



BILL OF QUANTITY AND PROJECT SPECIFICATION

FOR

OHTE SAFETY CRITICAL GOODS



1. INTRODUCTION

The purpose of this project is to provide a service of supply and deliver of OHTE safety critical Electrical goods.

2. DESCRIPTION OF WORKS/SCOPE OF WORKS

Supply and delivery of safety critical electrical goods to PRASA regions (Gauteng (GP), Kwa-Zulu Natal (KZN) and Western Cape (WC) Electrical Depot.

Safety Critical Electrical goods	Quantity	Distribution
Mast pole stencils	4	GP
High Voltage warning signs	50	WC 20x WW7, 20 x WW23, 10x "4 in one"
Tension device	20	10 x GP, 5 x WC and 5 x KZN
Kink remover (manual/hydraulic or battery operated)	10	4 x GP, 3 x KZN and 3 x WC
800mm ² feeder wire crimping tool	4	2 x GP, 1 x KZN and 1 x WC
Live line testers 3kV DC	4	WC
Live line tester 11kV AC to 33kV AC	4	WC
High Voltage Insulation	20	GP
Track switches	20	GP
Uplift limit device	40	GP
Dropper wire	10	GP
Dropper clips for contact and catenary	500	GP
Contact wire splice	40	GP
Bonding lugs & ferrule	500	GP
Bond kit for mast	500	GP
Bond kit for rail	500	GP



3. **DURATION**

The project contract will be for 5 Month from the date of award. i.e., Tenderer having acknowledged the receipt of the award letter.

4. **GUARANTEE**

4.1. Prasa shall be formally invited to conduct tests and visually inspect the equipment before delivery.

4.2. The material/equipment shall be subjected to a guarantee period of 24 months. The guarantee period shall commence the day it is formally handed over to and accepted by PRASA. The clause further requires that the warranty/guarantee document include, at a minimum:

- Warranty period and commencement date.
- Scope of warranty coverage, including parts, labour, and workmanship.
- Defects and failures covered under the warranty.
- Response times for technical support and rectification of faulty equipment.
- Repair, replacement, or refurbishment procedures for defective equipment.
- Details of local technical support and service centres.
- Warranty exclusions and limitations.
- Warranty claim procedure.
- Confirmation of replacement parts availability during the warranty period.
- Commitment that all warranty-related costs, including labour and transport, will be borne by the bidder

4.3. Any defects that may become apparent during the guarantee period shall be rectified to the satisfaction of PRASA at no cost to PRASA.

4.4. Should the contractor fail to comply with the above, Prasa is entitled to take effective replacement of the defective material. The contractor must reimburse Prasa the total cost for the replacement of materials.

5. **TENDERING PROCEDURE (EVALUATION)**

5.1. For all quoted items, bidders must submit descriptive literature consisting of a detailed technical description of the product offered, general constructional details, and principal dimensions, together with clear illustrations of each equipment offered. Tenderers shall provide the following additional information at the tendering stage:

- The battery requirements of the tool and the expected service life of the batteries at 20 operations per day.
- Spare components recommended and availability for local repair.



- The mass of the equipment.
- Experience in the durability of the tool during normal daily use, including weather resistance and sustained insulation values.

5.2. The Bidders must submit a letter from the OEM - Original Equipment Manufacturer /OEM agent (based in South Africa) authorising the bidder to supply the equipment to PRASA.

- Note: Information only - A local OEM/Agent will benefit PRASA for equipment inspection before delivery to PRASA and will be easily accessible during warranty claims/return of defective items.

5.3. All equipment offered must come with a guarantee of 24 months, and the guarantee document shall be submitted at the closing of the RFQ. Bidders shall submit a signed warranty/guarantee document in accordance with clause 4.2 of this specification.

5.4. Bidders must submit a reference letter of completed Supply and delivery of Electrical tools/materials in the past 3 years. The submission must include a brief description of the electrical tools, client name, client contact details, delivery timelines, and be signed by the client.

6. PENALTY

Should the Contractor fail to complete delivery on/before the stipulated completion dates, a penalty fee of R5000 per week will be charged.



7. TECHNICAL REQUIREMENTS

7.1. Mast pole stencils

- 7.1.1. The stencils must be re-usable OHTE mast numbering stencil sets manufactured from Chromadek, complete with numerals and letters.
- 7.1.2. The stencils must have 0 to 9 numbers, “A to Z” alphabet and special characters (full stop and forward slash).
- 7.1.3. The stencils must be able to produce numbers and characters with character height of 100 mm, and width of 30mm.
- 7.1.4. Stencil material withstands repeated use without distortion.
- 7.1.5. Individual character stencils or adjustable stencil kit.
- 7.1.6. Provision for accurate alignment and equal spacing of characters.
- 7.1.7. Characters shall produce clean, sharp edges without paint bleeding.
- 7.1.8. Suitable for application using brush, roller, or spray paint.

