Technical Bulletin

TB 0271 - Revision of Partial Discharge, Ultrasonic defect identification and categorisation

Purpose

This Bulletin informs affected workers of changes made to Partial Discharge (PD), ultrasonic testing limits and defect prioritisation for all 12/24kV HV distribution switchgear.

Background

As part of an ongoing review into the effectiveness of PD and Ultrasonic testing, new defect category limits and priorities have been introduced for all epoxy-resin air insulated and metal-clad switchgear. In consultation with relevant distribution stakeholders and EA Technologies, testing methods have also been revised with a new refresher training package developed.

The current testing procedure for PD and Ultrasonic testing is outlined in GNV1092.3 – 'Non-invasive network asset condition assessment testing – Transient Earth Voltage (TEV) and acoustic emission'.

Actions

- Table 1 below supersedes defect categorisation limits, qualitative indicators and category time limits detailed in SMI212 and TB0236. This applies to all HV distribution switchgear.
- Staff must book in training through technical.training@endeavourenergy.com.au. New test methods in addition to and incorporating GNV1092.3 are explained in Annexure 1 of this TB.
- Revised layouts of the 'PD app' have also been made available. Staff are required to log out and log back in to Survey123 'Collector' App to use the new PD app.

Impacted Standards

Contents of this technical bulletin will be included in the next update for SMI212 – 'HV switches and switch fuse units'.

PD activity	Visual tracking OR audible by ear OR smell of ozone	Discolouration	No Visual signs of PD (GNV1092.3)
ULTRASONIC ≥ 9 AND/OR TeV ≥ 25	CAT 2*	CAT 3	CAT 4
ULTRASONIC < 9 AND TeV < 25	CAT 2*	CAT 3	NO ACTION

Defect Category	Timeline to action
2	Apply warning tags and raise PIN defect (SMI212) Repair or replace in 1 MONTH
3	Retest in 1 YEAR. If confirmed CAT3, repair or replace in 6 MONTHS
4	Retest in 1 YEAR. Monitor defect.
NO ACTION	None

Table 1: Revised defect identification limits, categories and time to action
***All CAT1 and CAT2 defects must be raised as PIN defects, have warning tags applied and not operated live until rectified (SMI212 5.7). A Category 1 (48 hours) defect must be raised depending on individual risk assessment in accordance with SMI124 5.6.2.**

Content Owner: Evan Riddell (9853 6011)
Senior Engineer, Distribution Substation Assets
Approved By: Danny Asvestas (9853 6164)
Manager Asset Standards and Design

Endeavour Energy

Annexure 1: Updated TeV and Ultrasonic testing procedure (refer to GNV1092.3)

1. Set Ultra TEV+ to TEV setting and take a background TEV measurement on the closest earthed metalwork to the substation and record in the PD Testing App in the section labeled 'Background TeV'.

2. Open HV door and look for any visual signs of tracking, discolouration or audible discharge (examples below). Record the presence of any/all of these in the PD Testing App as required.

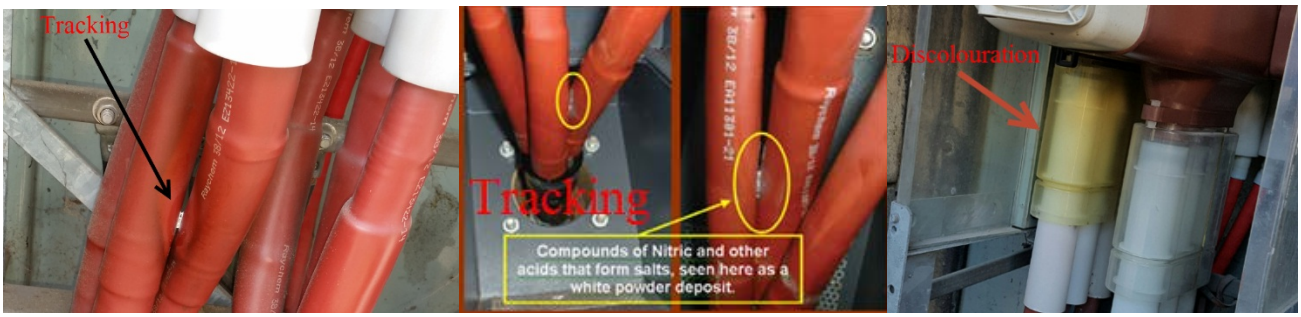

Figure 1: Physical signs of Tracking and Discolouration

3. Take TEV measurements on the switchgear frame / cable chambers and record TEV level and pulse count in PD Testing App. Red dots marked on the images below show test locations for TEV measurements on HV Distribution switchgear.
   The value recorded for TEV is the exact number displayed. There is no need to subtract the background reading. ***There is no longer a requirement to measure keylocks or metal plates on doors****.*

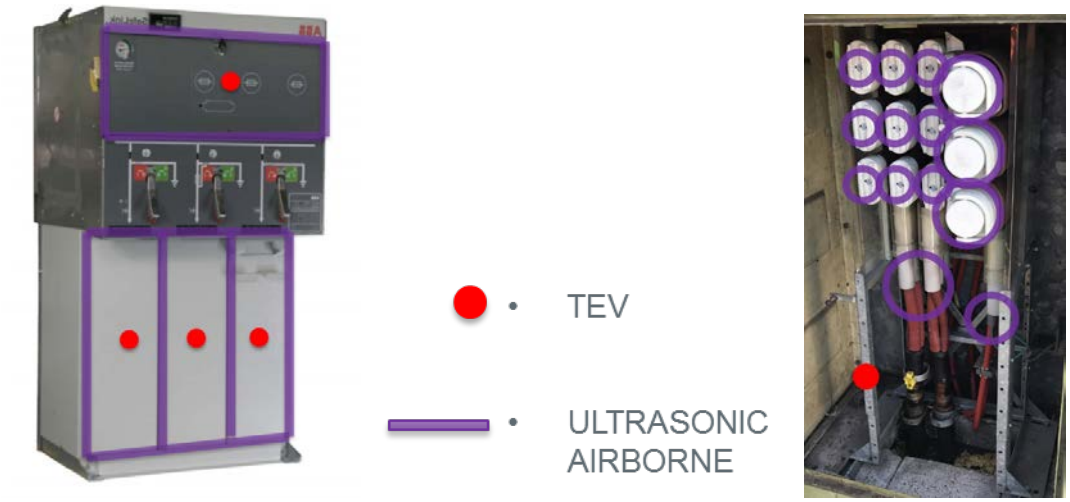

Figure 2: Typical testing locations for metal clad and Holec MD4 switchgear. The highest measured reading for both TeV and Ultrasonic is recorded

4. Change Ultra TEV+ to Ultra mode then connect headphones and flexible wand (below). Using the flexible wand test for any audible discharge coming from the switchgear and / or cable terminations. The areas marked in purple in the images above show highest potential test locations. Record the highest measured Ultrasonic reading into the PD Testing App.

Figure 3: Ultrasonic headset and flexible wand