

Cable Splicing and Terminating, MV

4.5 Days, 3.6 CEUs

Solid dielectric power cable systems are subject to higher voltages than ever before. Inadequate installation and testing of cable splices and terminations is the number one cause of failure (IEEE Std 493-2007 Table 10-33). Yet over the last few decades, cable splicing as a profession has declined as multi-crafting and departmental merges have made it just a function among many. Proper installation of cable splices and terminations drastically improves the lifetime of cables, and prevents damage to downstream equipment and nearby personnel. This hands-on course is intended for new or experienced electricians and technicians that install, maintain, repair or troubleshoot 5-35 kV solid dielectric power cables.

Pre-Requisites:

The student should have some field experience and basic knowledge of AC/DC electricity.

Lab and Classroom Attire:

AVO is committed to the personal safety of each participant and requires long pants and ANSI rated "safety toe" work shoes for lab activities. Lecture courses may involve a tour of a work or shop area and for this reason open toe shoes and shorts are not considered appropriate attire for classroom.

Learning Objectives:

Upon completion of this course and lab practice, the participant will demonstrate by attaining a minimum average grade of 80% (between lab practice and final exam), that he/she is able to:

- Explain medium voltage cable components and construction.
- Identify applications of different cable types including marine, offshore, mining, underground (URD) and tech.
- Prepare cable for splicing utilizing hand tools, abrasives and solvents.
- Install taped, molded and heat shrink splices on tape-shielded and jacketed concentric (JCN) cables.
- Install taped, cold shrink, heat shrink and molded elbow terminations.
- Utilize a high potential tester for performing withstand tests on assembled splices.
- Identify the causes of splice and termination failures.
- Explain procedures for buried, duct and tray installation and relevant OSHA safety requirements.

SCOPE

I. Introduction

II. Medium Voltage Splicing and Termination

- A. Material Technology
- B. Human Factors in Splicing
- C. Safety for Technicians
- D. Safety Rules

III. Types, Application and Manufacture of Medium Voltage Cables

- A. Cable Types
- B. Application of Medium Voltage Cable
- C. Manufacturing of Medium Voltage Cable

IV. Medium Voltage Cable Components

- A. Conductor
- B. Insulation
- C. Insulation Shield System
- D. Bedding Tape
- E. Jacket
- F. How Solid Dielectric Cables are Made

V. Cable Installation and Handling

- A. Safety
- B. Environmental Protection
- C. Light, Power, and Ventilation
- D. Housekeeping
- E. Cable Handling
- F. Direct Bury
- G. Causes of Cable Failures

VI. Cable Preparation

- A. Safety
- B. Hand Tools
- C. Abrasives and Solvents
- D. Supplies and Materials
- E. Knives and Cutting Tools Safety
- F. Cable Preparation

VII. Cable Splicing

- A. Application of Tapes
- B. Making a Splice
- C. Corona
- D. Soldering
- E. Torch Safety Precautions
- F. Heat Shrink Splice
- G. Molded Splice Installation
- H. Cable Splicing Labs
 1. Tape Splice
 2. Cold Shrink
 3. Heat Shrink

VIII. Cable Terminations

- A. Classification of Terminations
- B. Stress Control
- C. External Leakage Insulation
- D. Basic Impulse Level
- E. Seal to the External Environment
- F. Hand Taped Termination
- G. Terminating URD Cable
- H. Cable Termination Labs
 1. Tape Term
 2. Cold Shrink Term
 3. Molded Elbow
 4. Heat Shrink Term

IX. Cable Testing

- A. Testing Safety
- B. DC Withstand
- C. VLF Withstand
- D. VLF Withstand Test Lab

X. Conclusion

- A. Review
- B. Test