

Identifying Workmanship Installation Issues at a Solar Site

Solar Site Uses IMCORP Factory Grade® Technology to Achieve Precision Reliability™

HIGHLIGHTS

OVERVIEW

Workmanship issues at solar farm are identified with the Factory Grade® technology

CHALLENGE

Identifying root cause of substandard performance in the face of installer misunderstanding and push back

RESULTS

IMCORP's Factory Grade® technology proven 100% effective in identifying workmanship issues and providing Precision Reliability™ feedback to utility clients and their contractors

Our utility client asked us to commission the collector cable system at a new solar site due to concerns in the quality of the workmanship during the installation of the cable and accessories. Initial assessment with IMCORP's Factory Grade® technology pinpointed 12 live front cold shrink terminations that did not meet the accessory manufacturer's minimum performance standards. Additionally, a mid-span partial discharge (PD) location was detected in one of the cable segments. The cause of the mid-span cable issue was quickly identified as a dig-in during construction. However, the installation contractor was questioning the results and validity of the substandard termination assessment and claimed the terminations passed a VLF test and the installation crew was fully certified by the accessory manufacturer.

Working with the manufacturer, installation contractor, client utility's engineer, and construction supervisor, IMCORP dis-assembled the substandard terminations in the field and identified several installation issues. The most obvious issue was the incorrect insulation/semicon cutback dimensions (Figure 1). The manufacturer's insulation instructions required the dimensions, from the end of the insulation to the semicon cutback to be 13-inches. All 12 substandard terminations had 6-inch cutbacks. This error caused the termination kit's electrical stress control element and void filling compound to fall well below the semicon cutback. The semicon cutback is the point of highest electrical stress in the termination. Other issues identified included jagged/non-radial semicon cutbacks and cuts into the cable insulation. The terminations were repaired and re-assessed with IMCORP's Factory Grade® technology. This action verified the entire cable system met or exceeded the cable and accessory manufacturers' performance standards.



The Manufacturers' Standards



Component Standard	Testing Frequency	Thresholds* Sensitivity	Voltage
Terminations IEEE 48	50/60 Hz	5pC	≤ 1.5 Uo
Joints IEEE 404	50/60 Hz	5pC	≤ 1.5 Uo
Separable Connectors IEEE 386	50/60 Hz	5pC	≤ 1.3 Uo
MV Extruded Cable ICEAS-97/94-682/649	50/60 Hz	5pC	≤ 4.0 Uo*
HV / EHV Extruded Cable ICEAS-108-720	50/60 Hz	5pC	≤ 2.0 Uo

* No partial discharge should be observable above the sensitivity threshold up to the voltage threshold
 **200 V/mil



Figure 1: Field dissection revealing incorrect 6-inch semicon (black layer) cutback.