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OUR REF:..... FN/ec

YOUR REF

WHEN CALLING WITH REFERENCE
TO THIS LETTER PLEASE ASK FOR

..... F. Nyamakambo.....

25 November 2022

To All Bidders

Dear Sir/Madam

**ADDENDUM NO. 1 TO TENDER NO. ZETDC/INTER/16/2022 FOR TENDER NO. ZETDC/INTER/16/2022
FOR THE SUPPLY AND DELIVERY OF CABLES AND CONDUCTORS**

The above subject matter refers.

Kindly find attached **Addendum No. 1** in response to queries raised by participating bidders for Tender No. ZETDC/INTER/16/2022 for the Supply and Delivery of Cables and Conductors.

Yours faithfully

F. NYAMAKAMBO
SUPPLY CHAIN MANAGER



ADDENDUM NO. 1

**TO STANDARD BIDDING DOCUMENT (SBD) FOR
TENDER NO. ZETDC/INTER/16/2022**

**FOR THE SUPPLY AND DELIVERY OF CABLES AND
CONDUCTORS**



ZETDC



DISTRIBUTION DEPARTMENT

ZETDC SPECIFICATION NO. DS22112022AD

**SPECIFICATION FOR PVC INSULATED ALUMINIUM
OVERHEAD SERVICE CABLE (AIRDAC/Fig 8)**

ZETDC H/O PROCUREMENT

25 NOV 2022

2nd Floor Southwing Electricity Centre
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Tel: 0242 750262
procurement@zetdc.co.zw

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1. SCOPE

This specification calls for supply and delivery of PVC insulated, aluminium-cored overhead service cables. The scope of supply is as detailed in the Schedule of Requirements.

For the purpose of this specification, the aluminium overhead service cables shall be used for connecting new customer points to overhead lines.

The supplier shall state name, place and country of manufacture.

The supplier shall state whether or not the cables are produced under licence, in which case licence holders name shall be stated.

Tenderers shall include a complete statement of compliance with this Specification. For every clause in this Specification the Tenderers shall state compliance or non-compliance and shall elaborate where appropriate.

Tenderers shall use the words "comply", "do not comply" with this Specification or in the clauses of an informative nature, "noted". Where the words "do not comply" are used the Tenderer shall state whether modifications could be made and whether modifications would be undertaken. The cost implications of such modifications must be indicated in the statement of compliance as well as the pricing schedules.

The manufacture of the cables should only commence after inspection of the prototype by at least two (2) ZETDC Engineers. The supplier will meet all the costs associated with the inspection of the prototype cables.

2. STANDARDS, UNITS AND LANGUAGE

The service cable supplied shall be in accordance with the latest edition of the standards specified below and amendments thereof or any other standard, provided the Tenderer can provide documentary evidence that the standards are acceptable to ZETDC or it is equal to or better than the above standards. However, ZETDC specification shall supersede these standards in the event there is a discrepancy.



- BS 2627: 1970 Specification for Wrought Aluminium for Electrical Purposes Wire
- IEC 61089: 1991 Round wire concentric lay overhead electrical stranded conductors
- BS 6004: 2000 Electric Cables PVC insulated non-armoured cables for Voltages up to and including 450/750V, for electric power, lighting and Internal wiring.
- BS 7655-3.1: 1997 Specification for insulating & sheathing materials for cables. **PVC insulating compounds. Harmonized types**
- BS 7655-4.2:2000 Specification for insulating & sheathing materials for cables. **PVC sheathing compounds. General Application**
- BS EN/IEC 60811.1: 1995 Insulating and sheathing materials of electric cables. Common test methods. General application. Measurement of thickness and overall dimensions. Test for determining the mechanical properties.
- ASTM B233-97(2003) Standard Specification for Aluminium 1350 Drawers stock for Electrical Purpose.

Cables not complying with the above standards will be rejected.

All tenders, correspondence, and all description upon drawings, illustrations or instruction shall be in the English Language.

SI units of measurements shall be used throughout.

Tenderers should advise to which standard the cables are manufactured and tested, and shall supply relevant test certificates or test results.

