**SCHEDULE OF TECHNICAL DATA**

FOR CURRENT TRANSFORMER (145kV, 72.5kV & 36kV)

**WAPDA/NTDC Specifications (P-90:1982)**

Bid/Tender No. **------------------**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sr. #** | **DESCRIPTION** | |  |  |
| **A.** | **General** | |  |  |
| 1. | Manufacturer’s name & address. (Attach Manufacturer’s Catalogue/Brochure) | |  |  |
| 2. | Type/designation of offered CTs. | |  |  |
| 3. | Type Test Report(Attached Copy of type test reports attached): | | Yes/No. |  |
|  | a. | i) Issuing Laboratory.  ii) No. and Date. |  |  |
|  |
|  | b. | Rated Voltage. | kV |  |
|  | c. | Rated normal primary current. | A |  |
|  | d. | Rated secondary current. | A |  |
|  | e. | Rated short time withstand current at all ratios, for 1 sec, rms. | kA |  |
|  | f. | Rated peak with-stand current, rms | kA |  |
|  | g. | Resistance of primary winding |  |  |
|  |  | i) Series connections. | µΩ |  |
|  |  | ii) Parallel connections. | µΩ |  |
|  | h. | Resistance of secondary winding |  |  |
|  |  | Measuring Core 1. | mΩ |  |
|  |  | Protective Core 2. | mΩ |  |
|  |  | Protective Core 3. | mΩ |  |
|  |  | Protective Core 4. | mΩ |  |
|  | i. | Temperature-rise of winding. | oC |  |
|  | j. | Temperature-rise of top oil. | oC |  |
| 4. | **Details of following Type Test if performed.** | | **Date of Test** | **Name of Lab.** |
|  | a. | Lightning impulse withstand voltage test. |  |  |
|  | b. | Power frequency voltage withstand test at Primary & secondary windings and between sections (dry). |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | c. | Power frequency voltage withstand test at Primary & secondary windings and between sections (wet). |  |  |
|  | c. | Partial discharge Measurement. |  |  |
|  | d. | Radio Interference Voltage (RIV) Test. |  |  |
|  | e. | Measurement of Temperature-Rise. |  |  |
|  | f. | Measurement of resistance of Primary and secondary windings. |  |  |
|  | g. | Short-time withstand current and peak withstand current tests. |  |  |
|  | h. | Determination of errors before and after short circuit test. |  |  |
|  |  | Limits of current error for measuring core |  |  |
|  |  | Phase displacement for measuring core |  |  |
|  |  | Composite error for measuring core |  |  |
|  |  | Limits of current error for protective core |  |  |
|  |  | Phase displacement for protective core |  |  |
|  |  | Composite error for protective core |  |  |
|  | i. | Measurement of C & DF. |  |  |
|  | j. | Mechanical Test. |  |  |
|  | k. | Inter Turn Voltage Test. |  |  |
| **B.** | **Ratings** | |  |  |
| 1. | Rated voltage(Um), rms. | | kV |  |
| 2. | Nominal voltage, rms. | | kV |  |
| 3. | Rated Frequency. | | Hz |  |
| 4. | Rated normal primary current. | | A |  |
| 5. | Rated Secondary current. | | A |  |
| 6 | Rated continuous Thermal current, Icth, | | A |  |
| 7. | Lightning Impulse withstand voltage (Primary winding). | | kV |  |
| 8. | Power frequency withstand Voltage (Primary winding). | | kV |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 9. | Power frequency withstand Voltage (secondary winding). | | kV |  |
| 10. | Power frequency withstand Voltage between sections. | | kV |  |
| 11. | Rated Frequency. | | Hz |  |
| 12. | Temperature rise of winding. | | oC |  |
| 13. | Temperature rise of top oil. | | oC |  |
