



SECTION – 2.31

ZIG-ZAG TRANSFORMER & NEUTRAL GROUNDING RESISTOR

1.0.0 INTENT OF SPECIFICATION

This specification covers the design, technical data and testing of zig-zag transformer and Neutral Grounding Resistor.

2.0.0 SCOPE OF WORK

2.1.0 The scope of work shall include, supply, design, Engineering, manufacturing, assembly, procurement, transportation, loading, unloading, internal handling erection, installation, testing and commissioning etc. of zig-zag transformer and neutral grounding resistor.

2.2.0 It is not the intent to specify completely herein all details of the equipment; nevertheless, the equipment shall be complete and operative in all respects and shall confirm to the highest standard of engineering, design and workmanship.

3.0.0 ZIG-ZAG TRANSFORMER

Power transformer neutral earthing shall be non-effectively earthed through a zig-zag transformer with its secondary winding loaded with a suitable resistance, limiting the earth fault current to about 100 A. The zig-zag transformer shall be capable of carrying earth fault current for at least 10 sec continuously.

The transformer shall be oil type, three phase air cooled connected between power transformer neutral and earth. The resistor shall be of stainless-steel grid housed in enclosure of degree of protection of minimum IP 55. The cubicle shall be provided with space heater, cubicle lamp, receptacles etc.

4.0.0 NEUTRAL GROUNDING RESISTOR

4.1.0 The neutral grounding resistors shall be used to ground neutral of Transformers.

4.2.0 The NGR rating shall be based on the electrical design ambient temperature specified in project information. The short time current rating of the NGR shall be such that it can allow 100 A current for 30 seconds without exceeding the temperature rise of 30°C over the electrical design ambient temperature.

4.3.0 The NGR shall be rated for system having following system parameters.

Nominal voltage:	11000 V
Frequency:	50 Hz \pm 5%
Power frequency withstand voltage:	28 kVrms
Impulse withstand voltage:	75 kVp

4.4.0 The NGR rating shall be based on an ambient temperature as mentioned in GTS.

4.5.0 The NGR shall be natural air-cooled type. The resistor shall be made of stainless-steel grid.

4.6.0 The NGR shall be suitable for outdoor installation in a hot, humid, and tropical atmosphere.

4.7.0 One end of the resistor shall be connected to neutral side of the transformer through suitable cable box and other end shall be connected to earth pit through bushing and galvanized steel busbar.



- 4.8.0 The material of resistor shall be non-inductive and made of non-magnetic material of punched stainless steel. The resistor shall be of dry type and maintenance free. The resistors shall be designed to carry high currents at high temperatures without deterioration and with relatively small change in its resistance value. The operation of the resistor shall not be affected by moisture or fine dust or sand. All element connections shall be bolted type to ensure stable resistance value throughout the life of Unit.
- 4.9.0 The resistor shall be enclosed in aluminum enclosure protection of not less than 3mm, having degree of protection of IP 55. The enclosure shall have suitable hood or sloped roof on top for rain protection. The NGR shall be complete with support insulators and interposing insulators for resistor.
- 4.10.0 For NGR, the enclosure shall have cable box with bushing for receiving neutral cable.
- 4.11.0 Cable box shall be provided with Bolted type removable aluminum gland plate for fixing cable glands. Cable box shall be suitable for receiving termination kits. In case of bus connections bushing with all accessories shall be supplied.
- 4.12.0 A low voltage bushing and stud shall be provided through the enclosure wall for the resistor earth connection. The low voltage bushing shall be suitable for receiving 2 numbers of earthing flat. The cubicle shall be complete with mounting brackets, lifting hook etc.
- 4.13.0 The NGR cubicle shall be mounted on an insulated pedestal.
- 4.14.0 The enclosure shall be provided with a space heater & thermostat. Suitable terminal block shall be provided to receive 230 V AC supply and distribute the same to space heater through MCB. Door switch operated Illuminating lamp & socket shall be provided.
- 4.15.0 Support structure shall be of hot dip galvanized standard steel section. Height of support structure shall be not less than 1 meter. For the design of structures, loads such as Dead load due to equipment and structure, Wind load on structures, Seismic loads, short circuit forces shall be considered. All supporting structures shall be furnished including members, bolts, shims, base plates, brackets, bracings, and hardware. All steel members shall be suitably surface treated and hot dip galvanized after fabrication. All hardware shall be of high strength steel with weather resistant finish. Thickness of galvanizing shall be as per relevant ISO standard.