7.2.High Voltage warning signs

- 7.2.1. The warning signs shall be as follows:

a) 4 in 1 Notice

- Size: 1000mm x 1000mm
- Material: Chromadek

b) Specification of the Electrical shock hazard WW23 warning sign

- Diameter Size: 190mm x 190mm
- Material: Chromadek

c) Specification of the Electrical shock hazard WW7 warning sign



- Size: 190mm x 190mm
- Material: Vinyl Sticker

d) Specification of the Electrical shock hazard WW7 warning sign

- Size: 190mm x 190mm
- Material: Chromadek

7.3. Tension measuring device

7.3.1. The device must be capable of measuring tension of 45kN or higher to cover the mechanical tension range required in OHTE systems.

7.3.2. The device must provide clear, readily readable tension measurement in kilonewtons (kN).

7.3.3. Tension-meter selection must be based on force capacity and range, with accuracy typically $\pm 1\%$, and up to $\pm 3\%$ for very high tensions.

7.3.4. The device must meet overhead-use safety expectations, including:

- Rugged construction suitable for field conditions.
- A minimum 5:1 safety factor, similar to overhead weighing and load-monitoring systems used in industrial applications.

7.3.5. The device must be supplied with calibration certificate for the specific diameter and material of OHTE (161mm² grooved copper, 50mm² ACSR, 160mm² ACSR, 800mm² ACSR, conductors to ensure accurate field readings.

- Calibration must align with the wire size and type for reliable measurement in line-tension applications.



- 7.3.6. The device must measure the mechanical tension of an installed OHTE wires using a non-destructive method.
- 7.3.7. The device must measure the tension without cutting, breaking, loosening or removing the OHTE wires.
- 7.3.8. The device must be portable and suitable for routine use by railway maintenance personnel and must weigh less than 7.5kg.
- 7.3.9. The device must be battery powered, the battery must be rechargeable, must operate for minimum of 8 hours from fully charged. The charger must be compatible with South African 230V A, 50Hz electrical supply.

7.4. Kink remover

- 7.4.1. The offered Contact Wire Kink Remover shall be specifically designed and manufactured for the straightening and removal of kinks in railway overhead contact wire with area of 161mm^2 .
- 7.4.2. The kink remover must be suitable for use on grooved copper contact wires with area of 161mm^2 used in 3 kV DC OHTE systems in PRASA. The tool shall not damage the conductor profile, groove, or cross-sectional area during operation.
- 7.4.3. The device must be portable and suitable for routine use by railway maintenance personnel and must weigh less than 7kg.
- 7.4.4. The Contact Wire Kink Remover shall be manufactured from high-strength steel or equivalent durable material and shall incorporate corrosion-resistant protection suitable for outdoor railway maintenance environments. All contact surfaces shall be smooth and designed to prevent marking or scoring of the contact wire.
- 7.4.5. The bidder shall supply the Contact Wire Kink Remover as a complete operational unit, including a carrying/storage case, operating manual, maintenance instructions, and any accessories required for safe and effective operation.
- 7.4.6. In case the battery-operated kink remover is supplied, the battery must be rechargeable and must operate for a minimum of 8 hours from fully charged. The charger must be compatible with South African 230V A, 50Hz electrical supply.



