

ADDENDUM NO. 1: LDPWRI-BM/20072_ APPOINTMENT OF TERM CONTRACTORS FOR THE SUPPLY, DELIVERY, INSTALLATION, PREVENTATIVE MAINTENANCE, REPAIRS AND SERVICING OF STANDBY DIESEL GENERATORS IN LIMPOPO PROVINCE FOR PERIOD OF 36 MONTHS_ MOPANI DISTRICTS

1. CHANGE IN PROJECT DESCRIPTION:

APPOINTMENT OF FRAMEWORK CONTRACTOR FOR THE SUPPLY, DELIVERY, INSTALLATION, PREVENTATIVE MAINTENANCE, REPAIRS AND SERVICING OF STANDBY DIESEL GENERATORS IN LIMPOPO PROVINCE FOR PERIOD OF 36 MONTHS_MOPANI DISTRICT.

2. Tender Notice and Invitation to Tender

The following changes were effected on the T1.1. - Tender Notice and Invitation to Tender:

Evaluation criteria	<ol style="list-style-type: none"> 1. Compliance (mandatory or compulsory requirements) 2. Local content and production 3. Functionality 4. Price and Preference 5. Negotiation
Mandatory or Compulsory Requirements <i>(failure to submit, complete or comply with these requirements will lead to automatic disqualification)</i>	Completed and signed Form of Offer
	Completed and signed SBD 1, SBD 4, SBD 6.2, SBD 8, SBD 9
	Local Content and Production threshold requirements (failure to submit fully completed and signed SBD 6.2 and annexure C will lead to as stipulated in this bid document. Bidders must comply with the local content thresholds, failing which will lead to automatic disqualification. The industries, sectors and sub-sectors designated for local content and production with minimum thresholds can be downloaded from the DTI website, including the Local Content Declaration templates (Annexure C, D and E). http://dti.gov.za/industrial_development/ip.jsp
	Completed and signed Compulsory declaration and record of addendum

3. T1.2 Tender Data

The following changes were effected on T.1.2 Tender data:

C.3.11	<p>The tenderers will be evaluated in five (5) stages</p> <ol style="list-style-type: none"> (i) Mandatory and administrative Compliance (ii) Local content and production (iii) Functionality (iv) Price and Preference (v) Negotiations <ol style="list-style-type: none"> (i) Stage 1: Administrative Compliance: The Compliance or compulsory documents and returnables are detailed in Section T.2.1 of this tender document. Failure to submit, complete or comply with these requirements will lead to automatic disqualification. (ii) Stage 2: Local content and production: The tender will be evaluated in terms of Local Content and Production in accordance with the stipulated minimum threshold for local production and content on Annexure A attached herewith.
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The declaration made by the BIDDER in the Declaration Certificate for Local Content and Annex C will be used for this purpose.

All responses that will not meet the required minimum threshold for local content as stipulated in the specifications will be disqualified and not evaluated further. Only bidders that achieved the minimum threshold for local content and production will be evaluated further in terms of functionality and preference point system prescribed in the Preferential Procurement Regulations, 2017.

All Declarations for Local Content and Production must be fully completed and signed.

Bidders will need to meet a minimum threshold percentage for local production and content as set out in the Addendum of the Bid Document to be evaluated further on Stage 3 of Functionality.

The stipulated minimum threshold(s) for local production and content (refer to Annex A of SATS 1286:2011) for this bid is/are as follows:

Description of services, works or goods Stipulated minimum threshold	Minimum threshold(s)
Electrical and telecom cables	90 %
Transformers	90 %
Industrial Lead acid batteries	50 %

(iii) Stage 3: Functionality: Functionality of responsive bids submitted will be evaluated according to the predetermined criteria described below. **Bidders are required to score a minimum number of evaluation points of 70 for functionality in order to proceed to the next phase of evaluation**

CRITERIA	DESCRIPTION	POINTS
a) Bidders previous experience	Bidder's past experience (proof of supply, maintenance and repairs of diesel generators).	25
b) Key personnel	Background and experience of all key personnel proposed to undertake the services.	50
c) Plant	Bidder submit a list of plant	10
d) Physical location in the province	Company office and fully established factory established in Limpopo Province	15
Maximum possible Score		100

Refer to **EVALUATION SCHEDULE 1 and 2** for more details.

(iv) Stage 4: Ranking of bidders based on comparative price and Preference: the 80/20 point system will be applicable for this bid.

The procedure for final evaluation and ranking of the bidders will be based on Method 3 (Financial offer and preference).

The number of evaluation points awarded for financial offer will be calculated using this equation.

$$P = 80 * \left(1 - \frac{(P_o - P_m)}{P_m}\right)$$

Where:

P is the points awarded to the bid under consideration

P_m is the lowest acceptable bid price

P_o is the comparative price under consideration

The number of tender evaluation points awarded for preferences claimed in accordance the following Table.

B-BBEE status level of contributor	80/20 preference points system
Level 1 contributor	20
Level 2 contributor	18
Level 3 contributor	14
Level 4 contributor	12
Level 5 contributor	8
Level 6 contributor	6
Level 7 contributor	4
Level 8 contributor	2
Form not completed or non-complaint contributor	0

(v) Stage 5: Negotiations:

The department reserve the right to negotiate the rates with the successful service provider in line with the National Treasury Practice Notes.

T2.1 : LIST OF RETURNABLE DOCUMENTS

The following returnable documents were added under the compulsory and mandatory compliance. Failure to comply will be considered non-responsive, and the bid will not be evaluated any further.

- a. SBD 6.2 Declaration Certificate for Local Production and Content
- b. Annexure C for Local Content and Production
- c. Bidders must ensure that they submit the **Addendum No.1**. Failure to submit this Addendum will also lead to disqualification.

SBD 6.2: SBD 6.2 Declaration Certificate for Local Production and Content

To include this

The stipulated minimum threshold(s) for local production and content (refer to Annex A of SATS 1286:2011) for this bid is/are as follows:

<u>Description of services, works or goods</u>	<u>Stipulated minimum threshold</u>
Electrical and telecom cables	90 %
Transformers	90 %
Industrial Lead acid batteries	50 %

Local Content Referral Document for SBD 6.2 and annexures C,D &E					
Schedule No.	Item No.	Description	Local Contents	Unit	Quantity
4	4.1.13	Transformer (instrument)	90 %	No.	1
4	4.2.13	Transformer (instrument)	90 %	No.	1
4	4.3.13	Transformer (instrument)	90 %	No.	1
4	4.4.13	Transformer (instrument)	90 %	No.	1
4	4.5.13	Transformer (instrument)	90 %	No.	1
4	4.6.13	Transformer (instrument)	90 %	No.	1
4	4.7.13	Transformer (instrument)	90 %	No.	1
4	4.8.13	Transformer (instrument)	90 %	No.	1
4	4.9.13	Transformer (instrument)	90 %	No.	1
4	4.10.13	Transformer (instrument)	90 %	No.	1
4	4.11.13	Transformer (instrument)	90 %	No.	1
4	4.12.13	Transformer (instrument)	90 %	No.	1
4	4.13.13	Transformer (instrument)	90 %	No.	1
4	4.14.13	Transformer (instrument)	90 %	No.	1
4	4.15.13	Transformer (instrument)	90 %	No.	1
4	4.16.13	Transformer (instrument)	90 %	No.	1
4	4.17.13	Transformer (instrument)	90 %	No.	1
4	4.18.13	Transformer (instrument)	90 %	No.	1
4	4.19.13	Transformer (instrument)	90 %	No.	1
4	4.20.13	Transformer (instrument)	90 %	No.	1
4	4.21.13	Transformer (instrument)	90 %	No.	1
4	4.22.13	Transformer (instrument)	90 %	No.	1
4	4.23.13	Transformer (instrument)	90 %	No.	1
4	4.24.13	Transformer (instrument)	90 %	No.	1
4	4.25.13	Transformer (instrument)	90 %	No.	1
4	4.26.13	Transformer (instrument)	90 %	No.	1
4	4.27.13	Transformer (instrument)	90 %	No.	1
4	4.28.13	Transformer (instrument)	90 %	No.	1
4	4.1.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.2.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.3.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.4.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.5.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.6.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.7.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.8.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.9.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.10.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.11.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.12.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.13.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.14.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1

4	4.15.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.16.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.17.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.18.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.19.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.20.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.21.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.22.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.23.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.24.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.25.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.26.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.27.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
4	4.28.24	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	50 %	No.	1
7	7.1.	25 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable		Per meter	
7	7.2.	35 mm ² 4 core 600/1000 V, PVC/SWA/PVC Cu cable		Per meter	
7	7.3.	50 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable		Per meter	
7	7.4.	70 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable		Per meter	
7	7.5.	95 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable		Per meter	
7	7.6.	120 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable		Per meter	
7	7.7.	150 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable		Per meter	
7	7.8.	185 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable		Per meter	

PART C2.2 BILLS OF QUANTITIES

All the bills of quantities in the tender (C2.2) are replaced with the bills of quantities contained herein.

