|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1) | Manufacturer’s name and  type designation | | | | |  | | LEEEC SFZ-40000/132 | |
| 2) | Type test certificates  a) Issuing Laboratory  b) No. & Date | | | | |  | | short circuit test will be done in CTQC Lab only for one unit transformer and will be witness by Veikei, other tests for the above mentioned transformer will be done in factory Lab and witness by Veikei | |
| 3) | Vector group | | | | |  | | Dyn11 | |
| 4) | Rate power of the transformer  (temperature-rise measured by resistance) | | | | |  | |  | |
|  | a) With 55 deg C temperature rise of winding;   1. ONAN Cooling, 2. ONAF Cooling , | | | | | KVA  KVA | | 31500  40000 | |
|  | b) With 60 deg C temperature rise of winding;   1. ONAN Cooling, 2. ONAF Cooling , | | | | | KVA  KVA | | 34000  44000 | |
|  | c) With 65 deg C temperature rise of winding;   1. ONAN Cooling, 2. ONAF Cooling , | | | | | KVA  KVA | | 37000  47000 | |
| 5) | Temperature rise of oil corresponding to the KVA and temperature rise values given in ; | | | | |  | |  | |
|  | a) i. Item 4a(1)  ii. Item 4a(2) | | | | | Deg C  Deg C | | 50  50 | |
|  | b) i. Item 4b(1)  ii. Item 4b(2) | | | | | Deg C  Deg C | | 55  55 | |
|  | c) i. Item 4c(1)  ii. Item 4c(2) | | | | | Deg C  Deg C | | 60  60 | |
| 6) | Hottest spot winding temperature rise  corresponding to KVA and temperature rise  rating given in | | | | |  | |  | |
|  | a) i. Item 4a(1)  ii. Item 4a(2) | | | | | Deg C  Deg C | | 68  68 | |
|  | b) i. Item 4b(1)  ii. Item 4b(2) | | | | | Deg C  Deg C | | 73  73 | |
|  | c) i. Item 4c(1)  ii. Item 4c(2) | | | | | Deg C  Deg C | | 78  78 | |
| 7) | Tertiary winding rating, corresponding to  55 Deg C temperature-rise of winding  (measured by resistance) where applicable  a) ONAN cooling  b) ONAF cooling | | | | |  | | NA  NA | |
| 8) | Rated voltage of windings   1. H.V. Winding 2. L.V. Windings 3. Tertiary winding(if applicable) | | | | | kV  kV  kV | | 132  11.5  NA | |
| 9) | Tapping voltages at all  plus and minus tapings, Volts | | | | |  | |  | |
| 10) | Highest operating voltage for which tappings  are designed for continuous overvoltage  operation, percent of tapping voltage | | | | | percent | | Tapping 1  145.2kV  +110% | |
| 11) | Overvoltage Operation | | | | |  | |  | |
| **HV Tapings** | | Applied voltage | Operating time for rated tapping current Hrs | Current for continuous operation A | Temp Flux Density Tesla | | Temp Rise of core Deg C | | Temp Rise of winding Deg C |
| **132kV Winding** | | | | | | | | | |
| 145200 | | 152,000 | Continous | 152 | 1.62 | | 68 | | 55 |
| 132000 | | 152,000 | Continous | 152 | 1.78 | | 68 | | 55 |
| 132000 | | 145,000 | Continous | 159 | 1.7 | | 68 | | 55 |
| 118800 | | 145,000 | Continous | 159 | 1.89 | | 68 | | 55 |
| 118800 | | 132,000 | Continous | 175 | 1.72 | | 68 | | 55 |
| 12) | Maximum Flux density and operating conditions  at which occurs:  Frequency  Voltage HV  Voltage LV  Load Current | | | | | Tesla  Hz  Volts  Volts  Amps | | 1.89  50  145200  11500  159/2008 | |
| 13) | Design Flux density at rated voltage,  rated current and frequency | | | | | Tesla | | 1.55 | |
| 14) | Impedance voltage (Principal tap ) on 31.5 MVA base;   1. High voltage-low voltage   b) Low voltage-tertiary  c) High voltage-tertiary | | | | | Percent  Percent  Percent | | 10  NA  NA | |
| 15) | Resistance voltage (principal tap) on 31.5 MVA base;   1. High voltage-low voltage   b) Low voltage-tertiary  c) High voltage-tertiary | | | | | Percent  Percent  Percent | | 0.291  NA  NA | |