The service cables shall be manufactured to high quality standards under ISO 9001/2 Certification. Documentary proof of ISO Certification shall be provided with the bid.

The Manufacturer shall possess ISO 9001: 2008 Quality Assurance Certification valid throughout the delivery period of this tender, for the plant where the Service Main Wire is being manufactured. The Bidder shall furnish a certified copy of the ISO Certificate along with the offer. Quality Assurance System conforming to ISO 9001:2008 shall be followed in the manufacture of the service cable. The Bidders shall furnish documentary evidence that the Service cable manufacturer have obtained ISO 9001:2008 Certification. Offers of bidders who fail to furnish the proof of ISO 9001:2008 certificates will be rejected.



3. PARTICULARS OF THE ENVIRONMENT

The cable shall be capable of operation under the following environmental conditions.

- (a) At an average altitude of 1,500 m above sea level.
- (b) Ambient air temperatures not exceeding a maximum of +45°C or below -10 °C with a daily maximum average of 35°C.
- (c) Exposed to direct tropical sun.
- (d) Humidity 13 mg per cubic metre absolute and 65% relative before storms with vapour pressure 17 mm.hg.
- (e) Equipment will operate within the tropics and is subject to sudden ambient air temperature changes of the order of 10 degrees centigrade occurring at the onset of rain, but the barometric pressure at any given place does not vary by more than approximately 10 mm mercury.
- (f) Frequent and severe lightning storms occur during summer months, with isoceraunic levels varying between 50 and 100 thunderstorm days per annum.
- (g) Particular attention should be paid in the design of all equipment to ensure that there is no damage to working parts or insulation through the ingress of dust, insects, vermin which are prevalent for long periods in the year

4. CABLE CONSTRUCTION

4.1 General

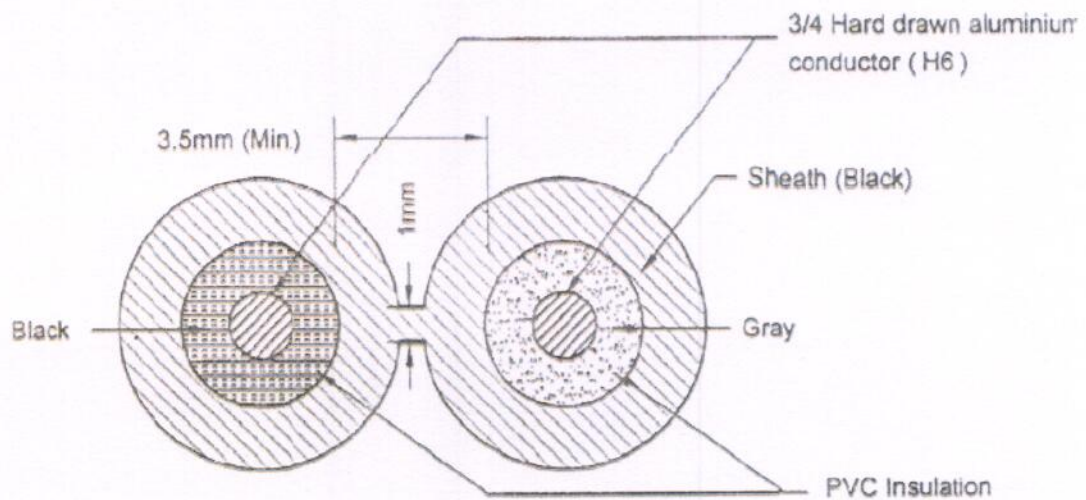
The service main wires shall comply with BS6004: 2000 in regard to thickness of the Insulation and the Sheath. The formation of insulations and overall sheathing shall be as per figure 1 below.

The core for the Service Main Wire shall be $\frac{3}{4}$ hard drawn aluminium (H6) wires as per BS 2627: 1970.

The Insulation shall be of harmonized PVC type TI 1 complying with BS7655-3.1: 1997.

The Sheath shall be PVC type 6 complying with BS7655-4.2: 2000. It shall fit closely to avoid ingress of moisture while in service but shall not adhere to the Insulation or to the bare conductor so that it shall be possible to remove the Sheath easily without damage to the insulation.