SCHEDULE 1: RATES FOR SUPPLY AND INSTALLATION OF NEW GENERATORS (INDOOR UNITS)

- These are the rates for supply and installation of new diesel generators.
- For pricing purposes
 - o The rate provided should be inclusive of the complete unit, complete with the auxiliary system, exhaust, cooling system.
 - o Refer to generic specification of generators in Section C3 of this document.
- This Bill list is not exhaustive and may not include all the sizes of generators in the market.
- The below power rates refers to the standby power, at 420 V (three phase) or 220 V (single phase)

Item	Description (generator size)	Quantity	Unit (VAT (A)	Price excl.)	Installation per unit (B)	Total Cost (A+B)
1.1.	25 kVA, 3 phase	1				
1.2.	50 kVA, 3 phase	1				
1.3.	80 kVA, 3 phase	1				
1.4.	100 kVA, 3 phase	1				
1.5.	125 kVA, 3 phase	1				
1.6.	150 kVA, 3 phase	1				
1.7.	200 kVA, 3 phase	1				
1.8.	250 kVA, 3 phase	1				
1.9.	300 kVA, 3 phase	1				
1.10.	315 kVA, 3 phase	1				
1.11.	350 kVA, 3 phase	1				
1.12.	400 kVA, 3 phase	1				
1.13.	415 kVA, 3 phase	1				
1.14.	450 kVA, 3 phase	1				
1.15.	500 kVA, 3 phase	1				
1.16.	550 kVA, 3 phase	1				
1.17.	600 kVA, 3 phase	1				
1.18.	650 kVA, 3 phase	1				
1.19.	700 kVA, 3 phase	1				
1.20.	750 kVA, 3 phase	1				
1.21.	800 kVA, 3 phase	1				
1.22.	850 kVA, 3 phase	1				
1.23.	900 kVA, 3 phase	1				
1.24.	950 kVA, 3 phase	1				

1.25.	1000 kVA, 3 phase	1			
1.26.	1125 kVA, 3 phase	1			
1.27.	1250 kVA, 3 phase	1			
1.28.	1500 kVA, 3 phase	1			
TOTAL CARRIED TO SUMMARY					R

SCHEDULE 2: RATES FOR SUPPLY AND INSTALLATION OF NEW GENERATORS (OUTDOOR UNITS)

- These are the rates for supply and installation of new outdoor diesel generators, complete with a weather and sound proof container.
- For pricing purposes
 - o The rate provided should be inclusive of the complete unit, complete with the auxiliary system, exhaust, cooling system.
 - o Refer to generic specification of generators in Section C3 of this document.
 - o The canopy shall be weather resistant and made of mild steel. The canopy should be provided with a sound proof to limit the noise level to 75 dB within 7 m radius.
 - o The generator should come with a standard base tank
- This Bill list is not exhaustive and may not include all the sizes of generators in the market.
- The below power rates refers to the standby power, at 420 V (three phase) or 220 V (single phase)

Item	Description (generator size)	Quantity	Unit Price (VAT excl.) (A)	Installation per unit (B)	Total Cost (A+B)
2.1.	25 kVA, 3 phase	1			
2.2.	50 kVA, 3 phase	1			
2.3.	80 kVA, 3 phase	1			
2.4.	100 kVA, 3 phase	1			
2.5.	125 kVA, 3 phase	1			
2.6.	150 kVA, 3 phase	1			
2.7.	200 kVA, 3 phase	1			
2.8.	250 kVA, 3 phase	1			
2.9.	300 kVA, 3 phase	1			
2.10.	315 kVA, 3 phase	1			
2.11.	350 kVA, 3 phase	1			
2.12.	400 kVA, 3 phase	1			
2.13.	415 kVA, 3 phase	1			
2.14.	450 kVA, 3 phase	1			
2.15.	500 kVA, 3 phase	1			
2.16.	550 kVA, 3 phase	1			
2.17.	600 kVA, 3 phase	1			
2.18.	650 kVA, 3 phase	1			
2.19.	700 kVA, 3 phase	1			
2.20.	750 kVA, 3 phase	1			
2.21.	800 kVA, 3 phase	1			

2.22.	850 kVA, 3 phase	1			
2.23.	900 kVA, 3 phase	1			
2.24.	950 kVA, 3 phase	1			
2.25.	1000 kVA, 3 phase	1			
2.26.	1125 kVA, 3 phase	1			
2.27.	1250 kVA, 3 phase	1			
2.28.	1500 kVA, 3 phase	1			
TOTAL CARRIED TO SUMMARY					R

SCHEDULE 3: RATES FOR SERVICING OF GENERATORS

Item	Description (generator size)	Quantity	Minor Service per unit	Major Service per unit	Total Cost
3.1.	25 kVA, 1 phase	1			
3.2.	25 kVA, 3 phase	1			
3.3.	50 kVA, 3 phase	1			
3.4.	80 kVA, 3 phase	1			
3.5.	100 kVA, 3 phase	1			
3.6.	125 kVA, 3 phase	1			
3.7.	150 kVA, 3 phase	1			
3.8.	200 kVA, 3 phase	1			
3.9.	250 kVA, 3 phase	1			
3.10.	300 kVA, 3 phase	1			
3.11.	315 kVA, 3 phase	1			
3.12.	350 kVA, 3 phase	1			
3.13.	400 kVA, 3 phase	1			
3.14.	450 kVA, 3 phase	1			
3.15.	500 kVA, 3 phase	1			
3.16.	550 kVA, 3 phase	1			
3.17.	600 kVA, 3 phase	1			
3.18.	650 kVA, 3 phase	1			
3.19.	700 kVA, 3 phase	1			
3.20.	750 kVA, 3 phase	1			
3.21.	800 kVA, 3 phase	1			
3.22.	850 kVA, 3 phase	1			
3.23.	900 kVA, 3 phase	1			
3.24.	950 kVA, 3 phase	1			
3.25.	1000 kVA, 3 phase	1			
3.26.	1125 kVA, 3 phase	1			
3.27.	1250 kVA, 3 phase	1			
3.28.	1500 kVA, 3 phase	1			
TOTAL CARRIED TO SUMMARY					R

SCHEDULE 4: RATES FOR SUPPLY AND INSTALLATION OF MATERIAL

Unit rates inclusive of material, profit and labour. Travelling distance and time will be determined execution of the works.

