

## **Testing & Commissioning**

10KV DC Sheath Integrity Test: The Test is applied when the cable sheath can be isolated from the earth to permit the voltage to be applied to the over sheath to check the integrity of the covering. This testing is generally applied at different stage of cable system installation at specified parameter as follow:

1. When the cable is still on reel/drum, the applied voltage is 10KV for 10 seconds, if test lead is provided.
2. Once the cable is laid, dressed and tied together in trefoil contribution a test voltage of 10KV is applied for 20 second.
3. After backfilling with sand, RCC protection slab, warning tape, normal soil etc as per drawing, a test voltage 10kV applied for 1 minute on each cable. This is a formal testing should be done in present of consultant/clients and reports should be signed as witnessed for record purpose. All cables end should be sealed properly if any end found damage. Jointing & Termination: Before jointing/termination of cables in joint bay/end side, both sides cable phase checking /continuity must be done and marked properly as per drawing, all cable should be moisture/water free, if any moisture/ water found in cables then nitrogen blowing must be done for removing oisture/water. After completion of jointing (cross-bonding) and End Termination Outdoor/Indoor then pre-commissioning test must be conducted in presence of consultant and client.

Earthing System: Earthing Systems are very important for any Electrical System, so proper earthing value should come as per requirement, must be checked jointly and recorded. Cable Outer sheath Earthing pits should be done separately in all the locations where ever earthing system provided as per system requirement/drawings/SLD.

**Testing & Commissioning:** Sheath Integrity test for laid Cable should be done immediately, so that any major sheath faulty found, proper action may be taken. Backfilling must be done as per drawing, after backfilling again sheath integrity to be performed, all test result must be recorder and witnessed by clients. Before joining work, phase identification must be done with proper color tape or permanent marker. Once all joints and termination work completed then EHV system is ready for pre-commissioning test,

Following Test (or advice by client test) must be done as Testing & Commissioning" SOP"

1. Continuity test or Phase Checking, 2. Sheath Integrity test,
3. Insulation test, 4. Capacitive test, 5. No load Test (or Comm. Test) for 24Hrs at rated voltage.

All test result / reports must be jointly signed by consultant/clients/contractor/testing agency.

### **List of Equipment for Testing & Commissioning Work:**

1. DC High Voltage Test Kit (0-25KV, 25mil. Amp.) + Portable DG Set.
2. Megger 5kv.
3. Insulation resistance tester / Multi meter.
4. Toolbox.

PHASE CHECKING TEST REPORT						
PROJECT		Project Name				
CABLE TYPE		.....kV .....SQmm XLPE CABLE				
ROUTE/FEEDER						
ROUTE LENGTH		km				
TEMPERATURE				°C	HUMIDUTY	%
No	PHASE		CONNECTION		TEST RESULT	
1	RED		Red	Earthed		
			Yellow	Unearthed		
			Blue	Unearthed		
2	YELLOW		Red	Unearthed		
			Yellow	Earthed		
			Blue	Unearthed		
3	BLUE		Red	Unearthed		
			Yellow	Unearthed		
			Blue	Earthed		
TEST INSTRUMENT			MANUFACTURER		REMARKS	
TEST	ORGANIZATION			NAME		SIGNATURE
WITNESSED BY	Client					
TEST BY	Testing Agency/Contractor					

10kV DC SHEATH INTEGRITY TEST REPORT					
PROJECT	Project Name				
CABLE TYPE	.....kV .....SQmm XLPE CABLE				
ROUTE/FEEDER					
ROUTE LENGTH	km				
TEMPERATURE		°C	HUMIDITY		%
TEST Section	CIRCUIT	Test Voltage / Time	PHASE	LEAKAGE CURRENT	TEST RESULT
From...	CIRCUIT 1	10kV	Red	mA	
to		applied for	Yellow	mA	
.....		1 minute	Blue	mA	
TEST INSTRUMENT		MANUFACTURER			REMARKS
Hi-pot kit / Megger					
TEST	ORGANIZATION		NAME		SIGNATURE
WITNESSED BY	Client				
TEST BY	Testing Agency/Contractor				

