

TECHNICAL DATA SHEET

| Power transformer Ungheni 25 MVA, 115 ± 9x1.78 % /38.5±2x2.5%/11 kV | | | | |
|---|-------------------------------------|------|---|---|
| No | Description | Unit | Data required | Data offered |
| 1 | GENERAL | | | |
| 1.1 | Manufacturer | | | TOO «Asia Trafo» |
| 1.2 | - country | | | Kazakhstan |
| 1.3 | - city | | | Shymkent |
| 1.4 | Kind of installation | | outdoor | outdoor |
| 1.5 | Standards | | IEC60076 IEC60137 IEC61463 IEEE 693-2005 | IEC60076 IEC60137 IEC61463 IEEE 693-2005 |
| 1.6 | Single or three-phase unit | | Three-phase | Three-phase |
| 1.7 | Type of core | | 3 limb, step-lap stacked core form | 3 limb, step-lap stacked core form |
| 1.8 | Type of tank | | Upper flange tank | Bell tank bottom connector |
| 1.9 | Tank fully vacuum proof | | Yes | Yes |
| 1.10 | Number of windings | | Three | Three |
| 1.11 | Winding material (HV,MV,LV) | | Coper | Coper |
| 1.12 | Insulation oil | | | |
| 1.13 | - manufacturer | | | |
| 1.14 | - type | | | ГК |
| 1.15 | - specification of oil | | IEC 60296 | IEC 60296 |
| 1.16 | - insulation oil inhibited | | Yes | Yes |
| 1.17 | - test method for corrosive sulphur | | IEC 62535 and ASTDM D1275B | IEC 62535 and ASTDM D1275B |

| | | | | |
|------|---|-----|------------------------------------|------------------------------------|
| 2 | RATINGS | | | |
| 2.1 | Rated power at nominal voltage (primary/secondary/tertiary) | | | |
| 2.2 | - at ONAN cooling | MVA | 20/20/20 | 20(see note1)/20/20 |
| 2.3 | - at ONAF cooling | MVA | 25/25/25 | 25(see note1)/25/25 |
| 2.4 | Maximum ambient temperature | °C | 50 | 50 |
| 2.5 | Annual average ambient temperature | °C | 15 | 15 |
| 2.6 | Minimum ambient temperature | °C | -30 | -30 |
| 2.7 | Maximum service altitude | m | 1000 | 1000 |
| 2.8 | Temperature rise limits at all tap changer settings | | | |
| 2.9 | - oil/top | K | 50 | 50 |
| 2.10 | - windings/average | K | 55 | 55 |
| 2.11 | - windings/hot spot | K | 68 | 68 |
| 2.12 | Rated voltages (no load) | | | |
| 2.13 | - HV | kV | 115 | 115 |
| 2.14 | - MV | kV | 38.5 | 38.5 |
| 2.15 | - LV | kV | 11 | 11 |
| 2.16 | Rated frequency | Hz | 50 | 50 |
| 2.17 | Permissible load at neutral point | % | 100/solidly earthed/surge arrester | 100/solidly earthed/surge arrester |
| 2.18 | Vector group symbol | | YNyn0d11 | YNyn0d11 |
| 2.19 | Impedance voltage – HV/LV (25 MVA basis) | | | |
| 2.20 | - maximum tap position | % | Specify | 19.0 (tol. ±15%) |
| 2.21 | - nominal tap position | % | 17.5 | 17.5 (tol. ±15%) |
| 2.22 | - minimum tap position | % | Specify | 15.0 (tol. ±15%) |
| 2.23 | Impedance voltage – HV/MV (25 MVA basis) | | | |
| 2.24 | - maximum tap position | % | Specify | 10.8 (tol. ±15%) |
| 2.25 | - nominal tap position | % | 10.5 | 10.5 (tol. ±7.5%) |
| 2.26 | - minimum tap position | % | Specify | 10.45(tol. ±15%) |
| 2.27 | Impedance voltage – secondary/tertiary | % | Min. 6.5 (±30%/-0%) | nominal |

