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. 5 KV and 15 KV cables shall be single conductor type rated MV-105, 133% insulation level composed of Class B compressed or compact stranded copper conductor, extruded semi-conductor shield, ethylene propylene (EPR) insulation complying with ICEA S-93-639, combination insulation shield and jacket consisting of corrugated copper drain wires embedded in extruded non-conducting chlorinated polyethylene (CPE), #2 AWG minimum. Alternately, provide a combination insulation shield and jacket consisting of 25% overlapped annealed copper tape ribbon (minimum 5 mil thick) embedded in extruded non-conducting PVC or chlorinated polyethylene (CPE). Cable shall be sealed against longitudinal water penetration at 5 psi water pressure per ICEA T-31-610. Preferred manufacturers of medium voltage cable are General Cable, Prysmian Cables & Systems, Southwire and Okonite.

B. On the IUPUI campus, 15 KV cables shall be single conductor type rated MV-105, 133% insulation level composed of Class B compressed or compact stranded copper conductor, extruded semi-conductor shield, ethylene propylene (EPR) insulation complying with ICEA S-93-639, combination insulation shield and jacket consisting of 25% overlapped annealed copper tape ribbon (minimum 5 mil thick) embedded in extruded non-conducting PVC or chlorinated polyethylene (CPE), #2 AWG minimum. Preferred manufacturers of medium voltage cable are: General Cable, Prysmian Cables & Systems, Southwire and Okonite.

C. Cables shall take the longest route around the manhole to allow slack for future use. In all cases, adequate slack for future splices shall be provided in the cable routing. Project Manager shall approve final cable routing. When installing cable use pulling eyes connected to conductor in lieu of pulling “baskets” which grip the outer jacket of cable. Steel cable shall not be used to pull in cables. Cable shall be pulled in as a circuit off spools and not laid out on the ground. Cables shall be wrapped as a circuit with fireproofing tape in manholes and junction boxes. Where installed, modular tees shall not be fire taped. Scotch 77 fireproofing tape spirally overwrapped with Scotch 69 glass cloth electrical tape on 6” centers is approved for this use.

D. Termination and splicing of cable shall be done utilizing manufactured kits. Scotch 7620 Series for indoor and Scotch7630 for outdoor termination shall be used. Splice kits shall be Scotch 5500 Series. Terminations and splices shall be installed by journeyman electricians who have been trained by the manufacturer for the type of equipment installed. Only compression type sleeves and lugs, specifically listed for use on medium voltage systems, shall be used to splice or terminate conductors. In some instances, a modular splicing system will be utilized. Coordinate installation requirements with Engineering Services or CFS. Abandoned feeders or circuit taps that remain energized as a result of project work, shall be terminated with live end seal kits like Raychem. On the IUPUI Campus, use Elastimold or Hubbell 600A deadbreak elbows for padmount transformers.
E. Where used, modular splicing systems with tightening by spanner wrench shall be Elastimold 600 Series with test point or equivalent by Hubbell. Cooper or 3M are not approved for this purpose.

F. Cable testing shall be performed by an independent, third party, approved testing agency. Cables shall be tested three times during construction projects.

1. Meggar test cable on reels at 5000VDC for one minute.

2. After the installation of new cable in conduit or ductbank, and prior to termination, cables shall again be meggar tested at 5000VDC for one minute.

3. After termination and splice kits are installed the following tests shall be conducted in according to current InterNational Electrical Testing Association (INETA) acceptance test standards in the presence of the Owner's representative.
   a. The cable shall be DC Hi-pot tested. This test shall not to exceed 80% of factory test value. Maintain the final test voltage level applied to the cable for 10 minutes.
   b. The cable shall be tested using the Tan Delta method.

4. Record and submit all test results to the Owner for approval prior to energization. The following information shall be included on test reports: date, project, circuit identification, cable manufacturer, insulation rating, conductor size, temperature and humidity at time of test, voltage increments, stabilization time, leakage current at final test voltage after 10 minutes, test graphs, megohm meter readings, and names and mode numbers of instruments used. If any single cable fails testing, all three cables in raceway system shall be replaced and then retested per the above requirements. No hi-pot testing of existing cable shall be permitted. During circuit upgrade reconductoring projects, Contractor shall be responsible for disconnection and reconnection of instrument transformers and lightning arrestors to facilitate acceptance testing.

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