SCHEDULE OF TECHNICAL DATA FOR AC DISCONNECTORS (ISOLATORS)

**WAPDA/NTDC Specifications (P-128:2011)**

 Bid/ Tender No.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr.****No.** | **DESCRIPTION** | Unit | Offered |
| **A.** | **General** |  |  |
| 1. | Manufacturer’s name & address. |  |  |
| 2. | Manufacturer’s catalogue attached with the bid. (If not attach the same) | Yes/No |  |
| 3. | Type/designation of offered disconnectors. |  |  |
| 4. | No. of poles of offered disconnectors. |  |  |
| 5. | Disconnector class wrt Mechanical Endurance. |  |  |
| 6. | **Type Test Report:** (Attach copy of type test report) |  |  |
|  | a. | i) Issuing laboratory. ii) No. and Date.  |  |  |
|  |
|  | b. | Rated normal current of disconnector. | A |  |
|  | c. | Rated short circuit withstand current of bus disconnector for 3 sec, rms. | kA |  |
|  | d. | Rated short circuit withstand current of Earthing switch for 3 sec, rms. | kA |  |
|  | e. | Rated peak withstand current, rms | kA |  |
|  | f. | Resistance of Main circuit including both contacts at 20 C. | mΩ |  |
| 6. | **Details of following Type Test if performed.**(Attach complete copies with photographs) | **Date of Test** | **Name of Lab.** |
|  | a. | Dielectric tests on main circuit (dry test). |  |  |
|  |  b. | Dielectric tests on main circuit (wet test). |  |  |
|  | c. | Radio Interference Voltage (RIV) Test. |  |  |
|  | d. | Measurement of Resistance of Main circuit including both contacts at 20 C and Temperature-Rise. |  |  |
|  | e. | Short-time withstand current and peak withstand current tests on bus disconnector. |  |  |
|  | f. | Short-time withstand current and peak withstand current tests on line disconnector including earthing switch. |  |  |
|  |  g. | Duration of short circuit. |  |  |
|  | h. | Operating and extended mechanical endurance tests. |  |  |
|  | i. | Test to verify the proper function of the position indicating device. |  | , |

|  |  |  |  |
| --- | --- | --- | --- |
| **B.** | **Ratings** |  |  |
| 1. | Rated voltage, rms. | kV |  |
| 2. | Nominal voltage, rms. | kV |  |
| 3. | Lightning Impulse withstand voltage |  |  |
|  | a. | Across isolating distance (Dry and Wet) | kV |  |
|  | b. | To Earth and between poles (Dry and Wet) | kV |  |
| 4. | One min. Power frequency withstand Voltage: |  |  |
|  | a. | Across isolating distance (dry & wet). | kV |  |
|  | b. | To Earth and between poles (dry & wet). | kV |  |
| 5. | Rated Frequency. | Hz |  |
| 6. | Creepage Distance. | mm |  |
| 7. | Rated normal current of offered disconnector. | A |  |
| 8. | Rated short circuit withstand current for 1 sec. | kA |  |
| 9. | Rated short circuit withstand current for 3 sec. | kA |  |
| 10. | Rated peak withstand current. | kA |  |
| 11. | Resistance of Main circuit of offered disconnector at 20oC ambient temperature | µΩ |  |
| 12. | Resistance of contacts of offered disconnector at 20oC ambient temperature. | µΩ |  |
| 13. | Radio Interference Voltage level, Max. | µV |  |
| 14. | Mechanical Endurance. | Nos. |  |
| 15. | Temperature-rise at 40C ambient temperature: |  |  |
|  | a. | Contacts. | C |  |
|  | b. | Terminals. | C |  |
|  | c. | Other metal parts. | C |  |
| 16. | Minimum clearance in air: |  |  |
|  | a. | Between poles. | mm |  |
|  | b. | To Earth. | mm |  |
|  | c. | Across isolating distance | mm |  |
| 17. | Type of Operating mechanism |  |  |
|  | a. | For disconnector |  |  |
|  | b. | For earthing switch |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 18. | Current required at rated supply voltage to operate the: |  |  |
|  | a. | Disconnector. | A |  |
|  | b. | Earthing switch. | A |  |
| 19. | No. of auxiliary switches: |  |  |
|  | a. | Disconnector. |  |  |
|  | b. | Earthing switch. |  |  |
| 20. | No. of spare auxiliary switches | No. |  |
| 21. | Auxiliary contacts rating | A |  |
| 22. | Whether two separate sets of auxiliary switches each comprising of at least 8 normally open and 8 normally closed contacts have been provided? |  |  |
| 23. | Rated continuous current of auxiliary and control contacts. | A |  |
| 24. | Rated short time current for 30 sec. of auxiliary and control contacts. | A |  |
| 25. | Working Temperature, Min.- Max. | C |  |
| **C.** | **CONSTRUCTION**(Attach photograph of disconnector showing all parts and a detail legend with the bid) |  |  |
| 1. | Contacts: |  |  |
