over 7 1/2 hp. From the 480 volt distribution system, a separately derived 3 phase, 4 wire 120/208 volt system will be used to supply power to all incandescent lighting and miscellaneous building power and receptacle circuits.
2. Provide at least one circuit for each classroom and do not connect more than one classroom on a circuit.
3. All large electrical equipment, e.g. transformers and main switchgear shall be located at or near ground level in the building near the power service entrance such that it may be removed if necessary without dismantling.

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H. Coordination Issues

1. It is the responsibility of the engineering team to prepare Reflected Ceiling Plans that accurately locate and coordinate ceiling panels, lighting fixtures, A/C supply and return grilles, sound system speakers, automatic sprinkler heads, fire and smoke detectors, access doors, and any other ceiling located items.
2. The final drawings shall as a minimum be checked for the following:
 - a. Physical space above ceiling for duct work, lighting fixtures, piping, etc.
 - b. That no piping of any type encroaches on electrical switchgear.
 - c. That electric closets are “stacked” so that feeder conduits and bus duct are in as straight a line and as short a route as possible.
 - d. That electric closets are not next to elevator shafts or stair wells, vertical HVAC duct chases and horizontal trunk runs or other Utility Avenues, etc., so that branch circuit conduits can “fan out” in all directions. Do not locate on exterior walls.
 - e. That electric panels or terminal boards are not in Janitor’s closets or public areas.

I. Basic Drawing Requirements

1. Electrical, Special Systems and Telecommunications Drawings should be drawn on 1/8” = 1’0” scale or larger floor plans. In conjunction with the requirements listed in sections of Division 26 that follow, the Electrical Drawings should include the following information:
 - a. The location of all electric utilization, power distribution and special systems equipment.
 - b. All branch circuit and feeder wiring including circuit numbers and circuit schedule.
 - c. An overall electrical one-line diagram.
 - d. Complete riser diagrams for power and special systems.
 - e. Detailed lighting fixture schedule including the type designation, manufacturer product number, type and size of lamps per fixture, and the accessories and methods for mounting the type of fixture.

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- f. Detailed panel schedule for each panelboard, switchboard, motor control center, etc. Include breaker, fusible switch size or fuse size, frame size, usage of circuit, spares, spaces and connected load for each circuit.
 - g. Site plan where necessary showing electrical and telephone service entry, duct bank and manhole locations and details, exterior lighting, circuiting, and details.
2. 1/4" = 1'0" scale drawings should be provided for the following:
 - a. Typical Rooms.
 - b. Electrical vaults and main power distribution areas.
 - c. Kitchens and other areas with high density of utilization equipment.
 3. Separate drawings should be provided for lighting, power, special systems, and telecommunications of each floor and roof.
 4. Room names and numbers shall appear on all Electrical Floor Plans. Special systems floor plans will require door numbers as well.
 5. Column lines and designations, plan North, and graphic scale shall appear on all sheets as they shall appear on all Architectural Sheets. All drawings shall be dated and signed for each Review Submittal.
- J. Specification Requirements
1. Electrical and Telecommunications Specifications shall be complete and in the CSI Masterspec format. Specifications shall be tailored to the project and not contain items that are not a part of the project.
 2. Electrical Specifications should not instruct the contractor or installer to size a piece of electrical equipment according to the National Electrical Code. All electrical designs should be complete and appear as such on the Drawings and Specifications.
 3. A clear statement shall be made concerning construction power; where available, and at what voltage and phase, who makes and removes the installation, and who pays for the energy.
 4. Specify non-proprietary equipment. Specify products with proven reliability. Include at least three manufacturers for all equipment.

K. Design Review

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1. Schematic design review (3% overall) shall include:
 - a. Narrative description of services: electrical, communications, central clock control, FCMS, CCTV, etc.
 - b. Narrative description of electrical distribution, utilization voltages, lighting types, illumination levels.
 - c. Rudimentary site plan with scale.
 - d. Basic floor layouts.
2. Preliminary Design Review (15% overall) shall include:
 - a. Site plan showing services.
 - b. Major electrical routing and equipment on background sheets (floor plans) with scale, North arrow, a column lines.
 - c. Typical lighting layouts for several representative areas.
 - d. Rudimentary one-line diagram.
 - e. Preliminary design presentation.
 - f. Special requirements, e.g., grounding, floor duct, plug mold, etc.
 - g. Rough draft of specifications.
 - h. Preliminary stage is subject to change and must yield to HVAC Utility routing.
3. Interim Design Review (60% overall) shall include:
 - a. Switchgear and panels located and drawn to approximate scales.
 - b. Lighting layouts including panels.
 - c. Several representative lights and receptacles circuited.
 - d. Fixture schedule.
 - e. Electrical symbols.
 - f. Site plan, all services detailed.

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- g. Panel schedules near completion.
 - h. Conduits larger than 2" size.
 - i. Bus duct and cable trays.
 - j. Controls.
 - k. Details.
 - l. One-line-diagram complete, except sizing of protective devices, transformers and feeders for final horsepower selections.
 - m. Reflected ceiling plans.
 - n. Specifications of all major equipment.
4. Final Design Review (100% overall) shall include:
- a. Design complete except for corrections required from Final Review Comments.
 - b. Engineer's seal on all of the drawings.

END OF STANDARD