| 16) | Reactance voltage (principal tap) on 31.5 MVA base;   1. High voltage-low voltage   b) Low voltage-tertiary  c) High voltage-tertiary | | | | | Percent  Percent  Percent | | 9.996  NA  NA | |
| 17) | Short Circuit impedance referred to the  first winding in the following pairs; | | | | |  | |  | |
|  | a) At Principal tap  i) High voltage-low voltage (ohms per phase)  ii) Low voltage-tertiary (ohms per phase)  iii) High voltage-tertiary (ohms per phase) | | | | |  | | 55.3  NA  NA | |
|  | 2) At extreme plus tap  i) High voltage-low voltage (ohms per phase)  ii) Low voltage-tertiary (ohms per phase)  iii) High voltage-tertiary (ohms per phase) | | | | |  | | 68.9  NA  NA | |
|  | 3) At extreme minus tap  i) High voltage-low voltage (ohms per phase)  ii) Low voltage-tertiary (ohms per phase)  iii) High voltage-tertiary (ohms per phase) | | | | |  | | 43.4  NA  NA | |
| 18) | Zero sequence impedance (principal tap) on 31.5 MVA base;  a) High voltage-low voltage  b) Low voltage-tertiary  c) High voltage-tertiary | | | | | Percent  Percent  Percent | | 9  NA  NA | |
| 19) | Regulation (Principal tap) on 31.5 MVA base   1. 100% power factor 2. 80% power factor 3. 70 % power factor | | | | | Percent  Percent  Percent | | 0.9  6.5  7.8 | |
| 20) | Exciting current on 31.5 MVA base   1. 90% voltage 2. 100% voltage 3. 105% voltage 4. 110% voltage 5. 120% voltage | | | | | Percent  Percent  Percent  Percent  Percent | | 0.25  0.3  0.36  0.5  4.3 | |
| 21) | Impulse test voltage;   1. HV Winding 2. LV Winding 3. Tertiary Winding | | | | | KV Peak  KV Peak  KV Peak | | 650  110  NA | |
| 22) | Separate source power frequency test voltage;   1. HV Winding 2. LV Winding 3. Tertiary Winding | | | | | KV rms  KV rms  KV rms | | 275  38  NA | |
| 23) | Induced over voltage withstand test | | | | | KV rms | | 275 | |
| 24) | Short circuit characteristics at rated voltage; | | | | |  | |  | |
|  | a) Maximum asymmetrical short circuit current for  which the mechanical bracings are designed and  constructed to withstand without damage frequent  short-circuit faults  i) HV Winding  ii) LV Winding  iii) Tertiary Winding | | | | | KA Peak  KA Peak  KA Peak | | 3.9  40.3  NA | |
|  | b) Maximum symmetrical short circuit current for  which transformer windings are designed and  constructed to thermally withstand without injury;  i) HV Winding  1 Sec.  2 Sec.  3 Sec.  4 Sec.  5 Sec.  ii) LV Winding  1 Sec.  2 Sec.  3 Sec.  4 Sec.  5 Sec. | | | | | amps  amps  amps  amps  amps  amps  amps  amps  amps  amps | | 2916.6  2062.4  1683.9  1458.3  1304.3  30130.4  21305.4  17395.8  15065.2  13474.7 | |
|  | iii) Tertiary winding  1 Sec.  2 Sec.  3 Sec.  4 Sec.  5 Sec. | | | | | amps  amps  amps  amps  amps | | NA  NA  NA  NA  NA | |
|  | 1. short circuit duration (Sec) | | | | |  | | 3 | |
| 25) | Guaranteed no load losses at rated frequency;   1. 100% voltage 2. 105% voltage 3. 110 % voltage 4. 120 % voltage | | | | | KW  KW  KW  KW | | 22  28  32  40 | |
| 26) | Guarantee Load losses for reference  temperature of 75 ºC including corresponding  consumption of fan motors | | | | |  | |  | |
|  | a) At Principal tap  i) 100% ONAN rating  ii) 75% ONAN rating  iii) 50% ONAN rating  iv) 100% ONAF rating  v) 75% ONAF rating  vi) 50% ONAF rating | | | | | KW  KW  KW  KW  KW  KW | | 95  56  25  150  91  41 | |