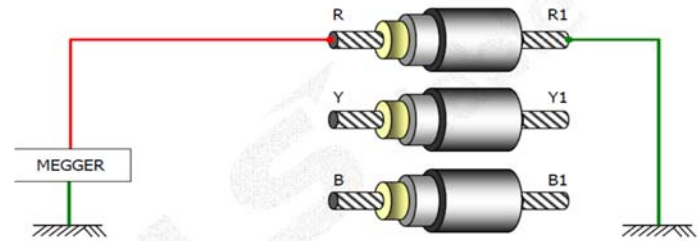


Fig. 1 Cable Phasing Test

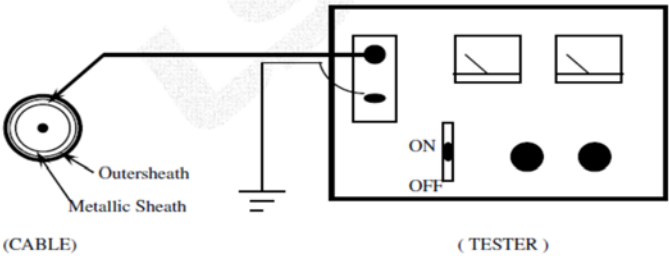


Fig. 2 10kV DC Sheath Test

INSULATION RESISTANCE									
TEST REPORT									
PROJECT		Project Name							
CABLE TYPE		.....kV .....SQmm XLPE CABLE							
ROUTE/FEEDER									
ROUTE LENGTH		k m							
TEMPERATURE				°C		HUMIDUTY		%	
S.No.	PHASE	TEST VOLTAGE / TIME			RESISTANCE			TEST RESULT	
1	RED	5kV / 1Minute			Measured			GΩ	
2	YELLOW	5kV / 1Minute			Measured			GΩ	
3	BLUE	5kV / 1Minute			Measured			GΩ	
TEST INSTRUMENT			MANUFACTURER				REMARKS		
TEST	ORGANIZATION				NAME			SIGNATURE	
WITNESSED BY	Client								
TEST BY	Testing Agency/Contractor								

EFFECTIVE CAPACITANCE									
TEST REPORT									
PROJECT		Project Name							
CABLE TYPE		.....kV .....SQmm XLPE CABLE							
ROUTE/FEEDER									
ROUTE LENGTH		km							
TEMPERATURE			°C		HUMIDITY		%		
No	PHASE	METALLIC SCREEN	SPECIFIED [μF/Km]		MEASURED TOTAL[μF]      μF/Km				
1	RED	Conductor & Sheath							
2	YELLOW	Conductor & Sheath							
3	BLUE	Conductor & Sheath							
TEST INSTRUMENT			MANUFACTURER			REMARKS			
TEST	ORGANIZATION		NAME			SIGNATURE			
WITNESSED BY	Client								
TEST BY	Testing Agency/Contractor								

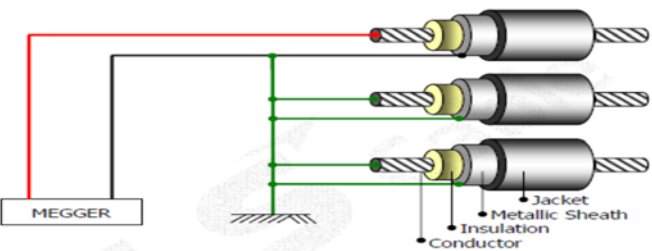
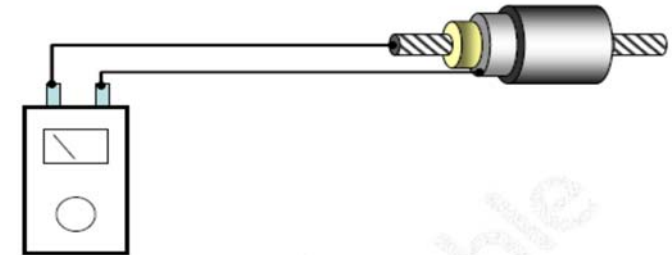


Fig. 3 Cable Insulation Resistance Test



Test Instrument

Fig. 4 Cable Capacitance Measurement

Commissioning Test: Before commissioning test megger must be done, Electrical Safety clearance obtained. All testing equipment's calibration certificate copy to be submitted along with test reports.

AC HIGH VOLTAGE TEST ON NO LOAD					
TEST REPORT					
PROJECT		Project Name			
CABLE TYPE		.....kV .....SQmm XLPE CABLE			
ROUTE/FEEDER					
ROUTE LENGTH		km			
TEMPERATURE		°C		HUMIDUTY %	
Sl. No.	Phase	Test Time	Charging Current [A]	Test Result	Remark
1	Red Phase	For 24 Hrs			
2	Yellow Phase				
3	Blue Phase				
TEST	ORGANIZATION		NAME		SIGNATURE
WITNESSED BY	Client				
	Contractor				

No Load charging current May recorded for future references.