4.1. 25 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.1.1.	Oil Filter Set	1	
4.1.2.	Engine Oil	Ltr	
4.1.3.	Air Filter	1	
4.1.4.	Diesel Filter	1	
4.1.5.	Coolant Refill	Ltr	
4.1.6.	Voltage Drop Test	1	
4.1.7.	Charge Rate Test	1	
4.1.8.	V-Belts	1	
4.1.9.	Mains failure Test (on load)	1	
4.1.10.	Valves	1	
4.1.11.	Flexible Hoses	1	
4.1.12.	Battery Charger	1	
4.1.13.	Transformer (instrument)	1	
4.1.14.	Automatic Change-over relays	1	
4.1.15.	Water Drain	1	
4.1.16.	Water Jacket	1	
4.1.17.	Ammeter	1	
4.1.18.	Fuses	1	
4.1.19.	Main Circuit Breaker	1	
4.1.20.	Heater	1	
4.1.21.	Starter	1	
4.1.22.	Bulk Tank Pump	1	
4.1.23.	Set of Bearings	1	
TOTAL CARRIED TO SUMMARY		R	

4.2. 50 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.2.1.	Oil Filter Set	1	
4.2.2.	Engine Oil	Ltr	
4.2.3.	Air Filter	1	
4.2.4.	Diesel Filter	1	
4.2.5.	Coolant Refill	Ltr	
4.2.6.	Voltage Drop Test	1	
4.2.7.	Charge Rate Test	1	
4.2.8.	V-Belts	1	
4.2.9.	Mains failure Test (on load)	1	
4.2.10.	Valves	1	
4.2.11.	Flexible Hoses	1	
4.2.12.	Battery Charger	1	
4.2.13.	Transformer (instrument)	1	
4.2.14.	Automatic Change-over relays	1	
4.2.15.	Water Drain	1	
4.2.16.	Water Jacket	1	
4.2.17.	Ammeter	1	
4.2.18.	Fuses	1	
4.2.19.	Main Circuit Breaker	1	
4.2.20.	Heater	1	
4.2.21.	Starter	1	
4.2.22.	Bulk Tank Pump	1	
4.2.23.	Set of Bearings	1	
4.2.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.3. 80 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.3.1.	Oil Filter Set	1	
4.3.2.	Engine Oil	Ltr	
4.3.3.	Air Filter	1	
4.3.4.	Diesel Filter	1	
4.3.5.	Coolant Refill	Ltr	
4.3.6.	Voltage Drop Test	1	
4.3.7.	Charge Rate Test	1	
4.3.8.	V-Belts	1	
4.3.9.	Mains failure Test (on load)	1	
4.3.10.	Valves	1	
4.3.11.	Flexible Hoses	1	
4.3.12.	Battery Charger	1	
4.3.13.	Transformer (instrument)	1	
4.3.14.	Automatic Change-over relays	1	
4.3.15.	Water Drain	1	
4.3.16.	Water Jacket	1	
4.3.17.	Ammeter	1	
4.3.18.	Fuses	1	
4.3.19.	Main Circuit Breaker	1	
4.3.20.	Heater	1	
4.3.21.	Starter	1	
4.3.22.	Bulk Tank Pump	1	
4.3.23.	Set of Bearings	1	
4.3.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)		
TOTAL CARRIED TO SUMMARY		R	

4.4. 100 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.4.1.	Oil Filter Set	1	
4.4.2.	Engine Oil	Ltr	
4.4.3.	Air Filter	1	
4.4.4.	Diesel Filter	1	
4.4.5.	Coolant Refill	Ltr	
4.4.6.	Voltage Drop Test	1	
4.4.7.	Charge Rate Test	1	
4.4.8.	V-Belts	1	
4.4.9.	Mains failure Test (on load)	1	
4.4.10.	Valves	1	
4.4.11.	Flexible Hoses	1	
4.4.12.	Battery Charger	1	
4.4.13.	Transformer (instrument)	1	
4.4.14.	Automatic Change-over relays	1	
4.4.15.	Water Drain	1	
4.4.16.	Water Jacket	1	
4.4.17.	Ammeter	1	
4.4.18.	Fuses	1	
4.4.19.	Main Circuit Breaker	1	
4.4.20.	Heater	1	
4.4.21.	Starter	1	
4.4.22.	Bulk Tank Pump	1	
4.4.23.	Set of Bearings	1	
4.4.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.5. 125 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.5.1.	Oil Filter Set	1	
4.5.2.	Engine Oil	Ltr	
4.5.3.	Air Filter	1	
4.5.4.	Diesel Filter	1	
4.5.5.	Coolant Refill	Ltr	
4.5.6.	Voltage Drop Test	1	
4.5.7.	Charge Rate Test	1	
4.5.8.	V-Belts	1	
4.5.9.	Mains failure Test (on load)	1	
4.5.10.	Valves	1	
4.5.11.	Flexible Hoses	1	
4.5.12.	Battery Charger	1	
4.5.13.	Transformer (instrument)	1	
4.5.14.	Automatic Change-over relays	1	
4.5.15.	Water Drain	1	
4.5.16.	Water Jacket	1	
4.5.17.	Ammeter	1	
4.5.18.	Fuses	1	
4.5.19.	Main Circuit Breaker	1	
4.5.20.	Heater	1	
4.5.21.	Starter	1	
4.5.22.	Bulk Tank Pump	1	
4.5.23.	Set of Bearings	1	
4.5.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.6. 150 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.6.1.	Oil Filter Set	1	
4.6.2.	Engine Oil	Ltr	
4.6.3.	Air Filter	1	
4.6.4.	Diesel Filter	1	
4.6.5.	Coolant Refill	Ltr	
4.6.6.	Voltage Drop Test	1	
4.6.7.	Charge Rate Test	1	
4.6.8.	V-Belts	1	
4.6.9.	Mains failure Test (on load)	1	
4.6.10.	Valves	1	
4.6.11.	Flexible Hoses	1	
4.6.12.	Battery Charger	1	
4.6.13.	Transformer (instrument)	1	
4.6.14.	Automatic Change-over relays	1	
4.6.15.	Water Drain	1	
4.6.16.	Water Jacket	1	
4.6.17.	Ammeter	1	
4.6.18.	Fuses	1	
4.6.19.	Main Circuit Breaker	1	
4.6.20.	Heater	1	
4.6.21.	Starter	1	
4.6.22.	Bulk Tank Pump	1	
4.6.23.	Set of Bearings	1	
4.6.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.7. 200 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.7.1.	Oil Filter Set	1	
4.7.2.	Engine Oil	Ltr	
4.7.3.	Air Filter	1	
4.7.4.	Diesel Filter	1	
4.7.5.	Coolant Refill	Ltr	
4.7.6.	Voltage Drop Test	1	
4.7.7.	Charge Rate Test	1	
4.7.8.	V-Belts	1	
4.7.9.	Mains failure Test (on load)	1	
4.7.10.	Valves	1	
4.7.11.	Flexible Hoses	1	
4.7.12.	Battery Charger	1	
4.7.13.	Transformer (instrument)	1	
4.7.14.	Automatic Change-over relays	1	
4.7.15.	Water Drain	1	
4.7.16.	Water Jacket	1	
4.7.17.	Ammeter	1	
4.7.18.	Fuses	1	
4.7.19.	Main Circuit Breaker	1	
4.7.20.	Heater	1	
4.7.21.	Starter	1	
4.7.22.	Bulk Tank Pump	1	
4.7.23.	Set of Bearings	1	
4.7.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.8. 250 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.8.1.	Oil Filter Set	1	
4.8.2.	Engine Oil	Ltr	
4.8.3.	Air Filter	1	
4.8.4.	Diesel Filter	1	
4.8.5.	Coolant Refill	Ltr	
4.8.6.	Voltage Drop Test	1	
4.8.7.	Charge Rate Test	1	
4.8.8.	V-Belts	1	
4.8.9.	Mains failure Test (on load)	1	
4.8.10.	Valves	1	
4.8.11.	Flexible Hoses	1	
4.8.12.	Battery Charger	1	
4.8.13.	Transformer (instrument)	1	
4.8.14.	Automatic Change-over relays	1	
4.8.15.	Water Drain	1	
4.8.16.	Water Jacket	1	
4.8.17.	Ammeter	1	
4.8.18.	Fuses	1	
4.8.19.	Main Circuit Breaker	1	
4.8.20.	Heater	1	
4.8.21.	Starter	1	
4.8.22.	Bulk Tank Pump	1	
4.8.23.	Set of Bearings	1	
4.8.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.9. 300 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.9.1.	Oil Filter Set	1	
4.9.2.	Engine Oil	Ltr	
4.9.3.	Air Filter	1	
4.9.4.	Diesel Filter	1	
4.9.5.	Coolant Refill	Ltr	
4.9.6.	Voltage Drop Test	1	
4.9.7.	Charge Rate Test	1	
4.9.8.	V-Belts	1	
4.9.9.	Mains failure Test (on load)	1	
4.9.10.	Valves	1	
4.9.11.	Flexible Hoses	1	
4.9.12.	Battery Charger	1	
4.9.13.	Transformer (instrument)	1	
4.9.14.	Automatic Change-over relays	1	
4.9.15.	Water Drain	1	
4.9.16.	Water Jacket	1	
4.9.17.	Ammeter	1	
4.9.18.	Fuses	1	
4.9.19.	Main Circuit Breaker	1	
4.9.20.	Heater	1	
4.9.21.	Starter	1	
4.9.22.	Bulk Tank Pump	1	
4.9.23.	Set of Bearings	1	
4.9.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.10. 300 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.10.1.	Oil Filter Set	1	
4.10.2.	Engine Oil	Ltr	
4.10.3.	Air Filter	1	
4.10.4.	Diesel Filter	1	
4.10.5.	Coolant Refill	Ltr	
4.10.6.	Voltage Drop Test	1	
4.10.7.	Charge Rate Test	1	
4.10.8.	V-Belts	1	
4.10.9.	Mains failure Test (on load)	1	
4.10.10.	Valves	1	
4.10.11.	Flexible Hoses	1	
4.10.12.	Battery Charger	1	
4.10.13.	Transformer (instrument)	1	
4.10.14.	Automatic Change-over relays	1	
4.10.15.	Water Drain	1	
4.10.16.	Water Jacket	1	
4.10.17.	Ammeter	1	
4.10.18.	Fuses	1	
4.10.19.	Main Circuit Breaker	1	
4.10.20.	Heater	1	
4.10.21.	Starter	1	
4.10.22.	Bulk Tank Pump	1	
4.10.23.	Set of Bearings	1	
4.10.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.11. 350 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.11.1.	Oil Filter Set	1	
4.11.2.	Engine Oil	Ltr	
4.11.3.	Air Filter	1	
4.11.4.	Diesel Filter	1	
4.11.5.	Coolant Refill	Ltr	
4.11.6.	Voltage Drop Test	1	
4.11.7.	Charge Rate Test	1	
4.11.8.	V-Belts	1	
4.11.9.	Mains failure Test (on load)	1	
4.11.10.	Valves	1	
4.11.11.	Flexible Hoses	1	
4.11.12.	Battery Charger	1	
4.11.13.	Transformer (instrument)	1	
4.11.14.	Automatic Change-over relays	1	
4.11.15.	Water Drain	1	
4.11.16.	Water Jacket	1	
4.11.17.	Ammeter	1	
4.11.18.	Fuses	1	
4.11.19.	Main Circuit Breaker	1	
4.11.20.	Heater	1	
4.11.21.	Starter	1	
4.11.22.	Bulk Tank Pump	1	
4.11.23.	Set of Bearings	1	
4.11.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.12. 400 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.12.1.	Oil Filter Set	1	
4.12.2. 2	Engine Oil	Ltr	
4.12.3. 3	Air Filter	1	
4.12.4. 4	Diesel Filter	1	
4.12.5. 5	Coolant Refill	Ltr	
4.12.6. 6	Voltage Drop Test	1	
4.12.7. 7	Charge Rate Test	1	
4.12.8. 8	V-Belts	1	
4.12.9. 9	Mains failure Test (on load)	1	
4.12.10.	Valves	1	
4.12.11.	Flexible Hoses	1	
4.12.12.	Battery Charger	1	
4.12.13.	Transformer (instrument)	1	
4.12.14.	Automatic Change-over relays	1	
4.12.15.	Water Drain	1	
4.12.16.	Water Jacket	1	
4.12.17.	Ammeter	1	
4.12.18.	Fuses	1	
4.12.19.	Main Circuit Breaker	1	
4.12.20.	Heater	1	
4.12.21.	Starter	1	
4.12.22.	Bulk Tank Pump	1	
4.12.23.	Set of Bearings	1	
TOTAL CARRIED TO SUMMARY		R	

