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1. **GENERAL DATA AND INFORMATION:**

 Project no: Contractor no

 Circuit: Manufacturer:

 Cable size Rated voltage

 Route length: Rated current:

 Cable type: Test date:

1. **MECHANICAL CHECKS & VISUAL INSPECTION:**

As per TCS – P – 105, Rev – 01Item no 3.20.1., 3.22.1.

|  |  |  |
| --- | --- | --- |
| Item | Description | Checked |
| 1 | Inspect For Physical Damage or Defects | ❑Yes  | ❑N/A  |
| 2 | Verify all cable connections as per drawing | ❑Yes  | ❑N/A  |
| 3 | Check all cables and cores are labeled correctly | ❑Yes  | ❑N/A  |
| 4 | Check tightness of terminals and confirm the cables are secured  | ❑Yes  | ❑N/A  |
| 5 | Check cable size against rating required | ❑Yes  | ❑N/A  |
| 6 | Check cable entry path trench or ducts are to be properly sealed  | ❑Yes  | ❑N/A  |
| 7 | Check for proper cable support ,clamping trays, blocking | ❑Yes  | ❑N/A  |
| 8 | Check cable bends to ensure that the bending radius is equal to or greater than that specified | ❑Yes  | ❑N/A  |
| 9 | Visual inspection, size and rating confirmation | ❑Yes  | ❑N/A  |
| 10 | Check that phases are identified and colorCoded | ❑Yes  | ❑N/A  |
| 11 | Check tightness of all bolted connections (torque wrench method) | ❑Yes  | ❑N/A  |
| 12 | Link Box tightness check | ❑Yes  | ❑N/A  |
| 13 | Check / inspect the cable outer jacket for any physical damage or irregularities  | ❑Yes  | ❑N/A  |
| 14 | Check / inspect the transposition of cable phases | ❑Yes  | ❑N/A  |
| 15 | Check for the cross connection of cable metallic sheath in cross bonding system | ❑Yes  | ❑N/A  |
| 16 | Check the rubber seals in the cable clamp to avoid any damage to cable outer jacket | ❑Yes  | ❑N/A  |
| 17 | Single core cable connected between power Transformer and switchgear shall be single point earthed at switchgear side and at floating side SVL (Sheath voltage Limiter) | ❑Yes  | ❑N/A  |
| 18 | Check that all ground points are securely connected to ground grid as specified | ❑Yes  | ❑N/A  |
| 19 | Verify that shields are terminated as specified (through Link Box or directly grounded)  | ❑Yes  | ❑N/A  |
| 20 | For accessories (sealing termination, instrument panels and Link Boxes), check the following as applicable.1.Name plate installed and data is correct2.condition of paint work3.All bolted connections | ❑Yes  | ❑N/A  |
| 21 | Check irregularities of outer jacket formed by non uniform shield wire distribution. | ❑Yes  | ❑N/A  |

1. **ELECTRICAL TESTS:**

As per TCS – P – 105, Rev – 01Item no 3.20.2., 3.22.2.

* 1. **CONDUCTOR PHASING AND CONTINUITY CHECK:**

|  |  |  |  |
| --- | --- | --- | --- |
| Phase | Red | Yellow | Blue |
| Phasing Check  | At far end | Result | At far end | Result | At far end | Result |
| Red -Earthed |  | Red – Open |  | Red – Open |  |
| Yellow- Open |  | Yellow -Earthed |  | Yellow - Open |  |
| Blue – Open  |  | Blue – Open  |  | Blue – Earthed  |  |

Criteria**:**

* 1. **OUTER JACKET INTEGRITY TEST:**

|  |  |  |  |
| --- | --- | --- | --- |
| Test | Red  | Yellow | Blue |
| Shield IR at 5 K.V. for 1 Min |   |  |  |
| Jacket Test at 10 K.V. for 1Min |   |  |  |
| Shield IR at 5 K.V. for 1 Min |  |  |  |

 Criteria:

* 1. **CONDUCTOR CAPACITANCE TEST:**

|  |  |  |  |
| --- | --- | --- | --- |
| Test | Red  | Yellow | Blue |
| Capacitance |  µf | µf / Km |  µf | µf / Km |  µf | µf / Km |
|   |  |  |  |  |  |
|  |  |  |  |  |  |

