PREFACE

This publication has been prepared as a guide for Architectural and Engineering (A&E) firms in the preparation of documents for the design and construction of new structures and the remodeling of existing structure for Indiana University. Items pertinent to requirements of Indiana University are contained herein.

The specification section numbers referenced by these standards are to help the A&E firms identify where IU Engineering standards are to be applied. These specification section numbers are based upon CSI standards and may not correspond to a particular A&E firm’s standard specification section numbering scheme.

Compliance with codes and OSHA regulations are minimum requirements. When requirements of Federal and/or State Codes are at variance with the contents of this publication, the most demanding requirements shall be observed.

**********************************************************

IT IS NOT INTENDED THAT THESE STANDARDS BE
COPIED AND USED AS A SPECIFICATION!

MATERIAL CONTAINED HEREIN SHALL NOT BE
COPIED VERBATIM IN SPECIFICATIONS OR IN NOTES
ON THE DRAWINGS EXCEPT WHEN INSTRUCTIONS
ARE GIVEN TO COPY CERTAIN ARTICLES OR
PARAGRAPHS.

**********************************************************

Changing technology and changes in State or University policies will require continuing revisions of these standards. Revisions will be maintained online at www.indiana.edu/~uao. Architects and Engineers doing work for the University are expected to ensure that they are working with the latest revision of the standards.

Throughout these standards, cross-references have been made frequently to emphasize the importance of coordination of all parts of the contract documents for a project. Because of the requirement for complete coordination, the holder of this document is cautioned to furnish complete standards to consultants or to ascertain that consultants have copies of the referenced sections and paragraphs affecting the consultant’s work.

If questions arise concerning instructions contained herein, please request clarification from Indiana University, Department of Engineering Services, (812) 856 - 7055.
A. Raceway
   1. General Requirements
      a. Conduit shall be installed with NO MORE THAN the equivalent of THREE 90-DEGREE BENDS in any conduit run. Pull boxes, properly sized to the latest requirements of the NEC, shall be installed if more than the equivalent of three 90-degree bends are needed in a conduit run. The location of the box shall be such that it eliminates a 90-degree bend in the conduit run.
      b. Minimum conduit size shall be 3/4”; 1/2” conduit is allowed for lighting switch legs.
      c. Conduit shall be labeled every 25 feet in accordance with the following.
         1) Normal Power: Black lettering on White background identifying voltage of conductors.
         2) Emergency Power: Red lettering on White background identifying voltage of conductors.
         3) Fire Alarm: White letters on Red background – “FIRE ALARM”.
         4) Telecommunications: Black letters on White background – “TELECOMMUNICATIONS”.
         5) Temperature Control: Black letters on White background – “TEMPERATURE CONTROL”.
   2. Power Feeder Conduit
      a. Interior exposed conduit shall be galvanized rigid metal conduit (GRC) or intermediate metal conduit (IMC).
      b. Interior concealed conduit 2” trade size and larger shall be GRC or IMC.
      c. Interior concealed conduit 1-1/2” trade size and smaller may be electrical metallic tubing (EMT), GRC, or IMC.
      d. DO NOT install power feeder conduits within floor slabs.
      e. Below grade conduit refer to paragraph E below.
      f. Exterior conduit shall be run below grade per 2.e above, but where necessary to be exposed they shall be GRC or IMC.
      g. Connection to Equipment: The use of flexible metal conduit (FMC) or liquid-tight flexible metal conduit (LFMC), not less than 12” nor more than 6’ in length, may be allowed for terminations of feeder runs serving low-voltage (less than 600 volt) equipment with inherent vibration, e.g. dry type transformer, motor terminal box, and etc. The use of flexible
conduit shall be reviewed with Engineering Services or CFS. FMC shall be UL-1 listed and LFMC shall be UL-360 listed.