4.13. 415 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.13.1.	Oil Filter Set	1	
4.13.2.	Engine Oil	Ltr	
4.13.3.	Air Filter	1	
4.13.4.	Diesel Filter	1	
4.13.5.	Coolant Refill	Ltr	
4.13.6.	Voltage Drop Test	1	
4.13.7.	Charge Rate Test	1	
4.13.8.	V-Belts	1	
4.13.9.	Mains failure Test (on load)	1	
4.13.10.	Valves	1	
4.13.11.	Flexible Hoses	1	
4.13.12.	Battery Charger	1	
4.13.13.	Transformer (instrument)	1	
4.13.14.	Automatic Change-over relays	1	
4.13.15.	Water Drain	1	
4.13.16.	Water Jacket	1	
4.13.17.	Ammeter	1	
4.13.18.	Fuses	1	
4.13.19.	Main Circuit Breaker	1	
4.13.20.	Heater	1	
4.13.21.	Starter	1	
4.13.22.	Bulk Tank Pump	1	
4.13.23.	Set of Bearings	1	
4.13.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.14. 450 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.14.1.	Oil Filter Set	1	
4.14.2.	Engine Oil	Ltr	
4.14.3.	Air Filter	1	
4.14.4.	Diesel Filter	1	
4.14.5.	Coolant Refill	Ltr	
4.14.6.	Voltage Drop Test	1	
4.14.7.	Charge Rate Test	1	
4.14.8.	V-Belts	1	
4.14.9.	Mains failure Test (on load)	1	
4.14.10. 0	Valves	1	
4.14.11.	Flexible Hoses	1	
4.14.12.	Battery Charger	1	
4.14.13.	Transformer (instrument)	1	
4.14.14.	Automatic Change-over relays	1	
4.14.15.	Water Drain	1	
4.14.16.	Water Jacket	1	
4.14.17.	Ammeter	1	
4.14.18.	Fuses	1	
4.14.19.	Main Circuit Breaker	1	
4.14.20.	Heater	1	
4.14.21.	Starter	1	
4.14.22.	Bulk Tank Pump	1	
4.14.23.	Set of Bearings	1	
4.14.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.15. 500 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.15.1.	Oil Filter Set	1	
4.15.2.	Engine Oil	Ltr	
4.15.3.	Air Filter	1	
4.15.4.	Diesel Filter	1	
4.15.5.	Coolant Refill	Ltr	
4.15.6.	Voltage Drop Test	1	
4.15.7.	Charge Rate Test	1	
4.15.8.	V-Belts	1	
4.15.9.	Mains failure Test (on load)	1	
4.15.10.	Valves	1	
4.15.11.	Flexible Hoses	1	
4.15.12.	Battery Charger	1	
4.15.13.	Transformer (instrument)	1	
4.15.14.	Automatic Change-over relays	1	
4.15.15.	Water Drain	1	
4.15.16.	Water Jacket	1	
4.15.17.	Ammeter	1	
4.15.18.	Fuses	1	
4.15.19.	Main Circuit Breaker	1	
4.15.20.	Heater	1	
4.15.21.	Starter	1	
4.15.22.	Bulk Tank Pump	1	
4.15.23.	Set of Bearings	1	
4.15.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.16. 550 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.16.1.	Oil Filter Set	1	
4.16.2.	Engine Oil	Ltr	
4.16.3.	Air Filter	1	
4.16.4.	Diesel Filter	1	
4.16.5.	Coolant Refill	Ltr	
4.16.6.	Voltage Drop Test	1	
4.16.7.	Charge Rate Test	1	
4.16.8.	V-Belts	1	
4.16.9.	Mains failure Test (on load)	1	
4.16.10.	Valves	1	
4.16.11.	Flexible Hoses	1	
4.16.12.	Battery Charger	1	
4.16.13.	Transformer (instrument)	1	
4.16.14.	Automatic Change-over relays	1	
4.16.15.	Water Drain	1	
4.16.16.	Water Jacket	1	
4.16.17.	Ammeter	1	
4.16.18.	Fuses	1	
4.16.19.	Main Circuit Breaker	1	
4.16.20.	Heater	1	
4.16.21.	Starter	1	
4.16.22.	Bulk Tank Pump	1	
4.16.23.	Set of Bearings	1	
4.16.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.17. 600 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.17.1.	Oil Filter Set	1	
4.17.2.	Engine Oil	Ltr	
4.17.3.	Air Filter	1	
4.17.4.	Diesel Filter	1	
4.17.5.	Coolant Refill	Ltr	
4.17.6.	Voltage Drop Test	1	
4.17.7.	Charge Rate Test	1	
4.17.8.	V-Belts	1	
4.17.9.	Mains failure Test (on load)	1	
4.17.10.	Valves	1	
4.17.11.	Flexible Hoses	1	
4.17.12.	Battery Charger	1	
4.17.13.	Transformer (instrument)	1	
4.17.14.	Automatic Change-over relays	1	
4.17.15.	Water Drain	1	
4.17.16.	Water Jacket	1	
4.17.17.	Ammeter	1	
4.17.18.	Fuses	1	
4.17.19.	Main Circuit Breaker	1	
4.17.20.	Heater	1	
4.17.21.	Starter	1	
4.17.22.	Bulk Tank Pump	1	
4.17.23.	Set of Bearings	1	
4.17.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.18. 650 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.18.1.	Oil Filter Set	1	
4.18.2.	Engine Oil	Ltr	
4.18.3.	Air Filter	1	
4.18.4.	Diesel Filter	1	
4.18.5.	Coolant Refill	Ltr	
4.18.6.	Voltage Drop Test	1	
4.18.7.	Charge Rate Test	1	
4.18.8.	V-Belts	1	
4.18.9.	Mains failure Test (on load)	1	
4.18.10.	Valves	1	
4.18.11.	Flexible Hoses	1	
4.18.12.	Battery Charger	1	
4.18.13.	Transformer (instrument)	1	
4.18.14.	Automatic Change-over relays	1	
4.18.15.	Water Drain	1	
4.18.16.	Water Jacket	1	
4.18.17.	Ammeter	1	
4.18.18.	Fuses	1	
4.18.19.	Main Circuit Breaker	1	
4.18.20.	Heater	1	
4.18.21.	Starter	1	
4.18.22.	Bulk Tank Pump	1	
4.18.23.	Set of Bearings	1	
4.18.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.19. 700 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.19.1.	Oil Filter Set	1	
4.19.2.	Engine Oil	Ltr	
4.19.3.	Air Filter	1	
4.19.4.	Diesel Filter	1	
4.19.5.	Coolant Refill	Ltr	
4.19.6.	Voltage Drop Test	1	
4.19.7.	Charge Rate Test	1	
4.19.8.	V-Belts	1	
4.19.9.	Mains failure Test (on load)	1	
4.19.10.	Valves	1	
4.19.11.	Flexible Hoses	1	
4.19.12.	Battery Charger	1	
4.19.13.	Transformer (instrument)	1	
4.19.14.	Automatic Change-over relays	1	
4.19.15.	Water Drain	1	
4.19.16.	Water Jacket	1	
4.19.17.	Ammeter	1	
4.19.18.	Fuses	1	
4.19.19.	Main Circuit Breaker	1	
4.19.20.	Heater	1	
4.19.21.	Starter	1	
4.19.22.	Bulk Tank Pump	1	
4.19.23.	Set of Bearings	1	
4.19.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.20. 750 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.20.1.	Oil Filter Set	1	
4.20.2.	Engine Oil	Ltr	
4.20.3.	Air Filter	1	
4.20.4.	Diesel Filter	1	
4.20.5.	Coolant Refill	Ltr	
4.20.6.	Voltage Drop Test	1	
4.20.7.	Charge Rate Test	1	
4.20.8.	V-Belts	1	
4.20.9.	Mains failure Test (on load)	1	
4.20.10.	Valves	1	
4.20.11.	Flexible Hoses	1	
4.20.12.	Battery Charger	1	
