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. **Medium Voltage Distribution System**

The following medium voltage distribution systems are present on the Indiana University Campuses:

1. IU Bloomington: 4,160 volt and 12,470 volt
2. IU Purdue University Indianapolis: 13,800 volt
3. IU Northwest: 12,470 volt
4. IU South Bend: 12,470 volt

In general, all systems are solidly grounded; verify system configuration at Campus locations. Distribution consists of phase conductors plus an insulated ground cable. This ground cable should be a 600 volt THW insulated cable. The existing system ground while not perfect is one of the best grounds available. This system ground should be extended to ground buses in the medium voltage switchgear and bonded to the other grounding electrodes used in the building. The size of the system ground cable shall be as recommended by Engineering Services or CFS.

B. **Service Entrance**

1. Simply referring to the National Electrical Code Article 250 on Grounding is not acceptable. The NEC is not a design manual and while we must meet the requirements of the NEC, additional information on the installation of the grounding system is the responsibility of the Consulting Engineer. The installation of ground mats, connection to water service, building steel, footing grounds, and etc., should be shown on the drawings and included in specifications.

2. A readily accessible ground bar connected to the grounding electrode conductor shall be installed in each main electrical equipment room. The ground bar shall be copper or tinned copper material, minimum 1/4” thick X 4” wide X 20” long. In lieu of a ground bar, a ground loop may be installed. The ground loop shall consist of a #2 AWG bare copper conductor installed around the perimeter of the electrical room at +36” AFF.

3. **Grounding Electrode:**
   a. Utilize building steel where available
   b. Metal underground piping shall be used. Natural gas piping shall not be used.
   c. A building footing ground shall be installed per NEC Article 250.52(A)(3)
   d. A ground mat consisting of at least three driven ground rods (8’-0” long X 3/4” diameter copper clad steel) 10 foot on center shall be installed.
4. The maximum acceptable impedance to ground at the service entrance is 5 ohms and the grounding system should be designed accordingly. The project specifications shall require testing and documentation of this ground impedance. Test results shall be included in project record documents.

5. Grounding electrode systems shall be bonded together at the service entrance within the main switchgear enclosure(s). No independent grounding electrode systems are allowed.

C. **Feeders:** Feeders shall have a separate insulated equipment grounding conductor installed.

D. **Branch Circuits:** Receptacle, lighting, power utilization equipment, etc., shall have separate insulated equipment ground conductors installed.

E. **Telecommunication System:** The telecommunication systems installed shall be grounded in accordance with the latest version of the IU Technical Standards for Telecommunications Distribution Facilities.

F. **Terminations:** Terminations of grounding system conductors shall be done using listed lugs and fittings specifically made for the use intended. Using sheet metal bolts with lock washers and Sta-Con connections on the wire is not acceptable.

G. **Inspection:** The Consulting Engineer and Owner’s Representative should inspect the main distribution equipment to verify that the main bonding jumper between the system ground and the grounded conductor (neutral in most cases) has been installed. Engineering Services has found several installations where this jumper was not properly installed resulting in an unsafe working condition.

H. **Manholes:** All metal parts in manholes, e.g. lid, ring, frame and support, ladder, and etc., shall be bonded to ground rod and ductbank ground conductor with a minimum #6 THW conductor.

I. **Ductbanks:** Refer to Section 26 05 43 - Underground Ducts and Raceways for Electrical Systems for ground conductor requirements in ductbanks.

**END OF 26 05 26**