3. Branch Circuit and Control Conduit
   a. Interior exposed conduit shall be GRC or IMC. Temperature control conduit in Mechanical and Electrical equipment rooms may be EMT.
   b. Interior exposed conduit in electrical closets containing only branch circuit panelboards, EMT may be used.
   c. Interior concealed conduit 2” trade size and larger shall be GRC or IMC.
   d. Interior concealed conduit 1-1/2” trade size and smaller may be EMT, GRC, or IMC.
   e. Branch circuit and control conduit may be installed in or under concrete slabs. Coordinate any conduit installed in concrete slab with Engineering Services of CFS.
      1) If installed under concrete slab use GRC, Schedule 40 Rigid Nonmetallic Conduit (RNC 40), or Schedule 80 Rigid Nonmetallic Conduit (RNC 80).
      2) If installed in concrete slab use GRC, RNC 40, or RNC 80. In addition, conduit installed in a concrete slab shall not exceed 1” trade size and must be installed in middle 1/3 of concrete slab.
   f. In existing buildings where conduits cannot be concealed, cut and channel walls and ceilings or install surface raceway where specifically directed by Engineering Services or CFS.
   g. Below grade conduit refer to paragraph E below.
   h. Exterior conduit shall be run below grade per 3.f above, but where necessary to be exposed shall be GRC or IMC.
   i. Connection to Equipment: Flexible metal conduit (FMC) or liquid-tight flexible metal conduit (LFMC), not less than 12” nor more than 6’ in length, as required by environment, shall be used for terminating at recessed light fixtures or vibrating equipment. Coordinate any other proposed uses with Engineering Services or CFS. FMC shall be UL-1 listed and LFMC shall be UL-360 listed.

4. Telecommunication System Conduit
   a. Refer to the latest version of Telecomm Design Guidelines and Communications Systems - Structured Cabling prepared by IU University Information Technology Services (UITS) for telecommunication system conduit requirements. These standards can be found on IU University Architects Office (UAO) web site; http://www.iu.edu/~uao/html/contracts_standards.html.
   b. General requirements for telecommunication system conduit include, but are not limited to the following:
      1) Sleeves through floors shall be GRC or IMC.
      2) Risers, home runs, and station cabling shall be installed in GRC, IMC, or EMT, as directed by Engineering Services or CFS.
5. Fire Alarm System Conduit
   a. Interior concealed dry spaces
      1) Use GRC, IMC, or EMT
      2) Where conduit cannot be installed, or with Engineering Services
         or CFS approval, plenum rated, MC type cable specifically
         manufactured for use with Fire Alarm Systems may also be used
         in interior concealed dry spaces (MC-FPLP). Jacket is to have
         red coloring.
   b. Interior exposed, or in moist locations use GRC or IMC.

6. Other Low-Voltage System Conduit
   a. Interior concealed dry spaces
      1) Use GRC, IMC, or EMT
      2) Where conduit cannot be installed, or with Engineering Services
         or CFS approval, low-voltage system cabling may be installed in
         open air providing the following criteria is satisfied.
         a) Cables are not subject to damage.
         b) Cables are provided with plenum rated jackets.
         c) Cables are properly supported by J-hooks and/or bridle
            rings.
   b. Interior exposed, or in moist locations use GRC or IMC.

7. Couplings and Fittings For Conduits
   a. The University is concerned with the quality of materials used and the
      workmanship expended on the installation of conduit couplings and
      fittings. Poor materials and improper installation can and have resulted
      in hazardous conditions due to the loss of the ground return path. The
      consultant is urged to address this issue in detail in the project
      documents.
   b. The minimum standards for material are:
      1) GRC and IMC conduit: threaded, corrosion resistant, malleable
         iron conduit bodies.
      2) No threadless fittings for GRC or IMC shall be used.
      3) EMT conduit: steel compression type for 2" and smaller; steel set-
         screw type for larger than 2".
      4) No cast or indent type couplings shall be specified.
      5) Use manufacturer's recommended solvent cement for RNC and
         manufacturer's standard fittings and accessories.

8. Surface Raceway
   a. In general the University does not accept the installation of surface
      raceways in new building construction. Possible areas where this
      equipment might be suitable are computer cluster rooms, shop areas,
      and laboratories. Remodeling of existing buildings will sometimes
      necessitate using surface raceways, however, this should be kept to a
      minimum. Verify the acceptance of using surface raceways with
      Engineering Services or CFS prior to designing around this type of
      system.
b. Where surface raceway is allowed to be used it may be of metallic or non-metallic construction; utilize smallest surface raceway available to accomplish the job. Paint surface raceway to match walls after installation. Where making vertical drops, install in room corners. Where running horizontally install just above wall baseboard trim. Install a separate equipment grounding conductor within surface raceway. Use manufacturers standard fittings and accessories.

c. Where single channel surface raceways are used for branch circuits and control wiring use Wiremold 700 as the minimum size metallic raceway solution, and Panduit LD10 as the minimum size non-metallic raceway solution.

d. Where single channel surface raceways are used for telecommunications wiring use Wiremold V2100 as the minimum size metallic raceway solution, and Panduit LD10 as the minimum size non-metallic raceway solution. Use extra deep 2-gang outlet boxes.

e. Where multiple outlet assemblies of the same type, e.g. all duplex receptacles, all UITS data outlets, are required use Wiremold 3000 as the minimum size metallic raceway solution, and Panduit T-70 as the minimum size non-metallic raceway solution.

f. Where multiple outlet assemblies are installed in a divided raceway use surface raceway with two covers, one for each channel. Install devices under separate covers. Use Wiremold DS4000 as the minimum size metallic raceway solution, and Panduit Twin-70 as the minimum size non-metallic raceway solution.

g. For laboratory installations utilize Wiremold Isoduct AL4320 extruded anodized aluminum raceway.