Criteria:

* 1. **CONDUCTOR RESISTANCE TEST:**

Conductor size:

Conductor material:

Air temperature: ºc

|  |  |  |  |
| --- | --- | --- | --- |
| Phase | Measured value = Rt ºC | Ambient temperature  | Recalculated values for 20 ºc = R  |
|  (Ω) |  (Ω / km) | (ºC) |  (Ω) |  (Ω / km) |
| Red  |  |   |  |  |  |
| Yellow  |  |   |  |  |  |
| Blue |  |  |  |  |  |

Recalculated = R 20 ºC = Rt ºC \* 1 / 1 + 0.00393 (t - 20) Ω

Criteria:

* 1. **CONDUCTOR INSULATION RESISTANCE TEST:**

|  |  |
| --- | --- |
| Test | Insulation Resistance for 1Min at 5 KV |
| Red  | Yellow | Blue |
| Conductor |   |  |  |

 Criteria:

* 1. Sheath voltage Limiter Insulation Resistance:

|  |  |  |
| --- | --- | --- |
| Joint bay number | Link box serial no | SVL insulation resistance for 1min at 2.5 k.V... |
| Red | Yellow | Blue |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Criteria:

* 1. **LINK BOX GROUND RESISTANCE MEASUREMENT:**

|  |  |  |  |
| --- | --- | --- | --- |
| Joint bay number | Link box serial no | Link box type  | Earth resistance  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

 Criteria:

* 1. **LINK BOX CONTACT RESISTANCE TEST:**

Link Box Location: Link Box Type:

|  |  |
| --- | --- |
| Location | Link Box Type  |
| Contact face | Resistance (µΩ) | Contact face | Resistance(µΩ) | Contact face | Resistance (µΩ) |
| Red top |  | Red bottom  |  | Ground top |  |
| Yellow top |  | Yellow bottom |  |  |  |
| Blue top |  | Blue bottom |  |  |  |
|  |
| Location | Link box type  |
| Contact face | Resistance (µΩ) | Contact face | Resistance(µΩ) | Contact face | Resistance (µΩ) |
| Red top |  | Red bottom  |  | Ground top |  |
| Yellow top |  | Yellow bottom |  |  |  |
| Blue top |  | Blue bottom |  |  |  |

|  |  |
| --- | --- |
| Location | Link box type  |
| Contact face | Resistance (µΩ) | Contact face | Resistance(µΩ) | Contact face | Resistance (µΩ) |
| Red top |  | Red bottom  |  | Ground top |  |
| Yellow top |  | Yellow bottom |  |  |  |
| Blue top |  | Blue bottom |  |  |  |

|  |  |
| --- | --- |
| Location | Link box type  |
| Contact face | Resistance (µΩ) | Contact face | Resistance(µΩ) | Contact face | Resistance (µΩ) |
| Red top |  | Red bottom  |  | Ground top |  |
| Yellow top |  | Yellow bottom |  |  |  |
| Blue top |  | Blue bottom |  |  |  |

Criteria:

* 1. **CROSS BONDING VERIFICATION TEST:**

 Current Injected at: Injected current:

|  |  |  |
| --- | --- | --- |
| Location |  X – Bond Link Box | Grounding Link Box  |
| ( S / s ------ ) | Current (A) | Volts to gnd (V) |  | Current (A) | Volts to gnd (V) |
| Red - blue |  |  | Red phase  |  |  |
| Yellow - red |  |  | Yellow phase |  |  |
| Blue -yellow  |  |  | Blue phase |  |  |
| Ground |  |  | Ground |  |  |

|  |  |  |
| --- | --- | --- |
| Location |  X – Bond Link Box | Grounding Link Box  |
| ( S / s ------ ) | Current (A) | Volts to gnd (V) |  | Current (A) | Volts to gnd (V) |
| Red - blue |  |  | Red phase  |  |  |
| Yellow - red |  |  | Yellow phase |  |  |
| Blue - yellow  |  |  | Blue phase |  |  |
| Ground |  |  | Ground |  |  |

