**ZIMBABWE ELECTRICITY TRANSMISSION & DISTRIBUTION COMPANY**

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***NORTHERN REGION***

ZETDC SPECIFICATION NO. 020809

SPECIFICATION FOR

**EARTH SETS**

**JUNE 2021**

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**ZETDC SPECIFICATION NO. 020809**

**EARTH SETS**

**1 SCOPE**

This specification covers the supply and delivery of earth sets. For the purposes of this specification, earth sets are equipment making up the temporary grounding system used on de-energized electrical power lines, electric supply stations, and electrical switchgear.

The Supplier shall state name, place and country of manufacture of each earth set supplied. The Supplier shall state whether or not the earth sets are produced under license, in which case licence holders name shall be stated.

Tenders shall include a complete statement of compliance with this specification and the Technical Guarantee Schedule shall be completed. For every clause in this specification the Tenderer shall state compliance or non-compliance and shall elaborate where appropriate.

Spares as recommended by the manufacturer should be included in the scope of supply.

**2. DETERMINATION OF RESPONSIVENESS**

Prior to the detailed evaluation of Tenders, ZETDC will determine whether each Tender is substantially responsive to the requirements of the Tender Document.

For the purpose of this clause, a substantially responsive Tender is one which will conform to all the terms, conditions and specifications of the Tender Document without material deviations or reservations. A material deviation or reservation is one which affects in a substantial way the price, scope, quality, completion, timing or administration of the works undertaken by the Tenderer under the Contract, or which limits in a substantial way, inconsistent with the Tender Document, the Zimbabwe Electricity Transmission and Distribution Company’s rights or the Tenderer’s obligations under the Contract and the rectification of which would affect unfairly the competitive position of other Tenders who have presented substantially responsive Tenders at reasonable price.

A Tender determined to be substantially non-responsive will be rejected by the Authority and may not subsequently be made responsive by the Tenderer by correction of the non-conformity.

The Zimbabwe Electricity Supply Authority may accept any non-material deviation or reservation provided that the acceptance thereof does not prejudice or affect the relative ranking order of any tender in the evaluation of Tenders.

**3. PARTICULARS OF THE ELECTRICAL SYSTEM**

Unless otherwise specified in the Schedule of Requirements, it must be assumed that the electrical system in which the earth sets will operate is;

1. Three phase overhead-line construction and underground system. The maximum earth fault factor on the network is 1.5.
2. Operated at 50 Hz, with approximately sinusoidal wave form.
3. The highest system voltage does not normally exceed the nominal system voltage by more than 10%. The nominal system voltages are 33 kV and 11 kV.
4. The system frequency variation does not exceed plus or minus 2.5% from 50 Hz.

Designs should allow for these variations.

**4. PARTICULARS OF THE ENVIRONMENT**

Earth sets will operate within the tropics and will be subjected to sudden ambient air temperature changes of the order of 10 °C per hour, occurring at the onset of rain, but the barometric pressure at any given place does not vary by more than approximately 10mm Mercury. Frequent and severe lightning storms occur during summer months, with isoceraunic levels varying between 50 and 100 thunderstorm days per annum.

The earth sets shall be capable of operating under the following environmental conditions.

(i) Maximum: 40 °C

(ii) Minimum: minus 10 °C

(iii) Maximum daily average: 35 °C

b) **Altitude:**

Maximum altitude of 1 500 metres above sea level. The design shall allow for reduced cooling effect due to high altitude.

c) **Humidity:**

Humidity of 13mg per cubic metre absolute and 65% relative before storms with vapour pressure of 17mmHg.

*It is the supplier’s responsibility to make himself familiar with any other climatic and physical conditions pertaining in Zimbabwe and to supply earth sets which meet all such conditions.*

**5. LANGUAGE, UNITS AND STANDARDS**

All tenders, correspondence, description upon drawings, illustrations or instructions shall be in unambiguous English Language. SI Units of measurements shall be used throughout.

Except where modified by ZETDC's Specifications, IEC Recommendations (IEC 61230) shall apply throughout or British Standards (BS) where they amplify the IEC 61230. In the case of conflict between the above stated Standards and this Specification, the ruling of this Specification shall prevail.

**6. DEFINITIONS**

Throughout this document, the following terms shall be used in the manner defined below:

***May -*** indicates the existence of an option

***Shall -*** indicates that a statement is mandatory

***Should* -** indicates a recommendation

**7. DESIGN FEATURES**

**7.1 Cables**

The earth sets offered shall have cables made of bunched strands of bare annealed soft copper. The cable leads shall be at within 40 - 120mm2 and at least 3m long for the phase leads; and 40 - 50mm2 and at least 12m long for the earth lead.

Ferrule

40 **-** 120mm2 phase lead at least 3m long

Yellow / orange thermoplastic jacket

Type “C” clamp or snap on clamps

Shrink Jacket

40 **-** 50mm2 earth lead at least 12m long

The cable shall be suitable for use on 33kV and 11kV voltages, and shall have a 1 second short circuit current rating of at least 8kA. The cable shall have a bright yellow or bright orange transparent thermoplastic jacket suitable for use within the -400C to 900C temperature range.

**7.2 Clamps**

The earth set offered shall be fitted with type C grounding clamps or Duckbill clamps (snap on). Clamps shall be made of bronze and shall have smooth jaws and a bronze eye-screw. Clamps shall have acme threads. Aluminium clamps maybe accepted provided the jaws are serrated.

**7.3 Ferrules**

The earth set shall have plain copper ferrules.

**7.4 Shrink Tubing**

The earth sets may have a transparent shrink tube for stress relief and inspection of cable strands between the ferrule and lead jacket.

**7.5 Support Stud**

The earth set may have a single supporting stud to help control lifting the set to the first clamp attachment point.

**7.6 Tool Bag**

All earth sets shall be supplied with heavy duty vinyl-impregnated fabric bags. The bags shall be of the same colour as the earth sets.

**7.7 Manuals and other Accessories**

The following manuals and toolkit shall be supplied at time of delivery:

* One operator’s manual/diagram with each earth set
* Maintenance chart/ booklet for each earth set showing service points and lubrication intervals and recommended lubricants.
* Manufactures recommended tools suitable for use with the earth set.

**7.8 Warranty**

A minimum one year warranty shall be provided on all manufacturers’ equipment.

**8 TECHNICAL GUARANTEE SCHEDULE**

EARTH SET

Please complete this schedule by ticking where requirement is met or stating the actual tendered earth set specification in the column labelled Actual

|  |  |  |  |
| --- | --- | --- | --- |
| **Particulars** | **Unit** | **Requirement** | **Actual** |
| Length(minimum) Phase leads  Earth Lead | M | 3 |  |
| M | 12 |  |
| Conductor Size Phase lead  Earth Lead | mm2 | 40 - 120 |  |
| mm2 | 40 – 50 |  |
| Electrical Rating Continuous Current  1s short circuit rating | A | Minimum 400 |  |
| kA | Minimum 8 |  |
| Rated operating voltage | kV | Minimum 36 |  |
| Rated withstand voltage | kV/m | 100 (min) |  |
| Colour (earth set) | - | Yellow/Orange/Red |  |
| Colour (Carry bag) | - | Yellow/Orange/Red |  |
| Clamp Type | - | C type or Snap On |  |
| Standard | - | IEC 61230 |  |
|  |  |  |  |