16140-H: WIRING DEVICES

Applicability:
The information expressed herein is unique to UMHHC owned, operated, and leased facilities, and are intended to supplement the University of Michigan's Architecture, Engineering, and Construction (UMAEC), design guidelines 16140. All information presented in the referenced UMAEC guideline applies to UMHHC facilities, unless explicitly stated otherwise below. Where differences and/or conflicts exist between the supplemental information noted below, and the information in the UMAEC guideline, this supplementary information shall take precedence.

General
1. All power wiring shall be in raceway. Any exceptions to this are as noted in Section 16050-H – “Basic Electrical Materials and Methods”.
2. The color of the wiring device itself shall be in accordance to that shown in Section 16195-H – “Electrical Equipment Identification”.
3. All receptacles, lighting switches and special power outlets shall be labeled as noted in Section 16195-H.
4. Crash Cart Power:
   a. The receptacles serving ‘crash carts in inpatient facilities or areas shall be on critical power.
   b. The receptacles serving ‘crash carts’ in outpatient clinics need not be on emergency power. (If any such building has emergency power, however, and the emergency power is ‘reasonably’ accessible, it is desirable that the crash cart location be served with emergency power.)

Materials:
1. Outlet, Junction and Pull Boxes
   a. All outlet boxes are to be of sufficient size for the number of wires specified and as required by National Electric Code. Flush boxes are to fit flush with the final finished wall, casework, or ceiling surface. Install metal box extenders and bond to the box where necessary. All receptacles, light switch, and other miscellaneous boxes shall be at least 1-1/2” deep.
   b. All outlet boxes are to be securely fastened in place independent of support from connecting conduit. Each outlet box for recessed fixtures, exit lights, smoke detectors, in suspended ceiling and like devices in gypsum board or interlocked tile ceilings are to be supported by auxiliary structural steel channels/members suspended between, and connected to, members of the ceiling structural system.
   c. All outlet boxes, in general, shall be flush type. The only exceptions are mechanical, electrical or communication areas; or areas specifically noted.
   d. Standard 4”, galvanized, pressed steel octagonal boxes, with depth as required by the NEC are to be used for ceiling outlets. Cast outlet boxes may be specified where they are an integral part of a fixture.
   e. Standard 4”, galvanized square boxes complete with appropriate plaster ring are to be used for all switch, receptacle and special outlets in plaster gypsum walls. Gang boxes are to be used where more than two devices occur at one location.
   f. Square cornered masonry type boxes, 2-1/2” minimum depth, are to be used on all flush switches, receptacles and special outlets in glazed tile, face brick and unfinished block walls.
g. Any noted surface mounted wall outlet boxes for switches, receptacles and special outlets, including telephone, and signal, are to be die cast type with matching wall plates or special surface mounting covers as noted.

h. All telephone/data outlets shall have 4-11/16" square boxes that are 2-1/2" deep.

2. Supports
a. Hangers and brackets shall be made of steel pipe, channel iron, angle iron or prefabricated steel channels such as channels by Unistrut.
b. Anchors shall be lead shield anchors for small work and expansion shields for large work.
c. Beam clamps shall be used where appropriate. Do not use C clamps.
d. Do not support electrical equipment, from existing electrical equipment or conduits, or the supports of other trades.

3. Wiring Devices
a. Standard simplex and duplex receptacles are to be automatic grounding type, 3 wire ground type Beryllium contacts rated 20 amperes at 125 volts. The grounding connections to all parts of the receptacle shall be of one piece of formed copper.

b. In new buildings, mount receptacles with the ground terminal up or to the left. In existing buildings, when renovating a room or part of an area, follow the standard in that building. If an entire room, and/or area, is being renovated, follow the standard noted above.

c. Hospital grade is to be used in all patient care areas – including consultation, waiting, locker, toilet, treatment control rooms and like areas. Hospital grade receptacles shall be installed in all areas of use group I-2 building occupancies.

d. In areas other than patient care (as defined above), use extra heavy duty receptacles.

e. All standard light switches are to be extra heavy duty specification grade, quiet, toggle type, back and side wired, rated 120-277 volt, 20 amperes under all loads.

i. For all emergency power applications use red devices with red pilot lights in the handle. Cover plates shall in general be red nylon.

f. All wiring devices shall be wired so that the device itself can be replaced without affecting the ground or neutral wire path to other devices on the same circuit. (Do not loop these wires around the corresponding screw on the device.)