9. Firestopping

Raceways penetrating a fire wall or other fire rated barriers shall have rating of fire barriers restored using approved methods. Drawings shall detail locations and techniques used.

B. Boxes

1. Wall and Ceiling Outlet Boxes

   a. In general wall outlet boxes shall be galvanized steel, 4” square with depth as required by devices or conduits. Specify partitioned multi-ganged switch boxes where voltage between exceeds 300 volts. Plaster rings shall be used for single gang devices. Telecommunication outlets shall be a minimum of 2-1/8” deep. In exterior or damp locations use cast metallic boxes type FD or FS.

   b. Ceiling outlet boxes shall be galvanized steel and rated and installed to support fixture or equipment weight.

   c. Wall boxes shall not be installed in any “through wall” manner. This includes back-to-back installation, and back-to-back with nipple connections.
2. Floor Boxes
   a. Cast-in-place type floor boxes shall be fully adjustable style cast metal where used at or below grade and fully adjustable style formed steel above grade level.
   b. Preferred cast-in-place floor box style will have devices mounted in a vertical plane, e.g. Legrand/Wiremold RFB or Evolution style.
   c. Poke through type floor boxes are acceptable for use in existing construction. Location of poke through floor boxes shall be carefully selected to not degrade the structural integrity of the existing floor.
   d. Preferred poke through floor box is Legrand/Wiremold 6AT or 8AT.

3. Pull and Junction Boxes
   a. Where installed indoors use galvanized sheet steel NEMA I enclosure with baked enamel finish. Boxes shall have screw cover.
   b. Where installed outdoors or in damp or wet locations use NEMA type 3R or 4 gasketed enclosure with screw cover.
   c. Where cast outlet boxes are installed use cast metal surface mounted pullbox.

4. Identification
   a. Pull and outlet boxes located in ceiling spaces and in unfinished areas of building shall be legibly identified on exterior with permanent markers indicating the circuits contained within and panel serving circuits.
   b. For fire alarm system pull and outlet boxes, paint cover red. If installed exposed in finished space, paint raceway and box to match finish, and install pre-printed labels on conduit that read “FIRE ALARM SYSTEM”.

C. Cabletray (Section 26 05 36)
   1. Cabletray shall be used to carry telecommunication cables, data cables, control system cables, other low-voltage system cables, and in rare instances power cables in accessible areas or locations without ceilings. Preferred style is wire basket.
   2. Refer to the latest version of *Telecomm Design Guidelines* and *Communications Systems - Structured Cabling* prepared by IU University Information Technology Services (UITS) for telecommunication system cabletray requirements. These standards can be found on IU University Architects Office (UAO) web site; http://www.iu.edu/~uao/html/contracts_standards.html.
   3. Install cable tray as low as possible above accessible ceilings and secure to side wall with an "L" shaped bracket wherever possible. Use 4" EMT (quantity determined by cable tray width) to transition above inaccessible ceilings. Install tray at 9'-0" in areas without ceilings. Stem mount supports from structure where side walls cannot be utilized. Stem mount supports shall be attached to the sides of the cable tray. To allow for future use an 18" minimum clearance shall be maintained on the free side(s) of cable trays and a minimum of 18" clearance shall be maintained above trays. Turns in tray shall be made by using two (2) 45 degree turns in lieu of one (1) 90 degree turn where possible.
D. Underfloor Duct (Section 26 05 39)
1. In areas of buildings with a known high concentration of power and telecommunication needs which cannot be served by wall outlets an underfloor duct system may be considered for use. The system shall be compartmentalized into three (3) separate raceways: one for power wiring, one for telecommunication wiring, and one for future cabling. The system must be coordinated with the architectural and structural design of the building.
2. Preferred manufacturers, subject to specific system requirements, are Legrand/Walkerduct and Square D.
3. Details of system design and installation shall be coordinated with Engineering Services or CFS. Specific concerns will include how duct system is interfaced with telecommunication's equipment rooms, electric panelboards, floor finishes, and etc.