7.5. Feeder cable hydraulic crimping tool

- 7.5.1. The hydraulic compression tool must be capable of crimping a feeder wire with an area of 800 mm² Aluminium Conductor Steel Reinforced; (Information: The diameter of the 800mm² feeder wire is 37mm).
- 7.5.2. The hydraulic compression head shall:
- The compression head shall have a minimum output force of 980 kN (100 ton) and shall be capable of compressing conductors, sleeves, terminals, and connectors used in 3kV DC railway electrification systems.
 - Operate at a working pressure of 68.5 MPa (685 bar) or higher.
 - Accommodate compression dies suitable for (800mm², 500mm², 160mm², 250mm² ACSR and copper conductors and fitting sizes.
 - Include a removable die cap or equivalent arrangement to facilitate easy insertion and removal of connectors. designed for field operation under railway maintenance conditions
- 7.5.3. The bidder shall supply a complete hydraulic power unit capable of operating the compression head at its full rated capacity.
- 7.5.4. The hydraulic power unit shall:
- Be an engine-driven hydraulic pump, air-cooled.
 - Be a double-acting hydraulic pump suitable for advancing and retracting the ram hydraulically.
 - Be capable of delivering a minimum hydraulic pressure of at least 68.5 MPa (686 bar).
 - Have hydraulic hoses, couplings, and fittings compatible with the compression head supplied.
 - Be supplied ready for immediate operation without requiring additional equipment.
- 7.5.5. The offered equipment shall be suitable for compression of copper, aluminium, ACSR, and other conductors commonly used in railway and power distribution systems. The bidder shall provide the complete range of dies required for the compression of OHTE 3kV DC conductors.
- 7.5.6. The bidder shall supply the equipment as a complete kit consisting of:
- Hydraulic compression head.
 - Hydraulic power unit.
 - Hydraulic hoses and couplings.
 - Carrying/storage cases.
 - Operating manuals.
 - Maintenance manuals.



- Recommended spare parts list.

7.5.7. The hydraulic crimping head must weigh less than 37 kg and the hydraulic pump must weigh less than 63 kg.



7.6. Live line detectors

- 7.6.1. DC Tester must detect a live line energised at a voltage between 2.3 kV and 3.6 kV and must be design according to SANS/IEC 61243-2
- 7.6.2. AC Tester tester shall detect a live line energised at a voltage between 11kV and 33kV AC and be safe when in direct contact with the live conductors and must be designed according to SAN/IEC61243-1.
- 7.6.3. The insulation level of all the live parts of the tester shall be designed for a safety
- 7.6.4. factor of not less than 2.5 and the live parts of the tester shall be marked with warning signs.
- 7.6.5. The tester shall not cause a flashover or breakdown between live parts of an installation or between a live part of an installation and earth.
- 7.6.6. The DC tester shall have a pick-up voltage of 1.10 kV DC ($\pm 5\%$) or lower.
- 7.6.7. The AC tester shall have a minimum pick-up voltage of 9kV AC ($\pm 5\%$) or lower.
- 7.6.8. The tester shall be constructed such that the indicator cannot be damaged or shut off
- 7.6.9. because of a spark discharge in accordance to SANS 61243-2 for DC and according to SANS61243-1 for AC.
- 7.6.10. The maximum circuit current through the tester when the rated voltage is applied to the contact electrode shall not exceed 3 mA ($\pm 5\%$).
- 7.6.11. In accordance to SANS 61243-2 clause 4.2.1.4 the tester shall not be affected in the presence of adjacent live or earthed systems. The presence of interference field shall not affect the indication when used in accordance with instructions for use.
- 7.6.12. The tester shall have a green light indicating de-energised (voltage not present) and a red light indicating energised (voltage present) conditions respectively.
- 7.6.13. The tester shall give a continuous indication when in direct contact with a live part. The indicators of the tester shall be clearly visible from ground level in bright daylight conditions and also be in accordance with SANS 61243-2 clause 4.2.2.1.
- 7.6.14. A tester with a built-in power source shall give a clear indication until the source is exhausted unless its usage is limited by an indication of non readiness or automatic shut-off as mentioned in the operating instructions.
- 7.6.15. The tester shall have a testing element that will indicate (check) whether the tester is ready or not ready for use in accordance to SANS 61243-2.



- 7.6.16. The tester shall be safe and waterproof when used in light rain for extended periods.
- 7.6.17. The tester shall be designed for very high reliability and long life with minimum
- 7.6.18. The tester shall be provided with a suitable portable carrying case. Where a separate
- 7.6.19. operating stick is provided, it shall also be supplied in a portable carrying case.
- 7.6.20. The mass of the tester shall be such that it can be handled and operated easily by one person (male or female).

7.7. High voltage Insulation

- 7.7.1. The high voltage hose must have a rated insulation voltage of at least 25kV.
- 7.7.2. The high voltage hose must have lips that can be opened (peeled) for conductor insertion and then be closed afterward.
- 7.7.3. The high voltage hose must have a length of 1.8m (182 cm), a diameter of 1.5 inches, and a weight of less than 4kg
- 7.7.4. The high voltage hose must be water repellent (not absorb water).

7.8. Track Switches

1. Electrical Rating

- The track switch shall be suitable for operation on a 3 kV DC OHTE system and capable of carrying the continuous traction load current without overheating.
- Rated insulation level shall be suitable for outdoor railway electrification applications.