|  |  |  |
| --- | --- | --- |
| Location |  X – bond link box | Grounding link box  |
| ( S / s ------ ) | Current (A) | Volts to Gnd (V) |  | Current (A) | Volts to Gnd (V) |
| Red - Blue |  |  | Red Phase  |  |  |
| Yellow - Red |  |  | Yellow Phase |  |  |
| Blue - Yellow  |  |  | Blue phase |  |  |
| Ground |  |  | Ground |  |  |

|  |  |  |
| --- | --- | --- |
| Location |  X – bond link box | Grounding link box  |
| ( S / S ------ ) | Current (A) | Volts to Gnd (V) |  | Current (A) | Volts to Gnd (V) |
| Red - Blue |  |  | Red Phase  |  |  |
| Yellow - Red |  |  | Yellow phase |  |  |
| Blue - Yellow  |  |  | Blue Phase |  |  |
| Ground |  |  | Ground |  |  |

 Criteria:

* 1. **ZERO AND POSITIVE SEQUENCE IMPEDANCE MEASUREMENT TEST:**

 First method:

* + 1. **ZERO SEQUENCE IMPEDANCE:**

|  |  |  |  |
| --- | --- | --- | --- |
|  U0 (v)  | I ph (A)  | cos Φ | Z0 = 3 u0 / i ph |
|  |  |  |  |
|  |  |  |  |
| Mean values =  | cos Φ = | |Z0| = |
|  Φ =  |
| sin Φ =  |

* + 1. Positive sequence impedance:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Phase  | U0 (V) | I Ph (A)  | cos Φ | Z0 = 3 U0 / I Ph |
| 1 | 2 | 1 | 2 | 1 | 2 | Avg | 1 | 2 | Avg |
| Red  |  |  |  |  |  |  |  |  |  |  |
| Yellow  |  |  |  |  |  |  |  |  |  |  |
| Blue |  |  |  |  |  |  |  |  |  |  |
|   | Sys mean value =  |  cos Φ = | |Z+| = |
|  Φ =  |
| sin Φ = |

Second method:

* + 1. **POSITIVE SEQUENCE IMPEDANCE :**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Phase  | Volt (V) | Current (A) | Phase  | Phase impedance |
| Red + yellow (forward) (reverse) |  |  |  | Red + j |
|  |  |  |
| Yellow + blue (forward) (reverse) |   |  |  | Yellow+ j |
|  |  |  |
| Blue + red (forward) (reverse)  |  |  |  | Blue+ j |
|  |  |  |

* + 1. **ZERO SEQUENCE IMPEDANCE:**

|  |  |
| --- | --- |
|  Volt (v) (Forward) (Reverse) |  |
|  |
| Current (A) (forward) (reverse) |   |
|  |
|  Phase (forward) (reverse)  |  |
|  |

Check value Z1+Z2+Z0

(Inject current in yellow phase, return via same paths as for Z0 measurement)

|  |  |  |
| --- | --- | --- |
|  | Volt (V) | Current (A) |
| Forward |  |  |
| Reverse |  |  |
| Z = 3 v/i |   |  Ωs (1) |
|  + +  |  |  Ωs (2) |

(1) & (2) should be similar values

* + 1. **ZERO SEQUENCE IMPEDANCE::**

Z0 = + j Ω

Z0 = + j Ω / Km

* + 1. **POSITIVE SEQUENCE IMPEDANCE :**

Z+ = + j Ω

Z+ = + j Ω / Km

* + 1. **INSULATION RESISTANCE BEFORE AND AFTER HV TEST:**

|  |  |  |  |
| --- | --- | --- | --- |
| Phase | Insulation resistance before HV test (5000v) | Insulation resistance after HV test (5000v) | Remarks |
|
| R |  |   |   |
| Y |  |   |   |
| B |  |   |   |

 Criteria:

* + 1. **A.C. HIGH VOLTAGE TEST :**

 AC Equipment Manufacture = Model / Type:

 Megohmmeter Type = Manufacture

 Temp / Hum % =

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Phase color | Red | Yellow | Blue | Result |
| Cable length in meters |  |  |  |  |
| Test Duration |  |  |  |  |
| Voltage Set |  |  |  |  |
| Actual Voltage |  |  |  |  |
| Resonant freq (HZ) |  |  |  |  |
| Charging Current (A) |  |  |  |  |
| Capacitance (n f) |  |  |  |  |

Criteria**:**