| | | | | |
|------|---|-------|----------|----------------------------|
| | (25 MVA basis) | | | 6.5 (tol. ±15%) |
| 2.28 | Magnetic flux density at | | | |
| 2.29 | -rated voltage and frequency | Tesla | Max. 1.7 | 1,7 |
| 2.30 | | | | |
| 2.31 | No load losses (tolerance +0%) | kW | <15 | 15 (tol. +15%) |
| 2.32 | No load current (I ₀ /I _n) | % | 0.1 | 0.1 (tol. +30%) |
| 2.33 | Core losses (W _{17/50}) | W/kg | Max. 0.9 | 0.9 |
| 2.34 | Short circuit voltage | | | |
| 2.35 | - HV-LV | % | 17.5 | 17.5 (tol. ±15%) |
| 2.36 | - HV-MV | % | 10.5 | 10.5 (±7.5%) |
| 2.37 | - MV-LV | % | 6.5 | 6.5 (tol. ±15%) |
| 2.38 | Load losses at rated power | | | |
| 2.39 | HV/LV (25 MVA basis) | | | |
| 2.40 | - maximum tap position | kW | Specify | 140 (tol. +15%) |
| 2.41 | - nominal tap position | kW | Max. 120 | 140 (tol. +15%) |
| 2.42 | - minimum tap position | kW | Specify | 140 (tol. +15%) |
| 2.43 | HV/MV (25 MVA basis) | | | |
| 2.44 | - maximum tap position | kW | Specify | 130 (tol. +15%) |
| 2.45 | - nominal tap position | kW | Max. 120 | 130 (tol. +15%) |
| 2.46 | - minimum tap position | kW | Specify | 140 (tol. +15%) |
| 2.47 | MV/LV (25 MVA basis) | kW | Max. 110 | nominal 110 (tol. +15%) |
| 2.48 | HV winding (25 MVA basis) | | | |
| 2.49 | - maximum tap position | kW | Specify | App. 50 |
| 2.50 | - nominal tap position | kW | Specify | App. 66 |
| 2.51 | - minimum tap position | kW | Specify | App. 73 |
| 2.52 | LV winding (25 MVA basis) | kW | Specify | App. 48 |
| 2.53 | MT winding (25 MVA basis) | | | |
| 2.54 | - maximum tap position | kW | Specify | App. 62 |
| 2.55 | - nominal tap position | kW | Specify | App. 62 |
| 2.56 | - minimum tap position | kW | Specify | App. 69 |
| 2.57 | Power consumption of cooling plant | kW | Specify | 0,75*2 Изолятор |

| | | | | |
|------|--|-------|------------|------------|
| 2.58 | Efficiency referred to 75 °C at rated voltage taping and at: | | | HV-MV nom |
| 2.59 | - 100% rated output and 1.0 power factor | % | 99.7 | 99.423 |
| 2.60 | - 75% rated output and 1.0 power factor | % | 99.7 | 99.532 |
| 2.61 | - 50% rated output and 1.0 power factor | % | 99.7 | 99.621 |
| 2.62 | - 25% rated output and 1.0 power factor | % | 99.7 | 99.631 |
| 2.63 | - 100% rated output and 0.8 power factor | % | 99.7 | 99.280 |
| 2.64 | - 75% rated output and 0.8 power factor | % | 99.7 | 99.416 |
| 2.65 | - 50% rated output and 0.8 power factor | % | 99.7 | 99.527 |
| 2.66 | - 25% rated output and 0.8 power factor | % | 99.7 | 99.540 |
| 2.67 | | | | |
| 2.68 | Voltage variation range HV | kV | +/- 18.423 | +/- 18.423 |
| 2.69 | Taping range HV | % | +/- 16 | +/- 16 |
| 2.70 | Number of steps HV | steps | +/- 9 | +/- 9 |
| 2.71 | Continuous power on all taps | | Yes | Yes |
| 2.72 | Voltage variation range MV 38.5 kV | kV | +/- 1.925 | +/- 1.925 |
| 2.73 | Tapping range MV 38.5 kV | % | +/- 5 | +/- 5 |
| 2.74 | Number of steps MV 38.5 kV | steps | +/- 2 | +/- 2 |
| 2.75 | Principal taping HV | kV | 115 | 115 |
| 2.76 | Principal taping MV | kV | 38.5 | 38.5 |
| 2.77 | | | | |
| 2.78 | Winding insulation design | | | |
| 2.79 | - HV | | Uniform | Uniform |
| 2.80 | - MV | | Uniform | Uniform |
| 2.81 | - LV | | Uniform | Uniform |
| 2.82 | Seismicity on MSK scale | | IX | IX |

