

## Memorandum

To: Ms L April

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From: Dr A Narain Singh Pr Eng

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### MOBILE 75kV HV TEST SET SPECIFICATION

**Note:** All specified components must be fitted or built into a shipping container and delivered as one unit that can be transported in all weather conditions from one site to another.

#### A. TECHNICAL

- a) A High Voltage AC Test Set, capable of 75kV AC and rated at least 1250kVA
- b) 75kV AC
- c) 380V supply
- d) 3 taps : 25kV, 50kV and 75kV
- e) PD < 10pC at full voltage
- f) Container fitted with a 100kV kilovolt meter.
- g) Pre load capacitor specifications:
  - i. Capacitance: 40nF
  - ii. Voltage Rating: 75 kV
  - iii. Q factor: >70
  - iv. Partial Discharge: <5pC @ 75 kV

#### B. MANUFACTURING

- a) Test set to be containerised (standard shipping container that does not require flatbed transportation) with sound proofing/damping to restrict noise levels during testing, fully water tight, allowing for operation of the test set without removing the HV test set from the container.
- b) The equipment must be mechanically stable on a level, smooth surface. Provide auxiliary means of stabilizing the structure when/if required.
- c) Must be suitable for easy rigging, transport on a suitable forklift and can be tied down on a flatbed truck
- d) Test set to be containerised, standard 6m x 3m with sound proofing / damping to restrict noise levels during testing, capable of operation without removing set from the container. Furthermore the container should be totally waterproof. Container should have double doors to open on both ends.
- e) Test set to be mounted on shock absorbers (preferably wire rope isolators) to limit impact of transport shocks and should comply to RSA transport regulations. Unit should be sufficiently robust to withstand transportation on untarred and gravel roads
- f) Controls should be fixed and capable of being removed from the container and the test set and operated remotely. The control unit should be lightweight easy to handle.
- g) Test set should require a maximum of 2 operators to be able to commission, test and decommission.

- h) Remote laptop based controls as well as set based controls, including a PC user interface and software to record and retrieve test data (i.e. record leakage current, time, test voltage).
- i) Ability to isolate earth connection for tan delta testing
- j) Must include rated cables for supply (25m) and test piece connection
- k) Adjustable rate of rise of voltage.
- l) Minimum of 5 days on site commissioning and training certification to be included for up to 15 candidates.
- m) Provide a lifting/rigging procedure for the container for lifting and moving the container safely.
- n) Provide a fastening procedure for the container on a flatbed truck.
- o) Provide a procedure to remove HV Test set from container.
- p) Must give a measurement of the leakage current and trip at set leakage current.
- q) Must have an alarm indication for PLC battery low/replacement to avoid loss of calibration settings.
- r) Comply with best practice manufacturing and quality standards

### **C. SAFETY, MAINTENANCE, AND WARRANTY**

- a) Dead man switch
- b) Main power supply breaker on the low voltage side
- c) External warning provisions
- d) Equipped with a fire extinguisher
- e) Container should have double doors to open on both ends.
- f) Flashing light and audio indication during testing
- g) Discharge rod
- h) Supplier to provide a two (2) year warranty on the 75KV resonance set, from date of commissioning. The warranty should clearly what is covered.
- i) Provide a procedure to remove the HV test set from container.
- j) Provide operation and maintenance manual, including circuit connection diagrams.
- k) Must include a trouble shooting procedures in the manual.
- l) Service Provider to quote separately on full maintenance plan, service interval including calibration for the unit within three (3) years.
- m) Comply with IEEE Std 510-1983 safety requirements (or equivalent) for mobile equipment intended to generate high voltage.
- n) Must provide warranty certificate, safety test certificates, and calibration certificates.

### **D. COMMISSIONING AND TRAINING**

- a) Minimum of 5 days on site commissioning and training certification to be included for up to 15 candidates.
- b) Must have capability to service, maintain, or calibrate the HV test set locally.

### **E. TECHNICAL EVALUATION CRITERIA**

SUPPLY AND DELIVERY OF 75 kV AC 1250 kVA HV RESONANCE MOBILE TEST SET				
CRITERIA	POINTS RANGE	EVALUATION RANGE (Deliverables)	EVALUATION RANGE - POINTS	SCORING %
Supplier to have experience in the HV testing field and testing of turbo generator rotor up to 900 MW rating	1: Less than 5 references 2: 5 to 10 references 3: More than 10 references	Provide verifiable references (signed by the commissioner of oath) of customers supplied with HV test services.	1= 5 2= 10 3= 20	
Supplier to be able to provide local backup service, including call outs, for the test set (i.e. calibration, maintenance, trouble shooting, and spares).	1: Supplier does not have skilled/certified personnel and a local facility for servicing and maintaining the test set 2: Supplier has one skilled/certified personnel and a local facility for servicing and maintaining the test set. 3: Supplier has two or more skilled/certified personnel and a local facility for servicing and maintaining the test set.	Provide proof of local facility/supportability (local supplier mandate or registered business with a South African physical address), confirmation of technical skills through CVs and HV regulation certification, and proof of academic qualifications.	1= 0 2= 10 3= 20	
Supplier to have the capacity and capability to manufacture, supply, and commission units of the size and type specified in the SOW.	1: No history of manufacturing and commissioning test sets of the size and type specified in the SOW. 2: Supplier has less than 5 years history of manufacturing and commissioning test sets of the size and type specified in the SOW. 3: Supplier has more than 10 years history of manufacturing and commissioning test sets of the size and type specified in the SOW.	Provide verifiable references (signed by the commissioner of oath) of customers supplied with HV test sets that met customer and safety specifications or proof of invoices.	1= 10 2= 25 3= 50	
Supplier has the capability to train and certify ERI employees on the use of the machine	1: No capability 2. Capable	Proof of instructor competency/experience in HV testing field.	1= 0 2= 10	
<b>Minimum qualifying threshold</b>			<b>75</b>	

Regards

A handwritten signature in black ink, appearing to be 'Dr A Narain Singh', written in a cursive style.

Dr A Narain Singh Pr Eng  
Generator Specialist