The following information shall be included in specifications prepared for use on all University of Cincinnati construction and renovation projects. This information is supplemental and not intended to be a complete specification.

GENERAL STANDARDS

General Criteria
Medium Voltage -
Review and modify the attached guide specification as required to meet the project requirements. Cable and wire procurement, especially for short lengths of interlocked armored cable (IAC), can take additional time. The Engineer shall include fair warning to the Contractor in the specifications. Cables are subject to ambient temperatures of –20 to +40 ºC (0 to 105 ºF).

Low Voltage -
All wiring shall be in raceway systems unless otherwise noted. Refer to “Electrical: Raceways” section for IAC applications. Refer to “Electrical: Raceways” section for metal-clad (MC) cable and armored cable (AC) applications. Refer to other specification sections for signal and communication type cable and terminations. Any low-voltage cable in air-handling spaces or plenums shall be specifically listed for use in such places (unless in enclosed raceways or conduit).

Design Evaluation
The following information is required to evaluate the design:

Programming
Statement of design intent, including materials and terminating devices

Schematic Design Phase
Description of overall distribution concept
Outline specifications

Design Development Phase
Preliminary one-line diagram showing conductor and cable sizing
Preliminary plans showing distribution routing and cable schedules
Preliminary detail drawings showing connection hardware information
Draft specifications

Construction Documents Phase
Complete one-line diagram showing conductor and cable sizing
Complete plans showing distribution routing and cable schedules
Complete detail drawings showing connection hardware information, protection methods, and grounding information
Complete specifications
Submittals

Medium Voltage –
For medium-voltage systems, refer to the attached guide specification, “Medium-Voltage Wire, Cable, and Terminations.”

Low Voltage –
For low-voltage systems, submit industry standard requirements.

PRODUCT STANDARDS

Product Requirements

Medium Voltage - Refer to the attached guide specification, “Medium-Voltage Wire, Cable, and Terminations.”

Low Voltage - Refer to the attached guide specification, “Wires and Cables (600 Volts and Below)”.

Power Conductors - Power conductors shall be stranded copper, 98 percent conductivity. Number 12 AWG (American Wire Gauge) is the minimum conductor size. Number 12 and No. 10 shall be solid conductor for lighting and receptacle branch circuits, and stranded for motor and equipment circuits and wherever vibration is a consideration.

Insulation - Insulation shall be THWN or XHHW (Also THHN when 1/O or smaller). Conductor color code shall be per requirements in these standards.

Control Wiring - Control wiring cable (600 volt) shall be in accordance with power conductors above, except that No. 14 AWG shall be permitted and all control wiring shall be stranded. "Low voltage" and special cables shall be as specified in subsequent functional sections (e.g., communications, fire alarm, computerized system, television, etc.).

Splices (600 volt) – Splices shall be solderless type only. Preinsulated "twist-on" type shall be permitted on solid conductor size No. 10 and smaller. Shall be hydraulic compression long-barrel type with application preformed insulated cover, heat-shrinkable tubing, or plastic insulated tape for all stranded conductors. For stranded conductors, provide terminations designed for use with stranded conductors.

Terminations (600 volt) –
Two-hole long-barrel compression lugs: 250 kcmil and above.
Single-hole compression lug: below 250 kcmil.
Conductors No. 12 and smaller: provide eye or forked-tongue compression lugs at bolted or screw connections; no lugs are required for compression-style terminal blocks.
Cable ties: Nylon or equivalent, locking type. Use a torque-limiting tool for installing ties.
Control cable splices shall be preinsulated crimp pigtail or butt splice connectors.
Control cable terminations shall be locking spade, insulated, compression lugs.
EXECUTION STANDARDS

Medium Voltage Installation
Refer to the attached guide specification, “Medium-Voltage Wire, Cable, and Terminations.”

Connections - Medium-voltage cable splices and connections are often placed in tunnels and manholes open to non-electrical workers; thus splices shall be provided with protective covers and junction boxes with protective cages. The Engineer shall investigate and work with UC Construction Management in designing appropriate worker protection barriers.

Conduits - Conduits for medium-voltage installations are rigid steel in buildings and street crossings; schedule 40 polyvinyl chloride (PVC) in direct-buried or concrete-encased applications; and cable tray in tunnels. Medium-voltage cable shall not be direct buried.

Junction Boxes - Size cable junction boxes to allow future expansion of the cable system.

Low Voltage Installation
Cable Ties - Provide cable ties (limit torque on ties) in panelboards, cabinets, and other unconfined spaces. Group and lace wiring neatly, and do not tie to factory-installed wiring in equipment. Bundle and tag multi-pole circuits in laboratory surface metal raceway.

Branch circuits - Homeruns greater than 75 feet to the first outlet shall be No. 10 minimum. Use no mechanical means for pulling wires, and no lubricant except powdered soapstone or an approved substitute. Make no splices in homeruns. Do not combine wiring from separate raceway systems unless specifically permitted by the Engineer.

Terminations - Terminate conductors so that conductor information is easily visible on at least one termination per feeder or within panel or switchboard pulling space. Observe cable bend radius limitations and follow lug manufacturer's installation procedure. Provide all control wire terminations with approved wire markers that mark the conductor with the terminal number for the wire.

Do not score the conductor when stripping insulation, and always pare or pencil when using a blade. Use of a stripping tool is preferable. Secure and tighten all terminations in accordance with manufacturer’s recommendations. Remove unterminated wiring unless noted otherwise or specifically approved to remain. Consult with the Engineer for precise instructions. Crimp terminations larger than 8 AWG shall be of the hexacentric type.

--- END OF SECTION ---