

# Identifying Workmanship Issues with Factory Grade® Technology

## Contractor Workmanship Feedback with IMCORP Factory Grade® Technology

### HIGHLIGHTS

#### OVERVIEW

Workmanship issues are identified with the Factory Grade® technology.

#### CHALLENGE

Identifying root cause of substandard performance of joints in an efficient and effective manner.

#### RESULTS

Utility client partners with IMCORP to ensure quality and educate installers on how to identify defects with immediate evidence-based feedback before failure.

A utility requested IMCORP to commission a 750kcmil cable system at a new upscale subdivision as part of their medium voltage quality control program. Initial assessment with our Factory Grade® technology pinpointed 2 pre-molded joints on 2 phases that did not meet the accessory manufacturer’s minimum performance standards. The first and second repair attempts by the original contractor crew were assessed only to find joints still failing to meet minimum performance standards. The installation contractor started questioning the validity of the assessment. The utility client was also under pressure from the developer of the residential subdivision to energize the circuit. Our client’s construction supervisor requested our assistance with a field dissection and root cause analysis with the installation contractor in attendance.

Working with the manufacturer, installation contractor, and the utility client’s engineer and construction supervisor, we directed the disassembly of the joints and identified several installation workmanship issues including, insufficient void filling grease, non-radial semicon cutbacks, insufficient connector crimping, improper application of the end caps, and an extreme bending radius near one of the joints. The workmanship issues were corrected and the joints were re-assembled. Our Factory Grade® technology then verified the entire cable system met the manufacturer’s performance standards. This case is yet another example of IMCORP partnering with utility clients to ensure quality and educate installers on how to identify defects with immediate evidence-based feedback before failure.



The Manufacturers’ Standards



Component Standard	Testing Frequency	Thresholds*	
		Sensitivity	Voltage
<b>Terminations</b> IEEE 48	50/60 Hz	5pC	≤ 1.5 U <sub>0</sub>
<b>Joints</b> IEEE 404	50/60 Hz	5pC	≤ 1.5 U <sub>0</sub>
<b>Separable Connectors</b> IEEE 386	50/60 Hz	5pC	≤ 1.3 U <sub>0</sub>
<b>MV Extruded Cable</b> ICEA S-97/94-682/649	50/60 Hz	5pC	≤ 4.0 U <sub>0</sub> <sup>a</sup>
<b>HV / EHV Extruded Cable</b> ICEA S-108-720	50/60 Hz	5pC	≤ 2.0 U <sub>0</sub>

\* No partial discharge should be observable above the sensitivity threshold up to the voltage threshold  
<sup>a</sup>200 V/mil

Table I: Manufacturers’ Standards

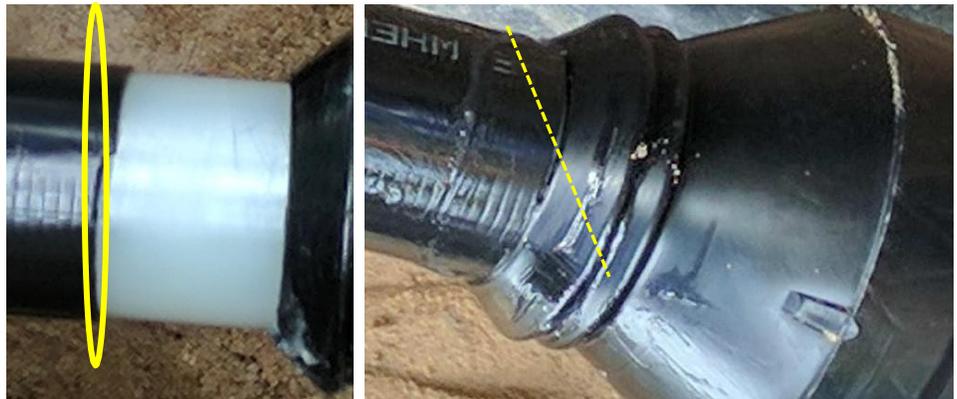


Figure 1: Field disassembly of the premolded joints showed non-radial and jagged cutbacks (left) creating stress-enhancements. Evidence of insufficient void filling grease applied under the end caps on both sides of the joint body (right, yellow circle), creating large air voids between the two mating surfaces.

[1] IEEE standards are classified as:

- Standards: documents with mandatory requirements.
- Recommended practices: documents in which procedures and positions preferred by the IEEE are presented.
- Standard Guides: documents in which alternative approaches to good practice are suggested but no clear-cut recommendations are made.