E. Underground Site And Electrical Utilities (Section 26 05 43)
1. Below Grade Low Voltage Power Feeder and Branch Circuits
   a. Below grade power feeder, branch circuit and control conduit are to be installed a minimum of 2’-6” below grade. Slope conduits away from building where possible. Install a magnetically detectable red plastic marking tape 1’ above top of conduit.
   b. Power feeder conduit shall be sand or concrete encased GRC, or concrete encased RNC 40 or concrete encased RNC 80. Below grade power feeder conduit shall be installed in a 3” sand or concrete envelope. Where RNC is used, transition to GRC for penetrating building footings or elbows up through floor slabs. RNC conduit shall not be installed within building interiors. Minimum conduit size is 1”.
   c. Branch circuit and control conduit shall be GRC, IMC, RNC 40 or RNC 80. IUPUI Campus shall be GRC, RNC 40 or RNC 80. Below grade branch circuit and control conduit shall be installed in 3” sand envelope (concrete encasement is also acceptable). Where RNC is used and penetrates building footing or elbows up through floor slab GRC or IMC shall be used. RNC shall not be installed within building. Minimum conduit size is 3/4”.
   d. Junction boxes and covers for branch circuits shall be constructed of cast iron or cast aluminum with neoprene gaskets and stainless steel screws. This type of junction box has problems associated with maintenance and accessibility. Use should be kept to a minimum.
   e. Below grade power feeder, branch circuit and control conduit may be installed using horizontal directional drilling (HDD) methods. If HDD is used, conduit shall be Schedule 80, High Density Polyethylene (HDPE). Preferred manufacturers are: Carlon “Bore-Gard” and Blue Diamond Industries EPEC-80.

2. Low and Medium Voltage Ductbanks and Service Entrance Feeders
   a. The system shall consist of concrete encased GRC, IMC, RNC 40 or RNC 80 conduits. IUPUI Campus shall be GRC, RNC 40 or RNC 80. Minimum conduit size is 5”. Provide 100% spare conduits. Spacing between conduits shall be 2” minimum and the concrete envelope shall
be minimum 3" thick. Use end bell fittings where conduits terminate in manholes or building walls. Plastic conduit spacers shall be used to support conduits and to maintain proper spacing. Install polyethylene plugs on unused conduits. The top of ductbanks shall be minimum of 2'-6" below grade and shall be sloped to drain away from buildings. Install a magnetically detectable red plastic marking tape 1' above top of ductbank. Bends in ductbanks shall be 30" minimum radius. Ductbanks shall utilize #4 reinforcing bar in all four corners with #2 crossties secured with tie wire every two feet along entire ductbank length. Where ductbank connects to a building or manhole, dowel the #4 rebar one-half thickness into the wall using a suitable epoxy adhesive. Transition to GRC at 5'-0" from building if RNC is used in duct bank. At completion of construction of ductbank pull a mandrel and brush or pig through all conduits in presence of Owner's representative to verify accessibility and cleanliness of conduit system. Pull strings shall be installed in all spare conduits.

b. Install a 4/0 bare copper ground wire within ductbank. Bond to ground rod at manholes.

c. On the IUPUI Campus, install a 2" conduit within ductbanks for metering purposes.

d. Padmount transformer secondary conductors and exterior emergency feeders shall be installed in ductbanks.

3. Low and Medium Voltage Manholes

a. Manholes shall be either poured in place or pre-cast concrete. Floor of manhole shall have a 1' x 1' sump. On the IUPUI Campus, the sump shall have a suitable drain opening and stone fill to a minimum depth of 18" and be located in the corner of the manhole floor. Manholes shall meet AASHO-H-20 truck loading with 20% impact rating. Manhole shall have pull-in irons located opposite each ductbank entrance. Sidewalls shall have cable supports on 24" to 30" centers. Manhole covers and frames shall be heavy duty cast iron 30" diameter clear opening. Manhole cover shall be marked "ELECTRIC" and have an identification number attached. Manholes shall have pick holes in lieu of "dropped handles". Where manholes are installed in planting areas install a 10" high frame for manhole lid. Minimum inside dimensions for manholes are 5'W x 7'L x 6'H. On the IUPUI campus, minimum inside dimensions for manholes shall be 6'W x 10'L x 7'H. Install a 5/8" x 8' long ground rod in each manhole and connect to all non-current carrying metal parts (lid, frame, ladder, and etc.). Seal and grout around all penetrations to minimize entrance of any water. Manholes shall be spaced no farther than 325' apart or 150' from building.