|  | b) At extreme plus tap  i) 100% ONAN rating  ii) 75% ONAN rating  iii) 50% ONAN rating  iv) 100% ONAF rating  v) 75% ONAF rating  vi) 50% ONAF rating | | | | | KW  KW  KW  KW  KW  KW | | 90  56  25  150  90  40 | |
|  | c) At extreme minus tap  i) 100% ONAN rating  ii) 75% ONAN rating  iii) 50% ONAN rating  iv) 100% ONAF rating  v) 75% ONAF rating  vi) 50% ONAF rating | | | | | KW  KW  KW  KW  KW  KW | | 110  67  30  170  108  48 | |
| 27) | Tolerance applicable for  a) Guaranteed no-load losses at 100% voltage  b) Guaranteed load losses at 100% ONAF rating at principal tap | | | | | Percent  Percent | | 0  0 | |
| 28) | High Voltage Bushings | | | | |  | |  | |
|  | a) Rating;   1. Voltage 2. Current 3. Impulse withstand voltage 4. Power Frequency Withstand voltage | | | | | KV  Amps  KV Peak  KV rms | | 145  800  650  275 | |
|  | b) Type | | | | |  | | BRDLW-145 | |
|  | c) Manufacturers | | | | |  | | CHINA | |
|  | d) Catalogue number (catalogue to be attached with bid) | | | | |  | |  | |
|  | e) Creepage Distance | | | | | mm | | 4500 | |
| 29) | Low Voltage Bushings | | | | |  | |  | |
|  | a) Rating;  1. Voltage  2. Current  3. Impulse withstand voltage  4. Power Frequency Withstand voltage | | | | | KV  Amps  KV Peak  KV rms | | 20  3150  125  55 | |
|  | b) Type | | | | |  | | BDW-20 | |
|  | c) Manufacturers | | | | |  | | CHINA | |
|  | d) Catalogue number (catalogue to be attached with bid) | | | | |  | |  | |
|  | e) Creepage Distance | | | | | mm | | 480 | |
| 30) | HV NEUTRAL BUSHINGS | | | | |  | |  | |
|  | a) Rating;   1. Voltage 2. Current 3. Impulse withstand voltage 4. Power Frequency Withstand voltage | | | | | KV  Amps  KV Peak  KV rms | | NA | |
|  | b) Type | | | | |  | | NA | |
|  | c) Manufacturers | | | | |  | | NA | |
|  | d) Catalogue number (catalogue to be attached with bid) | | | | |  | | NA | |
|  | e) Creepage Distance | | | | | mm | | NA | |
| 31) | LV neutral bushing | | | | |  | |  | |
|  | a) Rating;   1. Voltage 2. Current 3. Impulse withstand voltage 4. Power Frequency Withstand voltage | | | | | KV  Amps  KV Peak  KV rms | | 20  3150  125  55 | |
|  | b) Type | | | | |  | | BDW-20 | |
|  | c) Manufacturers | | | | |  | | CHINA | |
|  | d) Catalogue number (catalogue to be attached with bid) | | | | |  | |  | |
|  | e) Creepage Distance | | | | | mm | | 480 | |
| 32) | Tertiary bushing | | | | |  | | NA | |
|  | a) Number | | | | |  | | NA | |
|  | b) Rating;   1. Voltage 2. Current 3. Impulse withstand voltage 4. Power Frequency Withstand voltage | | | | | KV  Amps  KV Peak  KV rms | | NA | |
|  | c) Type | | | | |  | | NA | |
|  | d) Manufacturers | | | | |  | | NA | |
|  | e) Catalogue number (catalogue to be attached with bid) | | | | |  | | NA | |
|  | f) Creepage Distance | | | | | mm | | NA | |
| 33) | High voltage bushing current transformers  (catalogue to be attached with the bid)  a) number  b) ratio  c) accuracy class  d) accuracy limit factor  e) rated burden  f) short-time thermal current  g) continuous thermal current  h) Dynamic current  i) Resistance of the secondary winding  j) No. of cores in each bushing CT | | | | | VA  kA  kA  kA  Ohms | | 1  200/1  5P10  10  5  0.2  5  0.27  1 | |
| 34) | Low voltage bushing current transformers  (catalogue to be attached with the bid)  a) number  b) ratio  c) accuracy class  d) accuracy limit factor  e) rated burden VA  f) short-time thermal current kA  g) continuous thermal current kA  h) Dynamic current kA  i) Resistance of the secondary winding Ohms  j) No. of cores in each bushing CT | | | | | VA  kA  kA  kA  Ohms | | 1  3000/1  5P10  10  30  3  75  2.78  1 | |
