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.

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 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.
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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. **600 Volt and Below - Feeder and Branch Circuit Wires**

1. Conductors shall be annealed copper with the following type of insulation for uses listed:
   a. Feeder (including ground) - THWN
   b. Branch Circuits (including ground) - THHN/THWN

2. Minimum wire size for feeders and branch circuits shall be #12 AWG.

3. Wire size #12 AWG shall be solid conductor. Wire size #10 AWG may be solid or stranded. Wire size #8 AWG and larger shall be stranded conductor.

4. Preferred manufacturers
   a. Encore Wire Corp.
   b. General Cable
   c. Republic Wire, Inc.
   d. Southwire Co.

5. Branch circuit conductors #10 AWG and smaller shall be spliced together using properly sized and listed twist-on spring type insulated connectors, i.e. wire nuts. Conductors #8 AWG and larger shall be spliced using a non-insulated compression type sleeve or split-bolt connection. Install taped covering on sleeve or split-bolt to maintain insulation level of system.

6. Where not provided with equipment use mechanical type lugs (allen-head screw type) to terminate wire.

7. All feeder and branch circuit wiring shall be installed in raceway.

8. Homerun conductors shall be installed unspliced from panelboard source to first device.

9. Multiwire branch circuits are not acceptable. Each branch circuit requiring a neutral conductor shall be installed with a full-sized, dedicated neutral conductor. Special care must be taken when coordinating power feeds to systems furniture to avoid multiwire branch circuits.

10. In remodeling of former residential structures the use of non-metallic sheathed cable for branch circuits may be permitted. Any installation of this cable shall be designed and specified to meet the requirements of Article 336 of the National Electrical Code. Verify the acceptance of using non-metallic sheathed cable with Engineering Services or CFS prior to designing around this type of cable system.
11. Perform meggar tests on all feeders and motor branch circuit conductors. Do not meggar check solid state equipment.

12. Conductors shall be color coded per the following table. The preferred method of color coding is to use conductors with permanently colored insulation. If field applied color coding is required, use pressure sensitive vinyl tape like Scotch 35. Tape shall be applied in half-lapped turns for a distance of 6” from the terminal point and in boxes where splices or taps are made. The last two laps of tape shall be applied with no tension to prevent possible unwinding. If colored tape is applied, do not obliterate cable identification marking.

<table>
<thead>
<tr>
<th>CONDUCTOR</th>
<th>480 / 277 VOLTS</th>
<th>208 / 120 VOLTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Phase</td>
<td>Brown</td>
<td>Black</td>
</tr>
<tr>
<td>B Phase</td>
<td>Orange</td>
<td>Red</td>
</tr>
<tr>
<td>C Phase</td>
<td>Yellow</td>
<td>Blue</td>
</tr>
<tr>
<td>Neutral</td>
<td>Grey</td>
<td>White</td>
</tr>
<tr>
<td>Ground</td>
<td>Green with Yellow Stripe</td>
<td>Green</td>
</tr>
</tbody>
</table>

13. Conductors shall be labeled at each end with circuit information; e.g. panel label and circuit number. Labeling shall also be attached to each conductor at each pull or junction box the conductor passes through.

**B. Control and Signal Wires**

1. Motor control and relaying wiring shall be no smaller than #14 AWG stranded copper conductor type THWN, or MTW, installed in conduit and shall not be run with feeder or branch circuits.

2. Fire alarm and door access control system wiring shall be installed in a raceway system.

3. Temperature control cables, occupancy sensor wiring, and other low-voltage control cables are to be installed in a raceway system. However, system cables 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.
3. Telecommunications System Wiring: 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 wiring requirements. These standards can be found on IU University Architects Office (UAO) web site; http://www.iu.edu/~uao/html/contracts_standards.html.

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