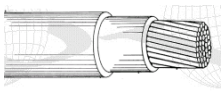
DISTRIBUTION COMMISSIONING FORM (DCF)2.1 – High voltage XLPE cable



Purpose: This instruction covers the testing and commissioning of all replacements or new installations of high voltage cross-linked polyethylene (XLPE) cable.

For more information refer to the *Distribution Commissioning Forms Manual (EDM 34137510)*

Note:

a. Refer to items 8 and 9 (Very Low Frequency Test and Insulation Resistance Test) for all feeder cables or where the cable is greater than 250 metres in length or has in-line joints. Information on joints must be sourced from the cable installer.

b. Do not use a high voltage DC cable tester (high potential) for testing HV XLPE cable.

c. Tests must be performed before the cable is put into service.

Work Package No:		**SPIDAWeb Pick ID:**	
Test Site:			
Location of Cable:	**From:**		
	To:		

1. Cable Description

Rated Voltage: kV		Length m		No. of joints
Size of Cable	mm^2	Cable Function:	Transformer	Feeder Cable

2. Visual Inspection and Safety Check

• Ring main switch • Ring main earth switch • Cap test points • Cable • Cable surge arresters	Does the construction comply with the distribution construction standards and applicable design drawings?	
	Is the switchgear switch in the OFF position? N/A	
	Check the equipment mimic diagram to confirm the earth switch position. Is the earth switch in the ON position? N/A	
	Have the interlock been disengaged to access the cable/compartment for test purposes?	
	Has a confirmatory test been conducted to confirm that the cables are de-energised (with an approved testing device) before proceeding further.	
	Have the earthing system been completed and undamaged if possible?	
	Is the equipment/cable free from physical damage?	
	Have the cable been clearly marked with each phase colour and labelled (if applicable)?	
	Have the surge arresters been disconnected from cable terminations (if applicable)?	

3. End to End Phasing Test

	Test Connection	Resistor Values	Test Results
Use a resistor box in conjunction with a 500 V insulation resistance tester to identify the cable end and phases.	Red phase – screen	MΩ	MΩ
	White phase – screen	MΩ	MΩ
	Blue phase – screen	MΩ	MΩ

4. Insulation Resistance Test

	Test Connection	Minimum Values	Test Results
Conduct an insulation resistance test for 1 to 10 minutes (subject to the length of the cable) or until the reading is stable. Use a 5 kV insulation resistance tester between each phase conductor and the corresponding cable screen.	Red phase conductor to red cable screen	>10,000 MΩ/10 GΩ	MΩ
	White phase conductor to white cable screen	>10,000 MΩ/10 GΩ	MΩ
	Blue phase conductor to blue cable screen	>10,000 MΩ/10 GΩ	MΩ

5. Sheath Integrity Test

	New Cable (>1,000 MΩ) Old Cable (>10 years old) (>100 MΩ)		
	Test Connection	Minimum Values	Test Results
Conduct an insulation resistance test for 1 to 10 minutes (subject to the length of the cable) or until the reading is stable. Use a 5 kV insulation resistance tester between each cable screen to earth.	Red phase cable screen to earth	>100 MΩ/ (1,000 MΩ/1 GΩ)	MΩ
	White phase cable screen to earth	>100 MΩ/ (1,000 MΩ/1 GΩ)	MΩ
	Blue phase cable screen to earth	>100 MΩ/ (1,000 MΩ/1 GΩ)	MΩ
If the insulation resistance test is <1,000 MΩ for new cables and <100 MΩ for old cables, notify the appropriate authorities (construction project manager - CPM) for further testing or repair; otherwise proceed. **Note**: Not applicable for mixed cables.			

6. Cable Termination Checks

Ensure all the cable connections and terminations are made and tightened to the required manufacturer standard.	☐
Ensure all the cables are clearly and correctly labelled.	☐

7. Handover of Responsibility for the Completion of Items 1-6

I hereby certify that items 1 to 6 have been completed with satisfactory results and transfer control to the person responsible for commissioning.				
Testing officer/cable jointer/CPM		BNA		
Signature		Date & Time		
Indicate if VLF testing is required according to criteria (cable length; in-line joints).			Yes	No

8. Very Low Frequency (VLF) Test (to be conducted by HV lab or Western Power approved testing contractors)

Test Connection	Value	Test Results
Set the VLF tester to apply the required voltage at a 0.01–1.0 Hz frequency (subject to the length of the cable) for 60 minutes for phases to screen (earth). Record the applied voltage as per Western Power procedures (EDM 21404211). Note: For maintenance of cables the test voltage is to be reduced to 80% for existing cable and to 60% for ageing cable (greater than 30 years of service).	kV	

AC (VLF) Tester—Triplex or Single-Phase XLPE Cable					
Connection			Voltage Peak	Test Duration	Start Leakage (mA)	Finish leakage (mA)
R+W+B	To	E		60 min		

9. Insulation Resistance Test (Post-VLF Test)

Conduct an insulation resistance test for 1 to 10 minutes (subject to the length of the cable) or until the reading is stable. After the VLF test, use a 5 kV insulation resistance tester between phase to phase and earth. Record the measured values.	Test Connection	Minimum Values	Test Results
	Red to (white & blue) phase & earth	>10,000 MΩ/10 GΩ	MΩ
	White to (red & blue) phase & earth	>10,000 MΩ/10 GΩ	MΩ
	Blue to (red & white) phase & earth	>10,000 MΩ/10 GΩ	MΩ
If the insulation resistance test is <1,000 MΩ for new cables and <100 MΩ for old cables, did the cable sheath withstand an applied HV of 4 kV DC per millimetre applied between the screen and the outer sheath (ground) without any puncture? If **NO**, the tester needs to locate the sheath fault and report to the CPM to arrange for repair. **Note**: Not applicable for mixed cables.			

10. Handover of Responsibility for the completion of Items 7-9

The person responsible for commissioning must ensure that all checks are completed, and the test results comply with the minimum standards.

Note: Phase out under NOCC switching schedules across the normally open point, if applicable.

I hereby certify that all items have been completed with satisfactory results and transfer control to the network operating authority.			
Commissioned by		BNA	
Signature		Date & Time	

1. Ensure the work area is left tidy with no hazards to the public.
2. Hand over responsibility to the operating authority.
3. Return this form to the project file as a record of the commissioning/handover certificate.
4. The completed form must be returned to the project file/work pack.