4.2 Manufacture.

The service cable shall have two cores, both lay in parallel and sheathed with **Black** colour PVC sheath material. Cross sectional area of the cores shall be 25mm².

The maximum continuous current carrying capacity at the maximum permissible continuous conductor temperature of 70°C and the factors for determining such rating shall be based on BS 6346 and subsequent amendments and all conditions prevailing on site as specified herein.

4.2.1 Aluminum Re-draw Rods

Aluminum re-draw rods used in the manufacturing of aluminum wire for the fabrication of the service cable shall conform to ANSI / ASTM 233-97.

The quality of aluminium re-draw rods used for the manufacture of the service cable shall be as stipulated below. The purity of the Aluminium re-draw rods shall not be less than 99.5%. The percentage composition of other elements shall not be more than the values stipulated below.

(a) Element Allowed % Max.

- i. Silicon 0.10
- ii. Iron 0.40
- iii. Copper 0.05
- iv. Manganese 0.01
- v. Chromium 0.01
- vi. Zinc 0.05
- vii. Boron 0.05



- viii. Gallium 0.03
- ix. Vanadium plus titanium, total 0.02
- x. Other elements, each 0.03
- xi. Other elements, total 0.10

Total % of impurities shall not be more than 0.5

- (b) The tensile strength of Rods shall be between 103MPa to 138MPa (10.3 N/mm² to 13.8N/mm²).
- (c) The Maximum Electrical resistivity of the Aluminium Re-draw Rods shall be 0.028080Ω.mm²/m

4.3 Marking

The outer sheath of the service cable shall be embossed with letters "ZETDC" followed by the manufacturer's identification, rated voltage & conductor size at every 550m or less along the length.

4.4 Packing

The service cable shall be delivered in 1000-meter length drums. Each drum shall bear a tag showing the following particulars.

- (a) Manufacturer's Name or Trade Mark,
- (b) Type of cable
- (c) Core size
- (d) Length of cable
- (e) Colour of Insulation /sheath.
- (f) Net weight/Gross weight.



4.5 Type Test Certificates

The certified copies of the Type Tests Certificates for the following tests as per BS 6004, IEC 61089

and ASTM B233-97 shall be furnished with the offer;

- (a) Insulation resistance (as per BS 6004:2000, clause 7.6)
- (b) Compatibility test (as per BS 6004:2000, clause 8.4)
- (c) Voltage test on cores (as per BS 6004:2000 Clause 7.4)
- (d) Flame propagation of a single cable (as per BS 6004:2000, clause 8.5)
- (e) Joints in Aluminium wires (as per IEC 61089, clause 6.5.4)
- (f) Stress–strain curves (as per IEC 61089, clause 6.5.1 and clause 6.5.2)
- (g) (Breaking strength of conductor (as per IEC 61089, clause 6.5.3)

Aluminium Re-draw Rods

- (a) Tensile test. (as per ASTM B233-97, clause 7)
- (b) Determination of chemical composition and purity. (as per ASTM B233-97, clause 5)
- (c) Electrical resistivity test. (As per ASTM B233-97, clause 9)

The type test certificates pertaining to recent manufacture of the aluminium service cable specified herein shall be from an independent testing authority acceptable to the purchaser.

4.6 INSPECTION & TESTING

4.6.1 Acceptance/Sample Test

The Manufacturer shall make necessary arrangements for inspections by 2 (two) ZETDC Engineers during Manufacture and before dispatch and also to carry out in their presence the sample tests and routine tests (as per Clause 12.2 below) stated in BS 6004, EN 60811-1-1:1995 and IEC 61089. Following tests shall be witnessed by the Engineer on selected samples and the copies of the test certificates shall be supplied with the cable.