4.20.13.	Transformer (instrument)	1	
4.20.14.	Automatic Change-over relays	1	
4.20.15.	Water Drain	1	
4.20.16.	Water Jacket	1	
4.20.17.	Ammeter	1	
4.20.18.	Fuses	1	
4.20.19.	Main Circuit Breaker	1	
4.20.20.	Heater	1	
4.20.21.	Starter	1	
4.20.22.	Bulk Tank Pump	1	
4.20.23.	Set of Bearings	1	
4.20.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.21. 800 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.21.1.	Oil Filter Set	1	
4.21.2.	Engine Oil	Ltr	
4.21.3.	Air Filter	1	
4.21.4.	Diesel Filter	1	
4.21.5.	Coolant Refill	Ltr	
4.21.6.	Voltage Drop Test	1	
4.21.7.	Charge Rate Test	1	
4.21.8.	V-Belts	1	
4.21.9.	Mains failure Test (on load)	1	
4.21.10.	Valves	1	
4.21.11.	Flexible Hoses	1	
4.21.12.	Battery Charger	1	
4.21.13.	Transformer (instrument)	1	
4.21.14.	Automatic Change-over relays	1	
4.21.15.	Water Drain	1	
4.21.16.	Water Jacket	1	
4.21.17.	Ammeter	1	
4.21.18.	Fuses	1	
4.21.19.	Main Circuit Breaker	1	
4.21.20.	Heater	1	
4.21.21.	Starter	1	
4.21.22.	Bulk Tank Pump	1	
4.21.23.	Set of Bearings	1	
4.21.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.22. 850 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.22.1.	Oil Filter Set	1	
4.22.2.	Engine Oil	Ltr	
4.22.3.	Air Filter	1	
4.22.4.	Diesel Filter	1	
4.22.5.	Coolant Refill	Ltr	
4.22.6.	Voltage Drop Test	1	
4.22.7.	Charge Rate Test	1	
4.22.8.	V-Belts	1	
4.22.9.	Mains failure Test (on load)	1	
4.22.10.	Valves	1	
4.22.11.	Flexible Hoses	1	
4.22.12.	Battery Charger	1	
4.22.13.	Transformer (instrument)	1	
4.22.14.	Automatic Change-over relays	1	
4.22.15.	Water Drain	1	
4.22.16.	Water Jacket	1	
4.22.17.	Ammeter	1	
4.22.18.	Fuses	1	
4.22.19.	Main Circuit Breaker	1	
4.22.20.	Heater	1	
4.22.21.	Starter	1	
4.22.22.	Bulk Tank Pump	1	
4.22.23.	Set of Bearings	1	
4.22.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.23. 900 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.23.1.	Oil Filter Set	1	
4.23.2.	Engine Oil	Ltr	
4.23.3.	Air Filter	1	
4.23.4.	Diesel Filter	1	
4.23.5.	Coolant Refill	Ltr	
4.23.6.	Voltage Drop Test	1	
4.23.7.	Charge Rate Test	1	
4.23.8.	V-Belts	1	
4.23.9.	Mains failure Test (on load)	1	
4.23.10.	Valves	1	
4.23.11.	Flexible Hoses	1	
4.23.12.	Battery Charger	1	
4.23.13.	Transformer (instrument)	1	
4.23.14.	Automatic Change-over relays	1	
4.23.15.	Water Drain	1	
4.23.16.	Water Jacket	1	
4.23.17.	Ammeter	1	
4.23.18.	Fuses	1	
4.23.19.	Main Circuit Breaker	1	
4.23.20.	Heater	1	
4.23.21.	Starter	1	
4.23.22.	Bulk Tank Pump	1	
4.23.23.	Set of Bearings	1	
4.23.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.24. 950 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.24.1.	Oil Filter Set	1	
4.24.2.	Engine Oil	Ltr	
4.24.3.	Air Filter	1	
4.24.4.	Diesel Filter	1	
4.24.5.	Coolant Refill	Ltr	
4.24.6.	Voltage Drop Test	1	
4.24.7.	Charge Rate Test	1	
4.24.8.	V-Belts	1	
4.24.9.	Mains failure Test (on load)	1	
4.24.10.	Valves	1	
4.24.11.	Flexible Hoses	1	
4.24.12.	Battery Charger	1	
4.24.13.	Transformer (instrument)	1	
4.24.14.	Automatic Change-over relays	1	
4.24.15.	Water Drain	1	
4.24.16.	Water Jacket	1	
4.24.17.	Ammeter	1	
4.24.18.	Fuses	1	
4.24.19.	Main Circuit Breaker	1	
4.24.20.	Heater	1	
4.24.21.	Starter	1	
4.24.22.	Bulk Tank Pump	1	
4.24.23.	Set of Bearings	1	
4.24.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.25. 1000 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.25.1.	Oil Filter Set	1	
4.25.2.	Engine Oil	Ltr	
4.25.3.	Air Filter	1	
4.25.4.	Diesel Filter	1	
4.25.5.	Coolant Refill	Ltr	
4.25.6.	Voltage Drop Test	1	
4.25.7.	Charge Rate Test	1	
4.25.8.	V-Belts	1	
4.25.9.	Mains failure Test (on load)	1	
4.25.10.	Valves	1	
4.25.11.	Flexible Hoses	1	
4.25.12.	Battery Charger	1	
4.25.13.	Transformer (instrument)	1	
4.25.14.	Automatic Change-over relays	1	
4.25.15.	Water Drain	1	
4.25.16.	Water Jacket	1	
4.25.17.	Ammeter	1	
4.25.18.	Fuses	1	
4.25.19.	Main Circuit Breaker	1	
4.25.20.	Heater	1	
4.25.21.	Starter	1	
4.25.22.	Bulk Tank Pump	1	
4.25.23.	Set of Bearings	1	
4.25.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.26. 1125 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.26.1.	Oil Filter Set	1	
4.26.2.	Engine Oil	Ltr	
4.26.3.	Air Filter	1	
4.26.4.	Diesel Filter	1	
4.26.5.	Coolant Refill	Ltr	
4.26.6.	Voltage Drop Test	1	
4.26.7.	Charge Rate Test	1	
4.26.8.	V-Belts	1	
4.26.9.	Mains failure Test (on load)	1	
4.26.10.	Valves	1	
4.26.11.	Flexible Hoses	1	
4.26.12.	Battery Charger	1	
4.26.13.	Transformer (instrument)	1	
4.26.14.	Automatic Change-over relays	1	
4.26.15.	Water Drain	1	
4.26.16.	Water Jacket	1	
4.26.17.	Ammeter	1	
4.26.18.	Fuses	1	
4.26.19.	Main Circuit Breaker	1	
4.26.20.	Heater	1	
4.26.21.	Starter	1	
4.26.22.	Bulk Tank Pump	1	
4.26.23.	Set of Bearings	1	
4.26.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.27. 1250 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.27.1.	Oil Filter Set	1	
4.27.2.	Engine Oil	Ltr	
4.27.3.	Air Filter	1	
4.27.4.	Diesel Filter	1	
4.27.5.	Coolant Refill	Ltr	
4.27.6.	Voltage Drop Test	1	
4.27.7.	Charge Rate Test	1	
4.27.8.	V-Belts	1	
4.27.9.	Mains failure Test (on load)	1	
4.27.10.	Valves	1	
4.27.11.	Flexible Hoses	1	
4.27.12.	Battery Charger	1	
4.27.13.	Transformer (instrument)	1	
4.27.14.	Automatic Change-over relays	1	
4.27.15.	Water Drain	1	
4.27.16.	Water Jacket	1	
4.27.17.	Ammeter	1	
4.27.18.	Fuses	1	
4.27.19.	Main Circuit Breaker	1	
4.27.20.	Heater	1	
4.27.21.	Starter	1	
4.27.22.	Bulk Tank Pump	1	
4.27.23.	Set of Bearings	1	
4.27.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