| 14. | Accuracy limit factor. | |  |  |
| 15. | Instrument Security Factor. | |  |  |
| 16. | Resistance of primary winding at 20oC ambient  temperature. | |  |  |
|  | a. | Series connections. | µΩ |  |
|  | b. | Parallel connections. | µΩ |  |
| 17. | Resistance of secondary winding at 20oC  ambient temperature: | |  |  |
|  | a. | Measuring Core 1. | mΩ |  |
|  | b. | Protective Core 2. | mΩ |  |
|  | c. | Protective Core 3. | mΩ |  |
|  | d. | Protective Core 4. | mΩ |  |
| 18. | Rated Secondary Output at lowest tap, VA: | |  |  |
|  | a. | Measuring Core 1. | VA |  |
|  | b. | Protective Core 2. | VA |  |
|  | c. | Protective Core 3. | VA |  |
|  | d. | Protective Core 4. | VA |  |
| 19. | Accuracy Class: | |  |  |
|  | a. | Measuring Core. | A |  |
|  | b. | Protective Core. | A |  |
| 20. | Short time current rating at all ratios, kA | |  |  |
|  | a. | Thermal, Ith. | kA |  |
|  | b. | Dynamic, Idyn. | kA |  |
| 21. | Rated duration of short circuit. | | Sec. |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 22. | Partial Discharge: | |  |  |
|  | - | Um. | pC |  |
|  | - | 1.2Um/√3. | pC |  |
| 23. | Rated Mechanical Static Withstand load. | | N |  |
| 24. | Rated Mechanical Dynamic Withstand load. | | N |  |
| 25. | C & D F, (tan δ). | |  |  |
| 26. | Max. Radio Interference Level at 1.1Um/√3 (RIV). | | µV |  |
| 27. | Inter Turn Insulation level. | | kV |  |
| **C.** | **Construction**  (Attach photograph of CT showing all parts and a detail legend ). | |  |  |
| 1. | Complete height of the CT. | | mm |  |
| 2. | Clearance to ground | | mm |  |
| 3. | Material of bellows, if applicable. | |  |  |
| 4. | Material of primary winding | |  |  |
| 5. | Material of secondary winding | |  |  |
| 6. | Material of rating plate. | |  |  |
| 7. | Thickness of rating plate. | | mm |  |
| 8. | Dimensions of rating plate (LxW) | | Mm |  |
| 9. | Weight per pole. | | Kg |  |
| 10. | Weight of oil per pole. | | Kg |  |
| 11. | **Characteristics of oil**: | |  |  |
|  | - | Viscosity at 40 oC, max. mm2/s |  |  |
|  | - | Viscosity at -30 oC, max. mm2/s |  |  |
|  | - | Density at 20oC, max.. g/ml |  |  |
|  | - | Flash point, oC |  |  |
|  | - | Dielectric dissipation factor, tan δ at 90 oC,  Max. |  |  |
|  | - | Pour point, max. oC |  |  |
|  | - | Dielectric strength, min. kV |  |  |
|  | - | PCB Content. |  |  |
|  | - | Acidity, max. mg KOH/g. |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **D.** | **Insulator** | |  |  |
| **1.** | Manufacturer’s name & address. (Attach Manufacturer’s catalogue and outline/dimensional drawing) | |  |  |
| 2. | Type of Insulator. | |  |  |
| 3. | Type tests (Attach copy of type test reports) | |  |  |
| 4. | **Details of Type Tests if performed.** | | **Date of Test** | **Name of Lab.** |
|  | - | Mechanical test. |  |  |
|  | - | Impulse withstand voltage. |  |  |
|  | - | Power frequency withstand voltage. |  |  |
|  | - | Radio interference Voltage. |  |  |
| 5. | Diameter of insulator. | | Mm |  |
| 6. | Height of Insulator | |  |  |
| 7. | Creepage distance (Phase to Earth). | | Mm |  |
| 8. | Phase to phase clearance. | | Mm |  |
| 9. | Max RIV at 1 MHz. | | µV |  |
| 10. | Impulse withstand voltage. | | kV |  |
| 11. | Power frequency withstand test voltage. | |  |  |
|  | a. | Dry 1 minute. | kV |  |