| 35) | Type of on-load tap changer (catalogue and data to be supplied with bid) | | | | |  | |  | |
| a. Manufacturers | | | | |  | | MR | |
| b. type | | | | |  | | 250D/145 | |
| c. Rated current | | | | | amps | | 250 | |
| d. Step voltage | | | | | Volts | | 1200 | |
| e. No. of steps | | | | |  | | 23 | |
| f. Motor Drive  i) Type  ii) Supply voltage (Volts)  iii) H.P  iv) Insulation level  (voltage to earth) | | | | | Volts  kV rms | | ED  415/240  1  2 | |
| g) Tap changer protective relay  (catalogue to be attached with the bid)  i) Type  ii) Make  iii) Contact rating | | | | |  | | RS2001  MR  DC110 | |
| h) Insulation levels  i) voltage to earth  ii) Impulse test voltage  iii) One minute power frequency  test voltage(50Hz) | | | | | kV rms  kV peak  kV rms | | 145  650  275 | |
| i) Internal insulation levels Impulse/  one minute power frequency test voltage  i. Between selected and preselected taps(KV peak/KV rms)  ii. Across fine tap windings(KV peak/KV rms)  iii. Between phase of fine tap windings(KV peak/KV rms)  iv. Across coarse and fine tap winding, if applicable(KV peak/KV rms)  v. Across coarse tape windings, if applicable(KV peak/KV rms)  vi. Between phases of coarse tap winding(KV peak/KV rms) | | | | |  | | 130/30  250/65  650/275 | |
| j. Remote tap position indicator  i. Type designation  ii. Manufacturer  iii. Method of remote indications | | | | |  | | MR | |
| k) Temperature-rise of contacts at 1.2 times  maximum rated through current | | | | |  | | NA | |
| l) Permissible number of operations at rates  step voltage | | | | |  | | 23 | |
| m) Permissible number of operations at  reduced step voltage | | | | |  | | 23 | |
| n) Permissible number of operations for  selector switch | | | | |  | | 2 | |
| o) Temperature-rise of transition resistors at  1.5 times max. rate through current | | | | |  | | NA | |
| p) Mechanical endurance.  i. No. of operations without requiring overhauling.  ii. Total No. of permissible operations in life time. | | | | |  | | 300000  600000 | |
| 36) | Liquid Type Oil Thermometer (catalogue to be  attached withbid**)** | | | | |  | |  | |
| a. Type designation | | | | |  | | BWY | |
| b. Manufacturer | | | | |  | | CHINA | |
| c. Catalogue No. | | | | |  | |  | |
| d. Contact rating between  110V&250V DC and 250V AC | | | | | Amps | | 5 | |
| 37) | Resistance Type Oil Thermometer (catalogues to be  attached with bid) | | | | |  | |  | |
| a. Type designation | | | | |  | | BWY | |
| b. Manufacturer | | | | |  | | CHINA | |
| c. Catalogue No. | | | | |  | |  | |
| d. Contact rating between  110V&250V DC and 250V AC | | | | | Amps | | 5 | |
| 38) | Oil Level Indicator (catalogues to be  attached with bid) | | | | |  | |  | |
| a. Type designation | | | | |  | | YZF | |
| b. Manufacturers | | | | |  | | CHINA | |
| c. Catalogue No. | | | | |  | |  | |
| d. Contact rating between  110V&250V DC and 250V AC | | | | | Amps | | 2 | |
| 39 | Winding Temperature Indicator  (catalogue to be attached with bid) | | | | |  | |  | |
| 1. Local | | | | |  | |  | |
| i). Type | | | | |  | | BWR | |
| ii). Manufacturer | | | | |  | | CHINA | |
| iii). Contract rating between  110V&250V DC and 250V AC | | | | | Amps | | 5 | |
| 1. Remote | | | | |  | |  | |
|
| i). Type | | | | |  | | XMZ | |
| ii). Manufacturer | | | | |  | | CHINA | |
| iii). Contract rating between  110V&250V DC and 250V AC | | | | | Amps | | 5 | |