4.28. 1500 kVA, 3 phase generator

ITEM No.	DESCRIPTION OF PART	QUANTITY	UNIT PRICE
4.28.1.	Oil Filter Set	1	
4.28.2.	Engine Oil	Ltr	
4.28.3.	Air Filter	1	
4.28.4.	Diesel Filter	1	
4.28.5.	Coolant Refill	Ltr	
4.28.6.	Voltage Drop Test	1	
4.28.7.	Charge Rate Test	1	
4.28.8.	V-Belts	1	
4.28.9.	Mains failure Test (on load)	1	
4.28.10.	Valves	1	
4.28.11.	Flexible Hoses	1	
4.28.12.	Battery Charger	1	
4.28.13.	Transformer (instrument)	1	
4.28.14.	Automatic Change-over relays	1	
4.28.15.	Water Drain	1	
4.28.16.	Water Jacket	1	
4.28.17.	Ammeter	1	
4.28.18.	Fuses	1	
4.28.19.	Main Circuit Breaker	1	
4.28.20.	Heater	1	
4.28.21.	Starter	1	
4.28.22.	Bulk Tank Pump	1	
4.28.23.	Set of Bearings	1	
4.28.24.	Sealed Lead acid maintenance free batteries (12 V, 120 Ah)	1	
TOTAL CARRIED TO SUMMARY		R	

SCHEDULE 5: RATES FOR LABOUR RATE AND TRANSPORT

ITEM	DESCRIPTION	UNIT	QUANTITY	COST
	Transport The cost for transport will include the cost of labour during travelling time, all overheads, fuel costs, etc			
5.1.	1 Ton LDV	Rate/km	1	
	Labour:		1	
5.2.	Electrician / Technician	Rate/hour	1	
5.3.	Labourer	Rate/hour	1	
TOTAL CARRIED TO SUMMARY		R		

SCHEDULE 6: RATES FOR STORAGE TANKS

Supply and installation of above-storage tanks for diesel, on a steel frame. The storage tanks should comply with SANS 10131:2004: Above-ground Storage Tanks for Petroleum Product and SANS 1200 HA: Structural steelwork (small works).

ITEM	DESCRIPTION	QUANTITY	RATE / UNIT	TOTAL COST (R)
6.1.	1 m ³ (1000 litres)	1		
6.2.	2.2 m ³ (2 200 litres)	1		
6.3.	4.5 m ³	1		
6.4.	5 m ³	1		
6.5.	8 m ³	1		
6.6.	10 m ³	1		
6.7.	12 m ³	1		
6.8.	15 m ³	1		
TOTAL CARRIED TO SUMMARY			R	

SCHEDULE 7: RATES FOR SUPPLY OF ELECTRICAL

Supply and installation of the following electrical cables and accessories:

ITEM	Description	Quantity	Rate / unit	Total Cost (R)
	Supply and installation of 600/1000 V, PVC/SWA/PVC Cu cable			
7.1.	25 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable	Per meter		
7.2.	35 mm ² 4 core 600/1000 V, PVC/SWA/PVC Cu cable	Per meter		
7.3.	50 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable	Per meter		
7.4.	70 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable	Per meter		
7.5.	95 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable	Per meter		
7.6.	120 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable	Per meter		
7.7.	150 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable	Per meter		
7.8.	185 mm ² 4 core, 600/1000 V, PVC/SWA/PVC Cu cable	Per meter		
	Supply and installation of bare copper earth wire			
7.9.	70 - 95 mm ² Bare copper earth wire	Per meter		
7.10.	120 - 150 mm ² Bare copper earth wire + terminations	Per meter		
	Supply and installation of cable terminations complete with shroud, glands and lugs			
7.11.	25 mm ² 4-core Cu cable terminations	1		
7.12.	35 mm ² 4-core Cu cable terminations	1		
7.13.	50 mm ² 4-core Cu cable terminations	1		
7.14.	70 mm ² 4-core Cu cable terminations	1		
7.15.	95 mm ² 4-core Cu cable terminations	1		
7.16.	120 mm ² 4-core Cu cable terminations	1		
7.17.	150 mm ² 4-core Cu cable terminations	1		
7.18.	185 mm ² 4-core Cu cable terminations	1		
	Supply and installation of circuit breakers (similar of equivalent to CBI)			
7.19.	20 A, TP, 6 kA	1		
7.20.	30 A, TP, 6 kA MCB	1		
7.21.	80 A, TP, 10 kA MCB	1		
7.22.	100 A, TP, 10 kA MCB	1		

