

Electrical Specifications for Contractors and UNM Personnel Doing Work at the University of New Mexico. (As of 11/30/2006)

The following specifications are basic, general UNM specifications that should be adhered to by Electrical Contractors and UNM personnel doing small electrical projects on UNM property. These specifications are especially relevant to projects which are performed by on-call contractors, or other electrical contractors working on small projects without actual blueprints and/or specification books. While all work performed on UNM property must meet or exceed the New Mexico Electrical Code (National Electrical Code and applicable amendments), the following specifications are UNM standards that should be adhered to and may be beyond the minimum allowed by the code(s).

- 1) Permits and inspections **MUST** be obtained (from CID) in order to perform any electrical work at UNM, and should be displayed on the jobsite for the job duration.

- 2) Metal-clad and non-metallic cables (including types: MI,AC,NM,MC,NMC,SNM,SE,USE,UF, or BX) should **NOT** be used on UNM property without the expressed consent of the Physical Plant Department's Engineering and Energy Services Division (PPD-EESD). Flexible metallic conduit with the appropriate conductors should be used for; fixture whips, equipment whips, or raceways "fished" down walls. In no instance should fixture or equipment whips exceed 6 feet in length. Flexible raceways "fished" into walls should terminate into a junction box immediately above the ceiling, and convert to conduit at that point.

- 3) All panels installed at UNM:
 - a. Will be "Bolt-in" circuit breaker type.
 - b. Will have copper busses.
 - c. Will be provided with neutral and equipment ground lugs (bars).
 - d. Will have a permanent label affixed to the panel front cover, showing the panel designation, panel voltage, and where it is fed from.
 - e. Will provide 30% unused (spare) capacity for future use.
 - f. NEMA 1 panels will be "Door in Door" construction.
 - g. Any recessed panel installed, in addition to the circuits for which it is being installed, will have 2 (ea) spare conduits (minimum ¾ trade size) stubbed from the panel into ceiling space above for future.
 - h. Bonding (grounding) bushings will be provided on all new panel feeders.
 - i. The "AIC" rating of all panels and circuit breakers should be approved by the PPD-EESD prior to installation.
 - j. Panel schedules must be completed (updated) and protected from dirt by a plastic sleeve on the inside cover of the panel. This applies to both new and modified existing panels.
 - k. All panels installed must meet the Code clearance requirements.

- 4) All exposed conduit should be run parallel and perpendicular to the structure. PVC pipe should NOT be used above grade (slab) except in special applications that have been re-approved by the PPD-EESD. In all PVC conduit runs, all bends over 30 degrees and all stub-ups should be in wrapped rigid conduit.
- 5) All fluorescent light fixtures installed must be provided with high frequency, instant start, electronic ballasts and applicable (i.e. T-8 or compact fluorescent) lamps. Where lamps will be frequently switched or controlled by occupancy sensors, ballasts shall be high frequency, program rapid-start type. All fluorescent light fixtures must be provided with a full coverage lens, or clear "tube protectors". Open lamp strip fixtures will be accepted only after special permission of the PPD-EESD. All multi-lamp ballasts must be of the "Parallel circuit" type. Lamp color shall be as approved by PPD-EESD and the UNM user. "U-lamp" light fixtures shall NOT be installed. Exterior light fixtures shall comply with the UNM lighting master plan.
- 6) All EMT fittings shall be of the compression type (gland & ring). Set-screw fittings will NOT be acceptable.
- 7) Only Copper wire and cable is allowed. No aluminum wire.
- 8) Labels will be installed on all panels, disconnects, hardwired equipment, etc., identifying its use and where it is fed from. Labels will be installed on all switches and receptacles, identifying its circuit.
- 9) The ends of all conduits containing wires of any type, will be bushed.
- 10) All conduits must be adequately supported.
- 11) All persons performing electrical work at UNM must use and adhere to UNM's Electrical Safety Program, including their "Lock-out/Tag-out" and "Energized Electrical Work" policies.
- 12) Exit signs shall be LED type with letter colors to match existing.
- 13) Standard tumbler switches shall be commercial specification grade, 20 amp, ivory. Duplex receptacles shall be commercial, specification grade, 15 amp (20 amp if on dedicated circuit) ivory. All terminations must be made using the screw terminals, not the "stab-in" provisions. Receptacles in restrooms, in kitchens, in labels, on building exteriors, or within six feet of any water source shall be of the GFCI type.

- 14) Device cover plates shall, in general, match the color and type of the existing plates in the immediate vicinity. Where there are no existing plates to be matched, provide brushed satin stainless steel plates. Exterior receptacles shall have a cast steel or aluminum cover that is weatherproof with the attachment plug cap inserted or removed. Exterior covers made of plastics will not be acceptable.
- 15) Where feasible, all protective devices shall be circuit breaker type. In other words, an enclosed circuit breaker is to be used in preference to a fused safety switch. Non-fused, heavy duty, safety switches may be acceptable for local equipment maintenance disconnection.
- 16) Motor-operated equipment (i.e. fan coil units) must be supplied by a minimum of a local manual motor starter with thermal overloads. It should be mounted on the side of the control enclosure, or within 3 feet maximum of the unit. Code required working clearances must be maintained in front of disconnects and control enclosures.
- 17) All motor operated equipment and it's associated electrical equipment must maintain the NEC required working clearances to facilitate safe access and maintenance. The PPD-EESD reserves the right to request equipment relocation if adequate working clearance is not provided.
- 18) Conductor splices/taps in gutters shall be made using "Polaris" type connectors. Taped split-bolt connections are not acceptable.
- 19) All personnel shall be licensed for the work they are performing. A licensed Journeyman shall be present for ALL electrical work, and in no case will the Journeyman / Apprentice ratio exceed 2 Apprentices to 1 Journeyman. All personnel shall be trained for the hazards present in the tasks they are performing (e.g. confined spaces).
- 20) "Hot" electrical work (at greater than 250 volts) shall only be performed with the prior approval of the PPD-EESD. Any time "Hot" electrical work is performed, 2 competent persons must be present at all times. An "Energized Electrical Work Permit" must be obtained.
- 21) Submittals may be required for some equipment, or as requested by the PPD-EESD. The contractor will provide submittals for all major equipment.
- 22) Remove completely all abandoned or unused electrical equipment. Removal of abandoned conduit that is underground, is at the discretion of the PPD-EESD. Existing oil-filled transformers may contain PCB's and shall be disposed of properly, with the appropriate legally-required documentation submitted to UNM RSHEA.

