

16050S01 – BASIC ELECTRICAL MATERIALS AND METHODS

1. BASIC ELECTRICAL MATERIALS

1. All conduit and raceway must be 3/4" or larger. Exposed raceway in finished areas shall be in 700 or larger wiremold. Exception: runs to individual devices 10' or less, 1/2" may be used.
2. All wiring shall be 98% conductivity copper.
3. All buss and buss duct conductors shall be 98% conductivity tin plated copper .
4. Aluminum or aluminum alloy connectors shall not be used on copper.
5. All wiring shall have THHN insulation minimum for installation in conduit.
6. All wiring devices shall be specification grade.
7. Wire size, #12 AWG minimum for power circuits.
8. Conductors #10 AWG and larger shall be stranded copper.
9. All driven ground rods shall be 5/8" X 8'-0" copperweld.
10. All panelboards shall have both neutral and ground bus separate. All panelboards shall use bolt-on breakers, only.
11. No plastic anchors are to be used to support electrical conduit and/or equipment. Use metallic expansion type anchors. Do not use lead anchors. No explosive type install anchors shall be used.
12. All utility markers required inside buildings, structures and facilities to identify exposed and concealed utilities, including electric, shall be provided in accordance with specification 02600D01.
13. All electrical equipment shall be UL listed for the application in which it is used.
14. All equipment and devices provided to meet this specification shall meet all applicable FCC requirements and restrictions.
15. Do not provide any devices which contain mercury unless there is not a mercury free device on the market which will perform the same function.
16. Rigid Conduit
Rigid conduit shall be standard weight, mild steel pipe. The conduit shall receive a protective zinc coating both inside and outside by means of hot-dip galvanizing. Threads shall not have any coating which will reduce the conductivity of the joint. Couplings, bends, elbows, fittings, etc., shall be subject to the same requirements as for straight lengths. All conduit and fittings shall meet UL-8 and labeled accordingly. Rigid conduit shall be delivered with plastic protectors on the threads.
17. Electrical Metallic Tubing (EMT)
Electrical metallic tubing (EMT) shall be cold rolled tubing with a zinc coating on the outside and zinc coating or a protective enamel coating on the inside. All EMT fittings shall be the steel compression type and meet the same requirements as EMT. All entries into boxes, cabinets, etc., shall have insulated throat and compression ring type connectors conforming to UL-514. All EMT shall meet UL-797 and be labeled accordingly.
18. Surface Metal Raceway
Metal raceway shall be two piece type, base mounted with snap-on cover as manufactured by wiremold or equal. Raceway installation shall be in accordance with manufacturer's instructions using adapters and fittings specifically designed and manufactured for the raceway used.

16050S01 – BASIC ELECTRICAL MATERIALS AND METHODS

19. Flexible Conduit
Flexible metallic conduit shall be constructed from flexibly or spirally wound electro-galvanized steel. Connections shall be by means of galvanized, malleable iron squeeze type fittings, or tomic twist-in type in sizes not exceeding 3/4" size. Liquid tight flexible metallic conduit shall be light gray in color. It shall have seal tight fittings and shall be equal to American Brass "Sealtite" Type UA.
20. Plastic Conduit
Plastic conduit shall be high impact, high grade, self extinguishing polyvinyl chloride (PVC) schedule 40, 90 deg. C, U.L. rated. Material must have tensile strength of 7,000 psi at 73.4 deg. F., flexural strength of 11,000 psi and compressive strength of 8,000 psi. Conduit fitting and elbows shall have the same requirements as the conduit.
Exception: Use schedule 80 PVC conduit when required by codes.

2. BASIC ELECTRICAL METHODS

1. General

1. All wiring shall be in 3/4" or larger conduit, wireway or raceway.
2. All conduit shall be concealed except in University of Kentucky designated mechanical rooms or unless otherwise specified and shown on drawings approved in writing by the UK Project Manager. Conduits which are not concealed must be surface metal raceway unless otherwise noted in the written exception.
3. Firestop all penetrations in accordance with the current edition of the National Electric Code.
4. All conduit, wiremold and junction boxes must be painted to match existing surface except in mechanical rooms.
5. During construction, cover all equipment subject to mechanical damage or contamination in any way.
6. All metering is to be included in contract unless provided by local utility company. Each building is to be sub-metered individually. All metering to meet UK Standard 16430S04.
7. Standard mounting height of devices:

Receptacles	18" A.F.F.
Light Switches	48" A.F.F.
Fire Alarm Manual Stations	48" A.F.F.
Fire Alarm Horns	84" A.F.F.
Thermostats	53" A.F.F.
8. All electrical panels shall be clearly labeled as to what circuit, electrical outlet, and/or room that each breaker feeds.

16050S01 – BASIC ELECTRICAL MATERIALS AND METHODS

9. Corridor outlets shall be provided at a maximum 65 feet spacing for floor machines. The 120 volt receptacles shall each be individually protected by a 20 ampere breaker and GFI receptacle.
10. All Fire Alarm, Security Alarm, Communications Equipment, Elevator Controllers, Life Safety (including emergency lights, exit lights and combination emergency/exit lights), Handicap Access, Mechanical and Electrical Room lights and receptacles, and other similar systems shall be supplied by emergency generator distribution panels. Note: Due to battery maintenance cost, do not provide battery backed up emergency and exit lighting on emergency generator power unless the University request this redundancy in specified areas.
11. Install mechanical identification to properly identify every system and its components.
12. All conduit, duct and raceway shall be installed in accordance with UK Standard 16110S01.