7.23.	100 A, TP, 10 kA MCCB	1		
7.24.	150 A, TP, 10 kA, MCCB	1		
7.25.	200 A, TP, 10 kA, MCCB	1		
7.26.	250 A, TP, 10 kA, MCCB	1		
7.27.	300 A, TP, 10 kA, MCCB	1		
7.28.	400 A, TP, 10 kA, MCCB	1		
7.29.	150 A, TP, 20 kA, MCCB	1		
7.30.	200 A, TP, 20 kA, MCCB	1		
7.31.	250 A, TP, 20 kA, MCCB	1		
7.32.	300 A, TP, 20 kA, MCCB	1		
7.33.	400 A, TP, 20 kA, MCCB	1		
TOTAL CARRIED TO SUMMARY				R

SCHEDULE 8: OTHERS

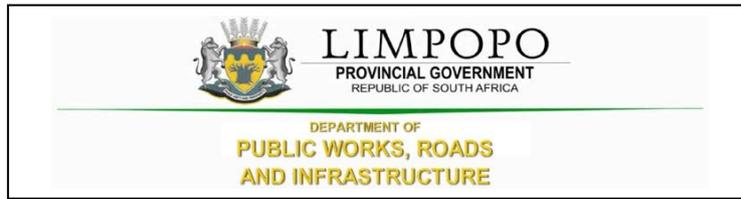
ITEM	Description	Quantity	Rate / unit	Total Cost (R)
8.1.	Water/Oil separator	1		
8.2.	Generator controller as per specification attached in Section C.3.2	1		
8.3.	Pre-cast concrete slab for the generator – 30 MPA	1		
TOTAL CARRIED TO SUMMARY				

Note:

Not all the items are listed in the Bills of Quantities contained herein. In event that the service provider is required to supply and install such an items, a supplier's invoice must be obtained and submitted to LDPWR&I or an agent of state using this contract. The service provider shall claim for the cost of item(s) stipulated on the invoice plus a mark-up of not exceeding 25 % on such an invoice.

SUMMARY OF SCHEDULES OF QUANTITIES

SCHEDULE 1: RATES FOR SUPPLY AND INSTALLATION OF NEW GENERATORS (INDOOR UNITS)	R
SCHEDULE 2: RATES FOR SUPPLY AND INSTALLATION OF NEW GENERATORS (OUTDOOR UNITS)	R
SCHEDULE 3: RATES FOR SERVICING THE GENERATORS	R
SCHEDULE 4.1. – 4.28. : RATES FOR SUPPLY AND INSTALLATION OF MATERIAL (SCHEDULE 4.1 – 4.28)	R
SCHEDULE 5: RATES FOR LABOUR RATE AND TRANSPORT	R
SCHEDULE 6: RATES FOR STORAGE TANKS	R
SCHEDULE 7: ELECTRICAL INSTALLATIONS	R
SCHEDULE 8: OTHERS	
VAT	R
TOTAL (CARRIED TO FORM OF OFFER)	R



C.3.2 SPECIFICATIONS



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
PUBLIC WORKS, ROADS & INFRASTRUCTURE

GENERIC SPECIFICATION FOR SUPPLY, DELIVERY AND INSTALLATION OF INDOOR AND OUTDOOR DIESEL GENERATORS

SECTION 1: GENERAL SPECIFICATIONS

1. DESCRIPTION OF THE WORKS

The specification includes the design, supply, manufacture, testing, delivery and installation of diesel generator within the Limpopo Province. The generators should be used throughout the Province, under the atmospheric conditions stated in this document.

The generating set shall be housed within an engine room or Container / Canopy on site identified by the Limpopo Department of Public Works, Roads and Infrastructure or any organ of state.

For new installations, service provider will also be responsible for civil works, such as Construction of a concrete plinth for the generator for outdoor units, trenches and installation of cables as necessary to bring the generator to operation. In such circumstances, the service provider will have to make provision of the first fill of the tank with diesel to allow for successful commissioning of the generator set.

Additionally, the service provider will be expected issue to electrical certificate of compliance, provide training of staff on the operation of the generator set and make provision of all handbooks, workshop manuals, drawings and circuit diagrams as necessary.

2. APPLICABLE STANDARDS, CODES AND REGULATIONS

- ✓ The Code of Practice for Wiring of Premises - SABS 0142-1
- ✓ The Occupational Health and Safety Act, Act 85 of 1993
- ✓ The municipal by-laws and any special requirements of the local supply authority
- ✓ The local fire regulations
- ✓ Department Standard Quality Specification for standby diesel alternator sets and ISO 9001:2000
- ✓ All relevant Departmental Quality specifications referred to in the standard specification.
- ✓ All low voltage switchgear and control gear assemblies are to comply to SABS 1473 Part 1 – 1989 /IEC 439 - 1 1985.

3. TEST CERTIFICATES AND INSPECTIONS

The following tests are to be carried out:

- (a) Factory test: At the supplier's premises, before the generating set will be delivered to site, Representatives of the Department may be present during the test to satisfy them that the generating set complies with the specification and delivers the specified output. The test must be carried out in accordance with ISO 3046, Part 2 and 3. The Department must receive proper notice of the date for the test.
- (b) Commissioning: After the generator has been installed and connected, and before hand-over back to the clinic, a full test will be carried out on the installation for a period of sufficient duration to confirm the satisfactory working of the installation. During this period, the installation will be inspected and the Contractor shall make good, to the satisfaction of the electrical engineer, any defects which may arise. The Department will issue the commissioning report template to be signed by the Contractor and Department's representative.
- (c) The Contractor shall provide all instruments and equipment required for commissioning. It shall also supply any water, power and fuel required for the construction works and commissioning of the installation at completion.
- (d) Test reports and all relevant statutory certificates for both the Factory Test and the Commissioning are to be submitted to the Client within 24 hours after the conclusion of each tests.
- (e) Training: The Contractor shall train assigned technical staff in the operation and maintenance of the generator installation.
- (f) The contractor shall issue an electrical certificate of compliance on conclusion of this project.

4. GUARANTEE AND MAINTENANCE

The Contractor shall guarantee the complete plant for a period of twelfth months after Commissioning has taken place (Defects liability period).

If during this period the plant is not in working order, or not working satisfactorily owing to faulty material, design or workmanship, the Contractor will be notified and immediate steps shall be taken by him to rectify the defects and/or replace the affected parts on site at his own expense.

The Contractor shall also be available on a call-out basis during the Defects Liability Period, to do repairs on any cabling, switchgear or any other mechanical or electrical equipment that affects the operation of the backup power supply.

The Contractor shall service and maintain the generator set for the full twelve (12) month period to the final delivery of the installation. However, should the Contractor fail to hand-over the generator set in good working order on the expiry of the Defects Liability Period, the Contractor shall be responsible for further monthly maintenance until the generator set is in good working condition.

During this period the Contractor will undertake to arrange that the generator set is inspected at least once every three (3) months by a qualified member of his staff who shall:

- (a) Report to the Officer-in-charge, keeping the maintenance records, and enter into a log book the date of the visit, the tests carried out, the adjustments made, and any further details that may be required.
- (b) Grease and oil moving parts, where necessary.
- (c) Check the air filter and, when necessary, clean the filter and replace filter oil.
- (d) Check the lubricating oil and top-up when necessary.
- (e) After the generator set has run one oil change for the number of hours stipulated by the manufacturers, drain the sump and refill with fresh lubricating oil. The reading of the hour meter on the switchboard will be taken to establish the number of hours run by the plant. Only the cost of the actual oil used, shall be charged as an extra on the monthly account.
- (f) Clean the lubricating oil filter and/or replace the filter element at intervals recommended by the engine manufacturer, the cost of a new filter element to be charged as an extra on the monthly account.
- (g) Check and when necessary adjust the valve settings and the fuel injection equipment.
- (h) Check the battery and top-up the electrolyte when necessary.
- (i) Test-run the plant for 0,5 hour and check the automatic starting with simulated faults on the mains, the proper working of all parts, including the electrical gear the protective devices with fault indicators, the changeover equipment and the battery charger. Make the necessary adjustments.
- (j) Report to the Department and to the Contractor on any parts that become unserviceable through fair wear and tear, or damaged by causes beyond the control of the Contractor. The Contractor on receiving the report, shall immediately submit a detailed quotation for the repair or replacement of such parts to the Department.
- (k) Advise the Department when it has become necessary to de-carbonise the engine and submit a quotation for this service.
- (l) Top up the water of the radiator, if applicable.
- (m) Clean the generator set and its components.