| | | | | |
|----------|--|-------|-----------|------------------|
| 3 | INSULATION LEVEL | | | |
| 3.1 | Insulation level HV winding | | | |
| 3.2 | - Power frequency withstand voltage line/neutral | kV | 230/230 | 200/100 |
| 3.3 | - Lightning impulse level line/neutral | kV | 550/550 | 480/200 |
| 3.4 | Insulation level LV winding | | | |
| 3.5 | - Power frequency withstand voltage | kV | 34 | 35 |
| 3.6 | - Lightning impulse level | kV | 110 | 75 |
| 3.7 | Insulation level MT winding | | | |
| 3.8 | - Power frequency withstand voltage line/neutral | kV | 95/95 | 85/85 |
| 3.9 | - Lightning impulse level line/neutral | kV | 250/250 | 190/190 |
| 4 | OPERATION DETAILS | | | |
| 4.1 | Cooling method | | ONAN/ONAF | ONAN/ONAF |
| 4.2 | Noise level (LpA) at a measuring distance of 2.0 m (all forced cooling in operation) | dB(A) | Max. 60 | 60 |
| 5 | BUSHINGS | | | |
| 5.1 | HV (lines) | | | |
| 5.2 | - manufacturer | | | Изолятор |
| 5.3 | - type | | | ГКТПШ-60-126/800 |
| 5.4 | - rated current | A | 800 | 800 |
| 5.5 | - power frequency test voltage | kV | 255 | 230 |
| 5.6 | - lightning impulse level | | 550 | 550 |
| 5.7 | - minimum creepage distance in accordance with IEC 60815 | mm | 2835 | 3150 |
| 5.8 | - cantilever load level according to IEC 60137 | daN | Specify | 1250 H |
| 5.9 | HV (neutral) | | | |
| 5.10 | - manufacturer | | | Asia Trafo |
| 5.11 | - type | | | ИПТ-35/400А |
| 5.12 | - rated current | A | | 400 |
| 5.13 | - power frequency test voltage | kV | 105 | 105 |
| 5.14 | - lightning impulse level | | 250 | 190 |

| | | | | |
|----------|--|-----|-----------------|-----------------|
| 5.15 | - minimum creepage distance in accordance with IEC 60815 | mm | 1050 | 700 |
| 5.16 | - cantilever load level according to IEC 60137 | daN | Specify | 5000H |
| 5.17 | LV | | | |
| 5.18 | - manufacturer | | | Asia Trafo |
| 5.19 | - type | | | ИПТ-10/3150Б |
| 5.20 | - rated current | A | 2000 | 3150 |
| 5.21 | - power frequency test voltage | kV | 42 | - |
| 5.22 | - lightning impulse level | | 110 | 110 |
| 5.23 | - minimum creepage distance in accordance with IEC 60815 | mm | 280 | 300 |
| 5.24 | - cantilever load level according to IEC 60137 | daN | Specify | 10000H |
| 5.25 | MT (lines/neutral) | | | |
| 5.26 | - manufacturer | | | Asia Trafo |
| 5.27 | - type | | | ИПТ-35/630Б |
| 5.28 | - rated current | A | 630 | 630 |
| 5.29 | - power frequency test voltage | kV | 105 | 105 |
| 5.30 | - lightning impulse level | | 250 | 190 |
| 5.31 | - minimum creepage distance in accordance with IEC 60815 | mm | 1050 | 1050 |
| 5.32 | - cantilever load level according to IEC 60137 | dan | Specify | 3500H |
| 6 | CURRENT TRANSFORMERS | | | |
| 6.1 | 115 kV line side | | | |
| 6.2 | For protection purposes | | | |
| 6.3 | Rated output | VA | 10 | 10 |
| 6.4 | Ratio | | | |
| 6.5 | - primary | A | 100-150-200-300 | 100-150-200-300 |
| 6.6 | - secondary | A | 5 | 5 |
| 6.7 | Class | | 0.5sFS5 | 0.5sFS5 |
| 6.8 | For protection purposes | | | |
| 6.9 | Rated output | VA | 30 | 30 |
| 6.10 | Ratio | | | |

