

Type and Service Conditions:

One (1) three-phase, 50 Hz, 65°C, oil-immersed, 110-20 kV generator step-up transformer, three-winding with buried tertiary, for use on 20 kV wind-turbine collection system. Design, loading, construction, accessories and components in accordance with latest IEC 60076 and IEC 60214 standards.

Environmental Conditions:

Elevation: $\leq 1000\text{m}$

GHSAP classification: 90% probability of not exceeding 2m/s peak horizontal acceleration

Abnormal Conditions: None

Lightning Rate (as per BS 6651: 1992) : 0.3-3.0 flashes per km^2 per year

Ambient Temperatures: Monthly average = $+10.0^\circ\text{C}$
Record high/low = $32.5^\circ\text{C}/-18.8^\circ\text{C}$

Ratings:

80/100 MVA at 65°C rise, ONAN/ONAF or equivalent manufacturer's option (but without pumps)

HV: 110,000 volts (no load) Grd-Y, 550 kV BIL

LV: 20,000 volts(no load) Grd-Y with provision for the connection of an NER, 125 kV BIL

TV: buried, delta with one corner earthed, two external test terminals

H0: 550 kV BIL winding terminal, un-earthed optional. Fully rated insulation

X0: 125 kV BIL winding terminal, earthed via NER

Connection: YNyn0d1

Impedance: 15% @ ONAF, rated tap

Target Losses at 75°C No Load Losses $<36\text{kW}$
Load Losses $<338\text{kW}$
Auxiliary Losses $<2.2\text{kW}$
If the figures cannot be met, please advise alternative figures for review by Airtricity.

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Losses will be evaluated at: NLLCR = €8098/kW, LLCR (ONAN, rated tap, 75°C) = €2049/kW, ALCR = €2327/kW

Short circuit level:
25kA, 1sec at 20kV side

Tap Changers:

De-energized in HV: None

Automatic On-Load, Tap Changer with Proportional and Integral (PI) control: +10/-20%, 32 steps, located in HV winding, constant flux voltage variation, full capacity taps above and below

Control cubicle:

To be mounted on the transformer.
IP 54 (or better) to IEC 60529.

Bushings:

Brown, each with NEMA 4-hole pad, suitable for connection to aluminium or copper terminals

HV: oil-filled with capacitance tap, 550 kV BIL

LV: solid, 125 kV BIL

Ho : oil-filled with capacitance tap, 550 kV BIL

Xo solid, 125 kV BIL

Cable Terminations:

HV: Spigot.

LV: Cable box. **5 x 1c 400mm² Cu/Al** Screened XLPE insulated per phase, **1 x 1c 400mm² Cu/Al** Screened XLPE insulated Neutral.

Note: Cable sizes and quantities TBC during installation design.

Arresters:

Metal oxide, station class, silicon outer, HV: 108 kV rating, 80 kV MCOV
LV 16.98 kV rating, 14 kV MCOV

Current Transformers:

HV: two (2) per phase, 600/5 MR, C800, 2.0 OLF (may not be required – provide option price)
LV: two (2) per phase, 3000/5 MR, C800, 2.0 OLF (may not be required – provide option price)
Ho: one (1), 600/5 MR, C800, 2.0 OLF (may not be required – provide option price)
Xo: one (1), 600/5 MR, C800, 2.0 OLF (may not be required – provide option price)

Station Service:

400/230 VAC, 50 Hz,
three phase and neutral

Sound Level:

IEC 60551 standard

Spare Parts:

One of each type of bushing gaskets and flange gaskets, sealed and boxed for long-term storage. Tap-changer; replacement ring kit and spare transformer fan unit.

Delivery and Field Services:

Supplier shall unload, place and align transformer on Airtricity-furnished foundation. Supplier shall completely assemble, dress, and oil-fill transformer. Supplier shall perform complete field acceptance tests, including but not limited to: Doble-type insulation tests (overall, bushings, excitation, arresters), insulation & core ground resistance, TTR of all taps, test CTs (ratio, polarity, excitation, insulation resistance). Supplier shall perform functional tests of controls, relays and fans, and calibrate oil-temp gauge with hot-oil well. Supplier shall sample oil from transformer before energisation and provide baseline test results (DGA, particle, dielectric breakdown, PF @ 25°C, IFT, acid/visual, KF moisture, and Furanic). The transformer shall be assembled, tested and ready for energisation within three weeks after delivery.