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h. Weatherproof receptacles are to be recessed, unless otherwise shown on plan, and are to be GFI type. Weatherproof receptacles shall be supplied with a gasketed NEMA 3R cover that is rain tight when receptacle is in use.

i. GFCI receptacles shall:
   i. Be supplied with built-in automatic ground fault protection manual reset and manual test buttons.
   ii. Have internal test circuitry to light an LED indicator, and/or sound a low level alarm when the device is no longer able to provide the GFCI functionality.
   iii. Shall have an interrupting rating of at least 2000 amperes.
   iv. Be supplied with gasketed cover plate on outdoor and wet locations.

j. Receptacle and switch boxes shall be grounded via the ground box screw.

k. Tamper resistant power receptacles shall be installed in
   i. Pediatric and Adult Psychiatric patient areas
   ii. Pediatric Hospital areas,
   iii. Pediatric Clinics,
   iv. Other areas (such as waiting rooms, etc) where children would be present

l. Receptacles in all Psychiatric hospital areas shall be protected by GFCI circuit breakers, and shall be labeled “GFCI C.B. Protected.”

m. Wall Plates
   i. Telecommunication outlet cover plates are:
      1. Typically supplied by MCIT when MCIT/AT&T pull the wiring. If telecommunication wiring is being installed under base contract, contact MCIT for plate detail requirements.
      ii. Custom multiple switch plates are to be supplied as required. The use of sectional wall plates will not be permitted.
      iii. All manual motor starters, pilot lights and special wall plates called for are to be factory engraved units with 3/16" block engraved nameplates.
Installation

1. Mounting Heights
Unless otherwise noted, boxes for the following wall outlets are to be located with their center lines at elevations above the finished floor line as follows:

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Height</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Switches and Occupancy Sensors</td>
<td>4'-0&quot;</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Receptacles</td>
<td>1'-6&quot;</td>
<td>Unless over work counters, baseboards, Radiation or as noted or required.</td>
</tr>
<tr>
<td>C</td>
<td>Receptacles in Mechanical Rooms and Electrical Rooms</td>
<td>4'-0&quot;</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Telephone</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Desk Type</td>
<td>1'-6&quot;</td>
<td>Unless otherwise noted.</td>
</tr>
<tr>
<td></td>
<td>- Wall Type</td>
<td>4'-6&quot;</td>
<td>Unless otherwise noted.</td>
</tr>
</tbody>
</table>

2. Where NEMA type 6-20R, 250 volt, 2 pole, 3 wire, 20 amp receptacles are shown on a 208 volt, single phase circuit for large freezers or other large appliances, the wiring shall be No. 10 AWG., minimum so that the circuits can be upgraded to 30 AMPS later if required.

3. Receptacles will be placed as directed in program statement or during design development phase. In general, however, the following minimums shall apply
   a. The minimum requirement in ‘general use’ spaces is one receptacle per wall in rooms.
   b. Place one approximately every 40’ in corridors.
   c. Install one receptacle on the alternate landings of stairwells.
   d. These minimums will not be applicable, however, in situations such as floor to ceiling shelves along entire wall, when specified in program statement/design development.

4. At only locations where patient care equipment requires it, install dedicated ground receptacles. See Section 16676 for details.

5. Receptacles and switches shall be grounded to the green ground screw. The receptacles and switch grounding shall be via a ‘pigtail, connected to the box ground. Doing this allows device replacement without affecting the grounding of other devices ‘downstream’.

6. In renovations, if a receptacle location will end up behind ‘permanently’ installed equipment, or system furniture, proceed as noted below:
   a. If the receptacle is a radially fed device (its circuit does not feed other devices) it shall be removed including associated wiring back to last active device or junction box and a blank cover plate installed.
   b. If the receptacle does serve downstream devices (it is a junction box) this receptacle and wiring shall be reworked to the (existing or new) junction box above the ceiling. The wiring to the former receptacle itself shall be removed, and a blank cover plate shall be installed.