| | | | | |
|------|----------------------------|----|-----------------|-------------------------|
| 6.11 | - primary | A | 200-300-400-600 | 200-300-400-600 |
| 6.12 | - secondary | A | 5 | 5 |
| 6.13 | Class | | 5P20 | 5P20 |
| 6.14 | For protection purposes | | | |
| 6.15 | Rated output | VA | 30 | 30 |
| 6.16 | Ratio | | | |
| 6.17 | - primary | A | 200-300-400-600 | 200-300-400-600 |
| 6.18 | - secondary | A | 5 | 5 |
| 6.19 | Class | | 5P20 | 5P20 |
| 6.20 | 115 kV neutral side | | | |
| 6.21 | For protection purposes | | | |
| 6.22 | Rated output | VA | 10 | 10 |
| 6.23 | Ratio | | | |
| 6.24 | - primary | A | 200-300-400-600 | 200-300-400-600 |
| 6.25 | - secondary | A | 5 | 5 |
| 6.26 | Class | | 5P20 | 5P20 |
| 6.27 | 38.5 kV line side | | | |
| 6.28 | For protection purposes | | | |
| 6.29 | Rated output | VA | 10 | 10 |
| 6.30 | Ratio | | | |
| 6.31 | - primary | A | 100-200-300-400 | 100-200-300-400 |
| 6.32 | - secondary | A | 5 | 5 |
| 6.33 | Class | | 0.5sFS5 | 0.5sFS5 |
| 6.34 | For protection purposes | | | |
| 6.35 | Rated output | VA | 30 | 30 |
| 6.36 | Ratio | | | |
| 6.37 | - primary | A | 200-300-400-600 | 200-300-400-600 |
| 6.38 | - secondary | A | 5 | 5 |
| 6.39 | Class | | 5P20 | 5P20 |
| 7 | ON-LOAD TAP CHANGER | | | |
| 7.1 | Manufacturer | | | CV2, Huaming (China) |
| 7.2 | Type | | | |

| | | | | |
|----------|--|-----|-----------------------------|-----------------------------|
| 7.3 | Rated through current | A | 400 | 350 |
| 7.4 | Rated step capacity | kVA | 1320 | 1200 |
| 7.5 | Lightning impulses level | kV | 550 | 325 |
| 7.6 | Power frequency withstand test voltage | kV | 230 | 140 |
| 7.7 | Short-time current | | | |
| 7.8 | - 3s value | kA | 6 | 6 |
| 7.9 | - peak value | kA | 15 | 15 |
| 7.10 | Type of connection | | Neutral | Neutral |
| 7.11 | Type of switching | | Vacuum type diverter switch | Vacuum type diverter switch |
| 7.12 | Contact life operation | Nos | Min. 600 000 | 600 000 |
| 7.13 | Auxiliary supply voltage (AC) | V | 400/230 | 400 |
| 8 | PROTECTION AND MONITORING EQUIPMENT | | | |
| 8.1 | - Buchholz relay | | EMB BF 80/10 (or. equ.) | EMB BF 80/10 |
| 8.2 | - Oil flow operated protection relay | | EMB URF 25/10 (or. equ.) | Qj6-25 |
| 8.3 | - Conservator gas detection relay | | EMB CF-38 (or/ equ.) | - |
| 8.4 | - Oil level indicator | | | |
| 8.5 | Type | | | YZF2-250 |
| 8.6 | Manufacturer | | | |
| 8.7 | - Pressure relief device | | resettable spring loaded | resettable spring loaded |
| 8.8 | Type | | | YSF8-55/130 |
| 8.9 | Manufacturer | | | |
| 8.10 | - Dehydrating breather | | Automatic, maintenance free | Automatic, maintenance free |
| 8.11 | Type | | | XS2-1/5 |
| 8.12 | Manufacturer | | | |
| 8.13 | - Oil temperature indicator | | | Yes |
| 8.14 | Type | | | BWY-804D |
| 8.15 | Manufacturer | | | LEAD |
| 8.16 | - Winding temperature indicator | | | Yes |