- (a) Cross section area of the conductor (as per IEC 61089 clause 6.6.1)
- (b) Conductor diameter (as per IEC 61089 clause 6.6.2)
- (c) Linear density-Mass per unit length (as per IEC 61089 clause 6.6.3)
- (d) Breaking strength of wires (as per IEC 61089 clause 6.6.4)
- (e) Surface condition (as per IEC 61089 clause 6.6.5)
- (f) Lay ratio and direction of lay (as per IEC 61089 clause 6.6.6)
- (g) Measurement of insulation thickness and overall dimensions (as per EN 60811-1-1:1995, clause 8.1)
- (h) Conductor resistance (as per BS 6004, clause 7.2)
- (i) Insulation resistance as per BS 6004:2000, clause 7.6)
- (h) Voltage test on completed cable (as per BS 6004:2000 Clause 7.3)

4.6.2 Routine Test

The following Routine test report of the service cable shall be made available for the observation of ZETDC Engineers.

- (a) Visual inspection of cable markings
- (b) Absence of faults in the insulation (as per BS 6004:2000 Clause 7.5)



5.0 DELIVERY PERIOD

Delivery period shall be 8 Weeks or better from order placement.

6.0 TECHNICAL SCHEDULES

6.1 Preamble

- 6.1.1 The Technical Schedules shall be filled in and completed by the Bidder, and submitted with the Bid.
- 6.1.2 All documentation necessary to evaluate whether the equipment offered is in accordance with this Specification shall be submitted with the Bid.
- 6.1.3 All data entered in the Schedules of Technical Guarantees are guaranteed values by the Bidder and cannot be departed from whatsoever.
- 6.1.4 All data entered in the Schedules of Informative Data are also guaranteed values by the Bidder. These data may only be altered following the Engineer's written consent

7.0 EXPERIENCE

The manufacturer shall have at least 5 years of experience in the manufacturer of PVC cables and he shall furnish sufficient documentary evidence in the bid to prove his manufacturing experience.

8.0 SAMPLE

A sample piece of the tendered 25mm² aluminum service cable length two meter (2m) manufactured according to this specification shall be accompanying the offer. Bidder's identity shall be indelibly marked on the samples.



9.0 TECHNICAL GUARANTEE SCHEDULE

Please complete this schedule by stating the actual tendered specification and sign as indicated.

Name of Manufacturer: _____

Model: _____



TABLE A

Description	Unit	Required	Guaranteed Value	Reference page in technical brochure (e.g. found on page 3, section 3.2 paragraph/line etc.)
Reference standards	-	IEC/BS		
Insulator material	-	PVC/FR STABILISED	UV	
Conductor material	-	Aluminium		
Conductor size	sq.mm	25		
Minimum insulation radial thickness	mm	0.8		
Minimum Average insulation radial thickness	mm	0.92		
Set Insulation Radial thickness	mm	0.97		
No of cores/Colour/Construction		2/Black/Fig 8		
Major diameter over insulation	mm	19		
Minor diameter over insulation	mm	8.65		
Method of installation		Air		
Nominal Voltage	V	400V ph to ph /230V ph to Neutral		
System Highest Voltage	V	440 V ph to ph /250V ph to Neutral		
System Frequency	Hz	50		
System Fault Level	kA	31.5		
No. of inner cores	ea	two		
Tensile Strength of Conductor material	N/mm ²	125 ~165		
Conductor construction	Min No of wires	7/2.21		
Conductor diameter	mm	6.63		
Conductor resistance at 20°C	ohm/km	1.066		
Operating ambient temperature	°C	1 to 40		
Conductor maximum operating temperature	°C	70		
Maximum current carrying capacity	A	92		
Approximate Voltage Drop@ power factor of 0.8 @ 50Hz and ambient air @ 30 Deg Celcius	mV/A/m	2.7		

Spark test-A.C. (r.m.s.)-10 kV		No breakdown		
Voltage test- A.C. (.r.m.s.)-2.0 kV		No breakdown		
Colour of sheath	-	Black		
Insulation tensile Strength	N/mm ²	12.5		
Insulation Elongation at break		125 %		
Insulation resistance to cracking	°C	Temp:150±2 Requirement: No crack		
Type of despatch drum	ea	Treated wooden		
Cable length per despatch drum	m	State		
Drum maximum diameter	mm	State		
Laden drum mass	Kg	State		
Routine Test Certificates		State		
Manufacturer's name:		State		
Country of Manufacture:		State		

Signed.....Designation.....Date.....

