



Ergon Energy Corporation Limited

Specification for Soil Resistivity Testing

This material is made available on the basis that it may be necessary for a Registered Professional Engineer of Queensland (RPEQ) to undertake or oversee the engineering services to meet statutory obligations.

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1. Purpose

This specification provides guidelines for soil resistivity testing and interpretation. The soil resistivity is a parameter used for the design of additional earthing systems to achieve the required structure footing resistance; as well as for the calculation of mutual coupling to metallic circuits (pipelines, fences, telecommunications, other powerlines during maintenance). Footing resistance is important for lightning back flashover performance; the distribution of earth fault currents and sizing of earthwires; earth potential rise of structures under earth faults; step and touch voltages.

Low soil resistivity is an indication of a potential corrosion hazard to buried metals such as copper used for earthing.

2. Reference Documents

2.1 Standards

AS/NZS 4853:2012 Electrical hazards on metallic pipelines
IEEE Std 81 Guide for Measuring Soil Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

2.2 Ergon Energy controlled documents

[PW000702R105](#) – Complete Simple Project Risk Management Plan
[PW000702F100](#) – Simple Project Risk Management Plan

[SS-1-7.3](#) Soil Resistivity Testing
[SP0510C04](#) Soil Resistivity Test Report spreadsheet

3. Safety, Environmental and Cultural Heritage Considerations

The contractor shall undertake a risk assessment in accordance with Ergon document PW000702R104 prior to work commencing. Ergon form PW000702F100 provides a record of this activity.

4. Procedure

All tests shall be done in accordance with the substation standard document SS-1-7.3. Informative Appendix L of AS/NZS 4853 and IEEE 81 provide additional guidelines for the measurement of soil resistivity.

The quantity of test sites required will depend upon the length of the line route and its geology. Geological survey maps may be used to locate changes in soil resistivity along the route. Generally, testing in urban areas will only provide apparent soil resistivity values because of the influence of underground metallic plant.

Unless otherwise specified, the contractor shall use the Wenner method (four pins equally spaced) for measuring soil resistivity. Pin (probe) spacings of 1, 2, 4, 8, 16 and 32 m shall be used. Testing at each site shall involve a sequence of measurements in two directions perpendicular to each other i.e. in a cross formation.

The test results shall be analysed in accordance with any of the methods detailed in document SS-1-7.3. Soil resistivity varies seasonally depending on ground moisture and engineering experience is required when deciding on the soil resistivity model to use for design.