|  | a. | Material |  |  |
|  | b. | Type of plating |  |  |
|  | c. | Thickness of plating material |  |  |
|  | d. | Dimensions |  |  |
|  | e. | Current density at continuous current |  |  |
|  | f. | Whether disconnectors are equipped with adjustable and self-aligned high pressure contacts? |  |  |
| 2. | Material of current carrying part/arm. |  |  |
| 3. | Dimensions of current carrying part/arm. |  |  |
| 4. | Cross section area of current carrying part. | mm2 |  |
| 5. | No. of earthing terminals for 95 - 120mm2 copper conductor. | No. |  |
| 6. | Material of Earthing terminal. |  |  |
| 7. | Capability of carrying rated short time current of earthing terminal. | kA |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 8. | Whether the outdoor control cubicle comply with the requirements of clause 7? | Yes/No |  |
| 9. | Whether the AC circuit of outdoor control cubicle is fitted with non-flammable transparent plastic cover to prevent accidental contact? | Yes/No |  |
| 10. | Degree of protection of control cubical. |  |  |
| 11. | Thickness of control cubical sheet. | mm |  |
| 12. | Material of sheet. |  |  |
| 13. | Dimensions of control cubical. |  |  |
| 14. | Provision of anti-condensation heater in control cubical. | Yes/No |  |
| 15. | Type of gasket to prevent ingress of moisture. |  |  |
| 16. | No. of extra terminals for future termination | No. |  |
| 17. | Size of cable used in wiring. | mm2 |  |
| 18. | Whether color identifications of all wiring comply with clause 7.2.2? | Yes/No |  |
| 19. | Whether ferrules of plastic label is attached with the each wire? | Yes/No |  |
| 20. | Material of cable glands. |  |  |
| 21. | Whether the power operating mechanism has the facility of manual operation? | Yes/No |  |
| 22. | Disconnectors withstand capability: |  |  |
|  | a. | Wind velocity | m/s |  |
|  | b. | Wind Load | kg/m2 |  |
|  | c. | Earth quake | G |  |
|  | d. | Richer-scale |  |  |
|  | e. | Horizontal acceleration | m/s2 |  |
| 23. | Rated Static Mechanical Terminal load for open or close operation of disconnector & earthing Switch: |  |  |
|  | a. | Straight Load. | N |  |
|  | b. | Cross Load. | N |  |
|  | c. | Vertical Force. | N |  |
| 24. | Rated Dynamic Mechanical Terminal load for open or close operation of disconnector & earthing Switch: |  |  |
|  | a. | Straight Load. | N |  |
|  | b. | Cross Load. | N |  |
|  | c. | Vertical Force. | N |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 25. | Max. Torque required at the operating handle to open the disconnector. | Kgm |  |
| 26. | Whether following arrangements have been Provided? |  |  |
|  | a. | Electrical interlocking between the disconnector and the circuit breaker | Yes/No |  |
|  | b. | Mechanical interlocking between the line disconnector and earthing switch and arrangement of their common signaling. | Yes/No |  |
|  | c. | Interlocking between manually and power operated drive mechanism. | Yes/No |  |
| 27. | Range of Control & auxiliary Voltage: |  |  |
|  | a. | D C Voltage, Min.--- Max. | V |  |
|  | b. | A C Voltage, Min.--- Max. | V |  |
| 28. | Whether operation counter has been provided? | Yes/No |  |
| 29. | Whether operation counter have without resetting facility? | Yes/No |  |
| 30. | Whether position indicating device is available? | Yes/No |  |
| 31. | Whether mechanism is suitable for remote operation? | Yes/No |  |
| 32. | Rated Voltage of motor of operating mechanism | V |  |
| 33. | Whether outdoor control cubical is provided with a 240V 5A three pin socket outlet by 2 pole MCB. | Yes/No |  |
| 34. | Cross-Section of the flexible copper between the rotating shaft and earthing switch | mm2 |  |
| 35. | Whether interlocking for manual operating mechanism comply with the requirements as listed in clause 7.5? | Yes/No |  |
| 36 | Type/designation of bearing used for rotation of disconnector. |  |  |
| 37 | Bearing Manufacturer’s name(Attach catalogue/ literature/test report indicating full details of manufacturing standard, dimensions) |  |  |
| 38. | Mass of complete disconnector: |  |  |
|  | a. | With earthing Switch | Kg |  |
|  | b. | Without earthing Switch. | Kg |  |
| 39. | Approximate dimensions in open position |  |  |
|  | a. | With Earthing Switch. | mm |  |
|  | b. | Without earthing Switch. | mm |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 40. | Approximate dimensions in closed position |  |  |