2. Grounding

1. A separate equipment ground wire shall be run continuous to all equipment and receptacles. The University does not recognize or accept the conduit ground as an equipment ground. Any ground required must be a properly sized wire or wires (insulated or uninsulated) from the buildings single point ground bus and running through all distribution panelboards and connecting to the equipment to be grounded.
2. All buildings shall have ground rods and ground planes to meet the requirements of the NEC and also the grounding requirements of equipment within the building. All main ground points shall be meggered. If more than 10 OHMS, additional ground rods shall be driven. Additional ground rods shall not be less than 6 ft. apart. If more than 25 OHMS, special care shall be used to obtain less then 10 OHMS.
3. Main service entrance conduit shall have grounding locknuts on one end. Meter shall be grounded to main service disconnect by a bare copper ground wire, sized to NEC.
4. Main service neutral shall be grounded at only one point (the main service disconnect) and that ground shall extend from the main water service entrance point before main water valve.

16050S01 – BASIC ELECTRICAL MATERIALS AND METHODS

3. Motors

1. This standard applies to all general duty motors provided, even those specified in all other divisions such as Div 15 where motors are provided with pumps, air handling units and similar equipment.
2. Provide power factor correction capacitors on induction motors of 10 H. P. or above to correct power factor to .91 or more. Provide a disconnect switch for each capacitor bank.
3. All 3 phase electric motors, (5 Hp. and larger), shall be protected against single phasing.
4. Efficiencies specified shall be according to US efficiency test protocol which is IEEE 112 Test Method B.
5. Efficiencies shall be stamped on the nameplate of the motor.
6. All general purpose motors shall be NEMA Premium™ efficiency as noted in tables 1 and 2 as follows:

Table 1						
Nominal Efficiencies For NEMA Premium™ Induction Motors Rated 600 Volts Or Less (Random Wound)						
	Open Drip-Proof			Totally Enclosed Fan-Cooled		
HP	6-pole	4-pole	2-pole	6-pole	4-pole	2-pole
1	82.5	85.5	77	82.5	85.5	77
1.5	86.5	86.5	84	87.5	86.5	84
2	87.5	86.5	85.5	88.5	86.5	85.5
3	88.5	89.5	85.5	89.5	89.5	86.5
5	89.5	89.5	86.5	89.5	89.5	88.5
7.5	90.2	91	88.5	91	91.7	89.5
10	91.7	91.7	89.5	91	91.7	90.2
15	91.7	93	90.2	91.7	92.4	91
20	92.4	93	91	91.7	93	91
25	93	93.6	91.7	93	93.6	91.7
30	93.6	94.1	91.7	93	93.6	91.7
40	94.1	94.1	92.4	94.1	94.1	92.4
50	94.1	94.5	93	94.1	94.5	93
60	94.5	95	93.6	94.5	95	93.6
75	94.5	95	93.6	94.5	95.4	93.6
100	95	95.4	93.6	95	95.4	94.1
125	95	95.4	94.1	95	95.4	95
150	95.4	95.8	94.1	95.8	95.8	95
200	95.4	95.8	95	95.8	96.2	95.4
250	95.4	95.8	95	95.8	96.2	95.8
300	95.4	95.8	95.4	95.8	96.2	95.8
350	95.4	95.8	95.4	95.8	96.2	95.8
400	95.8	95.8	95.8	95.8	96.2	95.8
450	96.2	96.2	95.8	95.8	96.2	95.8
500	96.2	96.2	95.8	95.8	96.2	95.8

16050S01 – BASIC ELECTRICAL MATERIALS AND METHODS

Table 2						
Nominal Efficiencies For NEMA Premium™ Induction Motors Rated Medium Volts 5kV or Less (Form Wound)						
HP	Open Drip-Proof			Totally Enclosed Fan-Cooled		
	6-pole	4-pole	2-pole	6-pole	4-pole	2-pole
250	95	95	94.5	95	95	95
300	95	95	94.5	95	95	95
350	95	95	94.5	95	95	95
400	95	95	94.5	95	95	95
450	95	95	94.5	95	95	95
500	95	95	94.5	95	95	95

4. Starter Disconnects

Combination starter/disconnects must be equipped with a factory disconnect micro switch and this switch must be wired into control circuit to deenergize the starter before disconnect opens.

5. Computer and Computer Room Circuits

1. Power supply for computer systems shall be provided with an isolated ground wire back to the service entrance single point isolated grounding grid buss.
2. Main feeder routing for computer and telephone cabling shall be inside hinged wireway whenever possible, branching off to individual computer terminations with conduit. Wireway shall be sized for 50% future growth. Minimum wireway size shall be 6".

6. Communications

1. Communications electrical shall meet University of Kentucky Standards Division 17.
2. Clocks and bells shall be self correcting compatible with the campus Primex Wireless system.
3. All television and telecable conduits shall have a home run to the floor communications panel. Outlets looped between rooms are not acceptable.

7. Security Systems

Provide conduit from at least one or more entrance doors on each building wall to a common 6"x6"x4" junction box mounted above the door. Door frame must include a small J-Box on each side of frame for lock/unlock and hinge feed thru and a small J-Box on top of frame for magnetic switch contacts. Provide a minimum of 1" conduit from each door 6"x6"x4" J-Box to the building facility management system or the designated access control panel for the future addition of access control.