- 23) All buildings power and utility outages must be coordinated and approved by the PPD-EESD. Only PPD Ford Utilities will operate utility power equipment.
- 24) All materials and workmanship by contractors shall be warranted for a period of 1 year after the date of "Final Acceptance".
- 25) The phasing of all conductors (#8 and larger) shall be identified by color coding tape. Conductors sizes #10 and smaller shall have colored insulation. The grounded (neutral) conductor sizes #6 and smaller shall be white or light gray, or have 3 continuous white stripes on other than green insulation. Grounded (neutral) conductors larger than size #6 shall be color coded white with coding tape. Grounding conductors sizes #6 and smaller shall have green insulation or be bare the entire length. Grounding conductors larger than size #6 shall be color coded green with coding tape. (Ref: NEC # 210.4, 200.6, 250.119.)
- 26) All penetrations in fire rated walls, shall be sealed with fire caulking or other approved method(s).
- 27) Subsurface Utilities. Owner will comply with NMSA 1978, Chapter 62, Article 14 (the New Mexico Excavation Law) by performing utility spotting activities or by employing a qualified utility spotting company, or both. The Owner will provide the latest and best underground utility information available regarding the campus in the form of Utility Mapping Drawings. In addition, the Contractor shall perform utility spotting work. The Contractor shall locate, spot and find all utilities within the project boundaries or affected by the project. The Contractor shall repair any and all damaged utilities caused by excavation and spotting activities. Costs for this work shall be included in the Contract Price. Owner will not recognize claims for spotting or repairing concealed or unknown subsurface utilities. The Owner will process an appropriate Change Order if concealed or unknown subsurface utilities must be relocated in order to construct the project as indicated in the Contract Documents.
- 28) Concrete paving and sidewalks shall be replaced in full panel sizes. Other paving (brick, pavers, etc.) shall be replaced to match the existing in every way.
- 29) No conductors shall be spliced within panel boards. Under no circumstances will "wire nuts" be accepted within any panel board.
- 30) Under no circumstances will non metallic "Wiremold" (surface raceway) contain any conductors which carry more than 50 volts. In all cases where "self-adhesive" surface raceway is used, in addition to the raceway adhesive, at least 2 mechanical fasteners per ten foot length shall also be used (straps, screws, etc.).

- 31) At no time will a contractor leave any electrical switchgear, panels, or energized devices open or exposed in a public area without having qualified electrical personnel working on or guarding the exposed electrical components.
- 32) All bolted pressure connections shall be torqued to manufacturer specifications.
- 33) The contractor is responsible for supplying the appropriate signs, flagging, and /or fencing to identify the construction area and to restrict entry. It is the duty of the contractor to ensure a safe environment to its staff, sub-contractors, and any occupants in the vicinity.
- 34) In general and where practical, all conductors should be continuous (no splices) from their point of origin to their point of termination. In NO case should "Service Conductors" be spliced without the expressed consent of PPD-EESD, and then only in a manner approved by PPD-EESD.
- 35) In NO case should the wire designation in an existing circuit be changed without the expressed consent of PPD-EESD. Remodel work that requires converting an existing circuit from one voltage to another, should have the existing wires removed and correctly color coded wires re-installed. In the very rare instance where the existing wires are to be reused, wires that have had their designation changed (i.e. an existing "hot" converted to a "neutral") will have their entire exposed length taped with the new appropriate color. Additionally, the altered conductor will be taped with the new color not only at its source and end device, but at every accessible point along the circuit. This includes but is not limited to; pull boxes, conduits, device boxes, gutters, panels, and anywhere else that the altered circuit can be accessed.
- 36) All service disconnecting switches (fused or non-fused) for rooftop or remote equipment are to be mounted on the exterior of the equipment and shall be heavy duty, hand operated safety switches. Disconnects requiring screw in fuses or pull blocks are not acceptable. Equipment disconnect switches should be readily accessible, and should in no case require the removal of a panel or opening of a door to access the service disconnect. Furthermore, all service disconnect switches shall have an adequate number of poles to interrupt all current carrying conductors to the unit.
- 37) Prior to working on any circuits that supply motorized equipment, the contractor shall verify the (clockwise or counterclockwise) rotation of the equipment, and ensure that when re-energized, the equipment maintains proper rotation.
- 38) In NO case should "Push-in Connectors" (e.g., WAGO Wall-Nuts, IDEAL In-Sure, etc.) be used in any manner on electrical work performed at the University of New Mexico, without the expressed consent of PPD-EESD. The splicing (or joining) together of wires, sizes #10 and smaller should be accomplished with industry

standard twist-on Wirenuts, Butt-Splices, or other NEC acceptable methods. The use of “Push-in Connectors” is specifically prohibited for “pigtail” wires in junction and device boxes, as well as in lighting fixtures, or virtually any other application.

NOTE: Any comments or questions regarding these specifications should be directed to one of the following:

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