4. Low Voltage Handholes

a. Precast concrete handholes may be used for underground low voltage power feeders. Requirements shall meet that of manholes except maximum size shall be 4' x 4' x 4', with cover size 30" diameter.
b. Other materials may be used for low voltage handholes, e.g. High Density Polyethylene (like PenCell), or polymer concrete (like Quazite). Coordinate the use of these products with Engineering Services or CFS.

5. Telecommunication System

a. Refer to the latest version of Telecomm Design Guidelines and Communications Systems - Structured Cabling prepared by IU University Information Technology Services (UITS) for telecommunication system ductbank requirements. These standards can be found on IU University Architects Office (UAO) web site; http://www.iu.edu/~uao/html/contracts_standards.html.

b. General requirements for telecommunication system ductbanks include, but are not limited to the following:

1) Telecommunication system ductbanks shall be 4 inch RNC 80 conduits installed on conduit supports on a sand bed.
2) Sand shall be installed a minimum of 3 inches below, 3 inches around and 3 inches above the conduits.
3) A 3 inch concrete cap shall be installed above the sand. The top of the concrete cap is to be no less than 3 feet below grade.
4) A yellow, magnetically-detectable warning tape shall be installed 1 foot above top of ductbank.
5) Where ductbank crosses or parallels steam and condensate lines conduit shall be rated for high temperature.
6) The minimum size of manholes is 6' W x 10' L x 7'H. Manhole lids shall be secured with a penta-head bolt and marked "TELEPHONE".
7) A continuous trace wire shall be installed with each telecommunication ductbank. The trace wire shall be installed in the sand envelope, NOT in any of the conduit in the ductbank. The trace wire shall be a #14 AWG copper conductor with THHN/THWN insulation. The trace wire shall be connected through any manholes or handholes installed as part of the ductbank. Color coding of the trace wire shall be used to differentiate between ductbanks entering and leaving at different directions from manholes and handholes.

END OF 26 05 33
# Schedule of Raceway Applications

<table>
<thead>
<tr>
<th>Application</th>
<th>GRC</th>
<th>IMC</th>
<th>EMT</th>
<th>FMC</th>
<th>LFMC</th>
<th>RNC 40</th>
<th>RNC 80</th>
<th>HDPE 80</th>
<th>MC FPLP</th>
<th>IU STD'S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Feeder Interior</td>
<td>CONCEALED 2&quot; AND LARGER OR EXPOSED</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 2</td>
<td>a, b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CONCEALED 1-1/2&quot; AND SMALLER OR EXPOSED</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 2.c</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ABOVE GRADE</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 2.f</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BELOW GRADE</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>E 1</td>
<td>a, b, e</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Connection to Vibrating Equipment</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 2.g</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Branch Circuit Interior</td>
<td>CONCEALED 2&quot; AND LARGER OR EXPOSED</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 3</td>
<td>a, c</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CONCEALED 1-1/2&quot; AND SMALLER OR EXPOSED IN ELECTRICAL CLOSET</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 3.b, d</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IN OR BELOW CONCRETE SLAB</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 3.e</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ABOVE GRADE</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 3.h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BELOW GRADE</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>E 1.a, c, e</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Connection to Vibrating Equipment</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 3.i</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ductbanks for Electrical Utility Distribution</td>
<td>IN DUCT BANK</td>
<td>IN DUCT BANK</td>
<td>IN DUCT BANK</td>
<td>IN DUCT BANK</td>
<td>E 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telecommunication Sleeves Through Floors</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telecommunication Riser, Home Runs, and Stations</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telecommunication Below Grade</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>E 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Alarm Circuits Concealed and in Dry Locations</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Alarm Circuits Exposed or in Moist Locations</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Control</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>- * -</td>
<td>A 3.a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**General Notes**

1) Refer to the listed sections for more details and limitations
2) The symbol * indicates approved type

**Abbreviations**

- **GRC** = Galvanized Rigid Metal Conduit
- **IMC** = Intermediate Metallic Conduit
- **EMT** = Electrical Metallic Tubing
- **FMC** = Flexible Metallic Conduit
- **LFMC** = Liquid Tight Flexible Metallic Conduit
- **RNC 40** = Rigid Nonmetallic Conduit, Schedule 40
- **RNC 80** = Rigid Nonmetallic Conduit, Schedule 80
- **HDPE 80** = High Density Polyethylene, Schedule 80
- **MC FPLP** = Plenum rated, Type MC - FPLP, with red jacket