|  | b. | Wet 10 sec. | kV |  |
| 12. | Ultimate strength of column. | | Kg |  |
| 13. | Withstand Pressure: | |  |  |
|  | a. | Cantilever Strength | N |  |
|  | b. | Tensile strength. | N |  |
|  | c. | Torsional strength | N |  |
|  | d. | Compression strength. | N |  |
|  | e. | Bending. | N |  |
| 14. | Material and color of insulator. | |  |  |
| 15. | Reference Manufacturing IEC Standard of insulator. | |  |  |
| **E.** | **Steel Supporting Structure** | |  |  |
| 1. | Manufacturer’s name & address.  (Attach drawing/photograph of the support structure). | |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 2. | Dimensions for steel support structure: | |  |  |
|  |  | Height. | mm |  |
|  |  | Breadth. | mm |  |
|  |  | Width. | mm |  |
|  |  | Structure fixing foundation details. |  |  |
| 3. | Tensile Strength of Angles/plates. | | Kg/mm2 |  |
| 4. | Tensile Strength of Nuts & Bolts. | | Kg/mm2 |  |
| 5. | Elongation. | | % |  |
| 6. | Weight of Zinc Coating of angles/nuts & bolts. | |  |  |
| 7. | Thickness of zinc coating angles/nuts & bolts | |  |  |
| 8. | Hardness of nuts & bolts. | | HB |  |
| 9. | Designed soil bearing capacity. | |  |  |
| 10. | Seismic withstand stress/magnitude. (Attach design calculations). | |  |  |
| 11. | Total weight of supporting steel structure with foundation bolts. | | Kg |  |
| **F.** | **Terminal** | |  |  |
| 1. | Manufacturer’s name & address.  (Attach drawing/photograph of the terminal). | |  |  |
| 2. | Material of primary terminals. | |  |  |
| 3. | Size of primary terminals. | |  |  |
| 4. | Current carrying capacity of primary terminals. | | A |  |
| 5. | Static withstand load of primary terminals | | Kg |  |
| 6. | Dynamic withstand load of primary terminals | | Kg |  |
| 7. | Whether brass cable glands are provided in the secondary terminal box. | | Yes/No |  |
| 8. | Material of secondary terminals. | |  |  |
| 9. | Whether two earthing terminals are provided. | | Yes/No |  |
| 10. | Material of earthing terminal. | |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **G.** | **Terminal Connector** | |  |  |
| 1. | Manufacturer’s name & address.  (Attach drawing/photograph with the bid). | |  |  |
| 2. | Type designation of connector | |  |  |
| 3. | Type tests (Attach copy of type test reports). | |  |  |
| 4. | Details of Type Tests if performed. | | **Date of Test** | **Name of Lab.** |
|  | - | Tensile strength & elongation. |  |  |
|  | - | Brinell hardness. |  |  |
|  | - | Conductivity. |  |  |
|  | - | Short circuit withstand. |  |  |
| 5. | Material of connector | |  |  |
| 6. | Material of keeper. | |  |  |
| 7. | Current carrying capacity of connector. | | A |  |
| 8. | Tensile Strength of connector. | | Kg/mm2 |  |
| 9. | Tensile Strength of keeper. | | Kg/mm2 |  |
| 10. | Hardness of connector. | | HB |  |
| 11. | Hardness of keeper. | | HB |  |
| 12. | Elongation of connector. | | % |  |
| 13. | Elongation of keeper. | | % |  |
| 14. | Electrical conductivity of connector. | | % |  |
| 15. | Electrical conductivity of keeper. | | % |  |
| 16. | Short Circuit Rating of connector. | | kA |  |
| 17. | Short Circuit Rating of keeper. | | kA |  |
| 18. | Material of Nuts & Bolts. | |  |  |
| 19. | Tensile Strength of Nuts & Bolts. | | Kg/mm2 |  |
| 20. | Brinell Hardness of Nuts & Bolts. | | HB |  |