|  | a. | With Earthing Switch. | mm |  |
|  | b. | Without earthing Switch. | mm |  |
| 41. | Whether blades of switches of disconnectors are counter operated and counter balanced? | Yes/No |  |
| **D.** | **Insulator** |  |  |
| 1. | Manufacturer’s name & address. |  |  |
| 2. | Manufacturer’s catalogue attached with the bid. (If not attach the same) | Yes/No |  |
| 3. | Type of Insulator. |  |  |
| 4. | Type tests (Attach copy of type test reports) |  |  |
| 5. | **Details of Type Tests if performed.** | **Date of Test** | **Name of Lab.** |
|  | 1 | Ultimate strength of column |  |  |
|  | 2 | Impulse withstand voltage |  |  |
|  | 3 | Impulse withstand voltage |  |  |
| 6. | Diameter of insulator | mm |  |
| 7. | No. of units per column | No. |  |
| 8. | Creepage distance (Phase to Earth) | mm |  |
| 9. | Phase to phase clearance | mm |  |
| 10. | Max RIV at 1 MHz | µV |  |
| 11. | Impulse withstand voltage | kV |  |
| 12. | Power frequency withstand test voltage. |  |  |
|  | a. | Dry 1 minute | kV |  |
|  | b. | Wet 10 sec | kV |  |
| 13. | Ultimate strength of column | Kg |  |
| 14. | Withstand Pressure |  |  |
|  | a. | Cantilever | N |  |
|  | b. | Tension | N |  |
|  | c. | Torsion | N |  |
|  | d. | Compression | N |  |
|  | e. | Bending | N |  |
| 15. | Material and color. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **E.** | **Steel Supporting Structure** |  |  |
| 1. | Manufacturer’s name & address.(Attach drawing/photograph with the bid) |  |  |
| 2. | Dimensions for steel supporting structure: |  |  |
|  | a. | Height. | mm |  |
|  | b. | Breadth. | mm |  |
|  | c. | Width. | mm |  |
|  | d. | Structure fixing foundation details. |  |  |
| 3. | Tensile Strength of Angles/plates. | Kg/mm2 |  |
| 4. | Tensile Strength of Nuts & Bolts. | Kg/mm2 |  |
| 5. | Yield Strength of Angles/plates. | Kg/mm2 |  |
| 6. | Yield Strength of Nuts & Bolts. | Kg/mm2 |  |
| 7. | Elongation in 200mm gauge. | % |  |
| 8. | Weight of Zinc Coating of angles/nuts & bolts. |  |  |
| 9. | Thickness of zinc coating angles/ & bolts. |  |  |
| 10. | Hardness of nuts & bolts. | HB |  |
| 11. | Designed soil bearing capacity. |  |  |
| 12. | Seismic withstand stress/magnitude. |  |  |
| 13 | Attached Seismic stress calculations. | Yes/No |  |
| 14. | Total weight of supporting steel structure with foundation bolts. | Kg |  |
| **F.** | **Terminal and Terminal Head** |  |  |
| 1. | Manufacturer’s name & address.(Attach drawing/photograph of the terminal with the bid) |  |  |
| 2. | Material of Terminal Head |  |  |
| 3. | Weight of terminal head. | Kg |  |
| 4. | Dimensions and size of Terminal Head. | mm |  |
| 5. | Current Carrying Capacity of terminal. | A |  |
| 6. | Static withstand load of terminal. | N |  |
| 7. | Dynamic withstand load of terminal. | N |  |
| 8. | Whether two earthing terminals are provided? | Yes/No |  |
| 9. | Material of earthing terminal. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **G.** | **Connector** |  |  |
| 1. | Manufacturer’s name & address.(Attach drawing/photograph with the bid) |  |  |
| 2. | Type of connector. |  |  |
| 3. | Type tests (Attach copy of type test reports) |  |  |
| 4. | **Details of Type Test if performed.** | **Date of Test** | **Name of Lab.** |
|  | a. | Tensile strength & elongation |  |  |
|  | b. | Brinell hardness |  |  |
|  | c. | Conductivity |  |  |
|  | d. | Short circuit withstand |  |  |
|  | e. | Heat cycle |  |  |
| 5. | Material of connector. |  |  |
| 6. | Material of keeper. |  |  |
| 7. | Current carrying capacity of connector & keeper. | A |  |
| 8. | Tensile Strength of connector & keeper. | Kg/mm2 |  |
| 9. | Hardness of connector. | HB |  |
| 10. | Hardness of keeper. | HB |  |
| 11. | Elongation of connector & keeper. | % |  |
| 12. | Electrical conductivity of connector. | % |  |
| 13. | Electrical conductivity of keeper. | % |  |
| 14. | Short Circuit Rating of connector. | kA |  |
| 15. | Short Circuit Rating of keeper. | kA |  |
| 16. | Material of Nuts & Bolts |  |  |
| 17. | Tensile Strength of Nuts & Bolts | Kg/mm2 |  |
| 18. | Brinell Hardness of Nuts & Bolts | HB |  |
| **I.** | **NAME PLATE** |  |  |
| 1. | Whether the data listed in clause 9 is engraved on the name plate? | Yes/No |  |
| 2. | Material of name plate. |  |  |
| 3. | Thickness of name plate. | mm |  |