2. Mechanical Construction

- The switch body, contacts, and operating mechanism shall be manufactured from corrosion-resistant materials suitable for coastal, industrial, and outdoor environments.
- All live parts shall be protected against accidental contact.

3. Operational Performance

- The switch shall provide a clear visible indication of OPEN and CLOSED positions.
- The operating mechanism shall permit safe operation from ground level using approved operating tools.
- The track switch must be supplied complete with operating rod, handle and all its accessories.



7.9. Uplift Limit Device

1. Mechanical Strength

- The uplift limit device shall withstand the maximum uplift forces generated by pantograph interaction without permanent deformation.

2. Material Requirements

- All components shall be manufactured from stainless steel, galvanized steel, or approved corrosion-resistant materials.

3. Performance

- The device shall effectively limit excessive uplift of the contact wire while maintaining normal dynamic performance of the overhead line equipment.
- The uplift limit device must be supplied complete with clamps for contact wire (161mm²) and catenary (160mm²).

7.10. Dropper wire, Dropper Clips for Contact and Catenary

1. Material

- Dropper clips shall be manufactured from stainless steel and must be corrosion-resistant.
- The dropper wire must be supplied in a 50kg roll, 4mm thickness class 304 of stainless steel wire.

2. Mechanical Security

- The clips shall securely grip both contact and catenary wires without causing strand damage or conductor deformation.

3. Electrical Continuity

- The installed clip shall maintain reliable electrical insulation between connected components throughout its service life.

7.11. Contact Wire Splice

1. Electrical Performance

- The splice shall achieve electrical conductivity equal to or greater than 95% of the conductivity of the contact wire.

2. Mechanical Strength

- The completed splice shall develop a tensile strength not less than 90% of the rated breaking load of the conductor.



- The splice shall be able to join two contact wires of 161m^2 copper grooved contact wire.

3. Compatibility

- The splice shall be suitable for the specified contact wire type and size and shall not interfere with pantograph operation.

7.12. Bonding Lugs & Ferrules

1. Material

- Bonding lugs and ferrules shall be manufactured from high-conductivity tinned copper and suitable for railway traction earthing and bonding applications.

2. Crimping Compatibility

- The lugs and ferrules shall be compatible with standard hydraulic crimping tools and dies recommended by the manufacturer.

3. Identification

- Each lug and ferrule shall be permanently marked to indicate conductor size and manufacturer identification.

7.13. Bond Kit for Mast

1. Complete Kit Supply

- The bond kit shall be supplied complete with bonding conductor, lugs, fasteners, washers, and all accessories required for installation.

2. Current-Carrying Capacity

- The bonding conductor shall be sized to safely carry fault currents associated with the 3 kV DC traction system.

3. Corrosion Resistance

- All metallic components shall be tinned copper, stainless steel, or hot-dip galvanized to ensure long-term outdoor durability.

7.14. Bond Kit for Rail

1. Electrical Conductivity

- The rail bond kit shall provide a low-resistance electrical connection between rails and associated return-current circuits.

2. Mechanical Integrity

- The bond assembly shall withstand vibration, rail movement, temperature variation, and normal track maintenance activities without degradation.



3. Complete Installation Kit

- The kit shall include bonding cable, rail connectors, lugs, fasteners, protective coverings, and installation instructions required for a complete installation

8. MECHANICAL REQUIREMENTS

8.1. The tools should be drop and shock-resistant.

9. OPERATING INSTRUCTIONS AND MANUALS

9.1. Each item must be accompanied by the manufacturer's operating instructions and manual.

10. MARKINGS

10.1. Markings:

- System operating voltage: - e.g. 3 kV DC only
- Manufacturer's name, symbol and serial number.
- Date of manufacture
- The functions of all switches shall be clearly and permanently marked in English.



11. DELIVERY

The Electrical tools shall be delivered at the PRASA regions (GP, KZN and WC) Electrical Depot

12. BILL OF QUANTITIES

Item description	Quantity	Price rate	Total
Mast pole stencils	4		
High Voltage warning signs	50		
Tension device	20		
Kink remover machine (manual/hydraulic or battery-operated)	10		
800mm ² feeder crimping tool	4		
Live line testers 3kV DC	4		
Live line tester 11kV AC to 33kV AC	4		
High Voltage Insulation	20		
Track switches	20		
Uplift limit device	40		
Dropper wire	10		
Dropper clips for contact and catenary	500		
Contact wire splice	20		
Bonding lugs & ferrule	500		
Bond kit for mast	500		
Bond kit for rail	500		
		Total (Exc.)	
		VAT (15%)	
		Total	

End