| | | | | |
|----------|--|----|-----------|---------|
| 8.17 | Type | | | BWR-04J |
| 8.18 | Manufacturer | | | LEAD |
| 9 | MASSES, MEASURES AND DRAWINGS | | | |
| 9.1 | Transformer masses: | | | |
| 9.2 | - total mass | kg | | 57 900 |
| 9.3 | - transportation mass | kg | | 48 700 |
| 9.4 | - untanking mass | kg | | 4 000 |
| 9.5 | - mass of insulating liquid | kg | | 16 100 |
| 9.6 | Overall dimensions including bushings: | | | App. |
| 9.7 | - height | mm | | 6182 |
| 9.8 | - depth | mm | | 4426 |
| 9.9 | - width | mm | max. 6250 | 5440 |
| 9.10 | Gauge of the tank | | | |
| 9.11 | - longitudinal | mm | 1524 | 1524 |
| 9.12 | - transverse | mm | 2000 | 2000 |

| | | | | |
|-----------|--|------|---|---------|
| 10 | RELIABILITY REQUIREMENTS | | | |
| 10.1 | Design of windings and/or magnetic core pressing system should not require any maintenance for the whole expected life term | | Yes | Yes |
| 10.2 | Manufacture has to have experience in short-circuit tests \geq 110 kV rated voltage transformers (withstand short circuit) according to IEC standard in independent laboratories not earlier than 2010 | | Specify transformer type, present test report | Yes |
| 10.3 | Life time | year | Min. 30 | Min. 30 |
| 11 | DELIVERY | | | |
| 11.1 | Incoterms | | DAP | DAP |
| 11.2 | Unloading on site | | Yes | Yes |
| 12 | DOCUMENTS TO BE PROVIDED WITH THE OFFER | | | |
| 12.1 | Transformer data plate (photo or drawing) | | Provide | Yes |

| | | | | |
|-------|--|--|---------|-----|
| 12.2 | Passport or Test Certificate of the similar* transformer previously manufactured not earlier than 2010 | | Provide | Yes |
| 12.3 | Reference list of the similar transformers for the last 5 years with end users contacts | | Provide | Yes |
| 12.4 | Certificate for manufacture's test laboratory (ISO/IEC) | | Provide | Yes |
| 12.5 | Outline transformer drawing | | Provide | Yes |
| 12.6 | Oil test certificate | | Provide | Yes |
| 12.7 | Short-circuit test report | | Provide | Yes |
| 12.8 | OLTC Type Test Report performed in independent and accredited European Laboratory according to IEC 60214-I:2014, | | Provide | Yes |
| 12.9 | OLTC instalatuon and operation manual | | Provide | Yes |
| 12.10 | Other documents required according to chapter 5 of the present document | | Provide | Yes |

- Similar transformer is a three – winding transformer with same/similar rated power, HV and MV rated voltage, no-load and load losses, impedance voltage, sound pressure level.

Manufacturer's notes:

1. On the branches of the HV winding below minus 5.34% (-3x1.78%), the power corresponds to the rated current of the branch minus 5.34%.
2. Routine and acceptance tests are in scope and accordance with IEC methods. Short-circuit test is not performed, stability to short circuit is confirmed by Manufacturer's calculation.
3. In everything unspecified, the transformer complies IEC60076.

Bidder's name: Power Logistics SRL

Signature and stamp/electronic signature of the bidder: _____ Dranga Iurii