| 40) | Buchholz Relay (catalogue to be attached with bid) | | | | |  | |  | |
| a) Type | | | | |  | | QJ4 | |
| b) Manufacturer | | | | |  | | CHINA | |
| c) Catalogue No. | | | | |  | |  | |
| d)Contact rating between  110V&250V DC and 250V AC | | | | | Amps | | 5 | |
| 41) | Pressure relief device (catalogues to be attached with the bid) | | | | |  | |  | |
| a) Type | | | | |  | | YSF | |
| b) Manufacturer | | | | |  | | CHINA | |
| c) Catalogue No. | | | | |  | |  | |
| d) Pressure range for operation | | | | | kg/cm² | | 55kpa | |
| e) Contact rating if applicable | | | | |  | | 0.3A | |
| f)Number | | | | |  | |  | |
| 42) | Automatic voltage regulator, if required | | | | |  | |  | |
| a) Type Designation | | | | |  | | TAPCON | |
| b) Manufacturer | | | | |  | | MR | |
| c) catalogue No. | | | | |  | |  | |
| d)Input P.T. supply voltage | | | | | Volts | | 110 | |
| e) Input C.T. supply current | | | | | Amps | | 5 | |
| f)voltage adjustment range, percent of  the voltage to be regulated. | | | | | Percent | | ±10 | |
| g) Sensitivity range percent of  the voltage top be regulated | | | | | Percent | | ±0.5-±0.9 | |
| h) Under voltage blocking percent  of the voltage to be regulated. | | | | | Percent | | 70-95% | |
| i)Overcurrent blocking percent of normal current | | | | | Percent | |  | |
| 43) | Forced air cooling equipment | | | | |  | |  | |
|  | a) type(whether plate or tube) of radiators | | | | |  | | PLATE | |
|  | b) No. of radiators | | | | |  | | 14 | |
|  | c) No. of tubes/plates in one radiator | | | | |  | | 20 | |
|  | d) Radiator dimensions  Length(L)\*Width(W)\*Height(H) | | | | |  | | 985\*536\*2255 | |
|  | e) Total No. of fans | | | | |  | | 14 | |
|  | f) No. of fans required for full upper rating  output under specified conditions | | | | |  | | 10 | |
|  | g) No. of spare fans | | | | |  | | 4 | |
|  | h) Motor rating  i) H.P.  ii) Supply voltage | | | | | V | | 0.25kW  415v | |
| i)Total fan consumption at full load | | | | | kW | | 3.5 | |
| 44) | Breather (catalogues to be attached with bid)  a) Type  b) Make  c) Number | | | | |  | | XS-5kg  CHINA  2 | |
| 45) | Valves (catalogues to be attached with bid)  a) Type  b) Make  c) Size  i) Drain valve  ii) Filter valve  iii) Sampling valve | | | | |  | | GLOBE  CHINA  DN80  DN80  20 | |
| 46) | Guarantee noise level  a)At lower rating (ONAN)  b)At upper rating (ONAF) | | | | | db  db | | 68  73 | |
| 47) | Type of construction, core or shell | | | | |  | | CORE | |
| 48) | Weight of core and coils | | | | | kg | | 28000 | |
| 49) | Weight of case and fittings | | | | | kg | | 8000 | |
| 50) | Weight of core | | | | | kg | | 19000 | |
| 51) | Weight of coil | | | | | kg | | 9000 | |
| 52) | Weight of copper | | | | | kg | | 8000 | |
| 53) | Weight of oil | | | | | kg | | 18000 | |
| 54) | Total weight | | | | | kg | | 65000 | |
| 55) | Shipping weight of heaviest piece | | | | | kg | | 58000 | |
| 56) | Weight of heaviest piece for untanking | | | | | kg | | 35000 | |
| 57) | Total volume of oil  a) Main tank  b) Conservator  c) Radiators | | | | | Litres  Litres  Litres | | 17500  1000  2050 | |
| 58) | Tank dimensions  Length(L)  Width(W)  Height(H) | | | | | mm  mm  mm | | 4590  1570  2880 | |
| 59) | Overall dimensions  Length(L)  Width(W)  Height(H) | | | | | mm  mm  mm | | 6950  4150  5880 | |
| 60) | Thickness of plates  a) Tank cover  b) Tank sides  c)Tank bottom  d) Radiator  e) Conservator | | | | | mm  mm  mm  mm  mm | | 20  8  16  1  8 | |