5. MATERIALS AND WORKMANSHIP

- (a) The work throughout shall be executed to the highest standards (**SABS approved**) and to the satisfaction of the Department of Public Works, Roads and Infrastructure's representative. The Engineer shall apply the standards and

specifications in the contract document and have the authority to reject any work and materials, which, in his judgement, are not in full accordance therewith. All condemned material and workmanship shall be replaced and removed from site, or rectified as directed and approved by the Engineer.

- (b) All work shall be executed by qualified tradesman.
- (c) The Contractor shall warrant that the materials and workmanship shall be of the highest grade and to specification.
- (d) The cost of all sundry material and consumables required for the proper installation of equipment, switchgear and cabling, will be included in the cost of said equipment, switchgear and cabling.
- (e) The Contractor shall thoroughly acquaint himself with the work involved and shall verify on site all measurements necessary for proper installation work. The Contractor shall also be prepared to promptly furnish any information relating to his own work as may be necessary for the proper installation work and shall co-operate with and co-ordinate the work of others as may be applicable.
- (f) All components and their respective adjustment, which do not form part of the equipment installation work, but influence the optimum and safe operation of the equipment shall be considered to form part of, and shall be included in the Contractor's scope of works.
- (g) All control equipment and serviceable items shall be installed and positioned such that they will be accessible and maintainable.
- (h) The Contractor shall make sure that all safety regulations and measures are applied and enforced during the installation and guarantee periods to ensure the safety of the public and the User Client.
- (i) The Contractor is to include for all scaffolding required to complete the work required.

6. BROCHURES

Detailed brochures of all equipment offered shall be presented together with the tender documents, if possible.

7. SUBMITTALS

The following information must accompany the quotation:

- (a) Full particulars, performance curves and illustrations of the equipment offered, must be submitted with the quotation.
- (b) The design of the control system to comply with the requirements for automatic starting, stopping, interlocking and isolation as specified.
- (c) Curves furnished by the engine makers, showing the output of the engine offered against the speed, for both intermittent and continuous operation as well as fuel consumption curves when the engine is used for electric generation

The contractor shall issue a set of drawings and wiring diagrams upon receipt of the order. One diagram shall be contained in a metal pouch on the side of the control panel.

SECTION 2 – TECHNICAL SPECIFICATIONS

1. SERVICE CONDITIONS

All plant and equipment to operate satisfactory within the province. The design satisfy the following operating conditions:

Nominal supply voltage	: 230 / 420 V \pm 5 %
Nominal supply frequency	: 50 Hz
Altitude	: ~ 1500 m above sea level
Ambient temperature	: 0 – 45 °C
Relative humidity	: 45% - 75%
Average annual rainfall	: 350 mm
Pollution	: Light pollution
Lightning ground flash density	: >1,0 flashes/km ² /year

2. DETAILED SPECIFICATION

2.1 ENGINE

The engine shall be multi-cylinder diesel engine running at 1500 revolutions per minute (rpm) and rated for continuous duty in accordance with BS 5514. The department prefers water cooled and turbo-charge engines.

The engine shall be governed to a tolerance \pm 5 rpm for all loads. Recovery for transient speed variations shall be within 5 seconds.

The engine should be able to deliver maximum alternator output power continuously at a unity power factor (PF = 1). In addition, the engine shall be capable of delivering 110 % load for one hour, after the set has been running at full load for a period of six hours and shall, after the overload period of one hour it must be capable of maintaining the rated output continuously without any undue mechanical strain, overheating, incomplete fuel combustion or other ill effects. The engines should be operating under the environmental conditions stated above.

The engine shall be equipped with the following facilities (at mimimum):

- Cooling Radiator if water cooled engine is offered.
- Engine starter motor.
- Automatic Radiator Louver arranged to close when engine is stationary – ONLY in some instances when required.
- Engine heater system for cold starting. The generator set should connect to the load within 3 minutes of mains power failure.
- Fuel pump solenoid arranged to be energized to run.
- Fuel lift pump.

- Fuel filters.
- By-pass type lubricating oil filter.
- Lubricating oil level dipstick. Easy facilities for draining lubricating oil sump.
- Dry type replaceable cartridge air filter.
- Engine driven battery charging alternator.
- Low oil pressure switch arranged to shut down plant on low oil pressure.
- Low coolant level switch arranged to shut down plant on low coolant level.
- Electrical sensors for remote indication of oil pressure and water temperature.
- Fixed overload stop set at 10%.
- High engine temperature switch fixed in a suitable position on the engine and arranged to shut down the plant on high engine temperature.
- Over speed shut-down device to protect against run-away.
- The engine shall be capable of satisfactory performance on a commercial grade of distilled petroleum fuel oil such as (Commercial grade diesel fuel 50ppm sulphur content).
- The diesel base tank should allow the generator to run 24 hours continuously at full load without the need for re-fill. In exceptional cases, a larger base tank may be specified by LDPWR&I.

The engine shall be controlled by a governor to maintain governed speed for 50 Hz operation. Class A1 governing in accordance with B.S. 5514 as amended is required.

2.2 EXHAUST SYSTEM

The engine shall be fitted with an efficient Stainless-Steel exhaust system. Flexible bellows shall be fitted between the exhaust outlet and the silencer. The flexible piping must on no account be used to form a bend or compensate for misalignment.

The super residential silencer shall be located on the canopy roof and shall be of the highly efficient type suitable for use in medical areas and shall be capable of providing 30 to 40 decibels of suppression.

The silencer and discharge piping shall be suitably supported. Internal (inside the canopy) exhaust pipe shall be suitably lagged then clad in polished stainless-steel sheet.

2.3 STARTER

The engine shall be equipped with a 12 Volt starting system of sufficient capacity to crank the engine at a speed, which will allow starting of the engine. The starting equipment shall include a 12 Volt D.C. starter motor engaging directly on the flywheel ring gear.

The battery shall be maintained in a fully charged state by an engine driven battery charging alternator with automatic charge rate control. The battery shall stand in an acid spillage tray

treated with acid resistant paint, positioned in such that adequate ventilation is provided. Adequate natural ventilation shall be provided between and around the batteries.

The batteries shall be connected to the engine with suitably rated PVC insulated flexible leads. The batteries shall have sufficient capacity to provide three automatic attempts to start immediately followed by three manual attempts without any appreciable drop in voltage.

The battery shall be date stamped with the year and month of manufacturing

2.4 ALTERNATOR

The alternator shall be of the two bearing type coupled to the engine through a suitable flexible coupling. All the alternators shall be of the brushless, self-excited screen protected drip proof type, and shall comply with the following conditions:

- The ratings of the alternators shall be
 - 25 kVA, 415/230 V AC
 - 50 kVA, 415/230 V AC
 - 80 kVA, 415/230 V AC
 - 100 kVA, 415/230 V AC
 - 125 kVA, 415/230 V AC
 - 150 kVA, 415/230 V AC
 - 200 kVA, 415/230 V AC
 - 250 kVA, 415/230 V AC
 - 300 kVA, 415/230 V AC
 - 315 kVA, 415/230 V AC
 - 350 kVA, 415/230 V AC
 - 400 kVA, 415/230 V AC
 - 415 kVA, 415/230 V AC
 - 450 kVA, 415/230 V AC
 - 500 kVA, 415/230 V AC
 - 550 kVA, 415/230 V AC
 - 600 kVA, 415/230 V AC
 - 650 kVA, 415/230 V AC
 - 700 kVA, 415/230 V AC
 - 750 kVA, 415/230 V AC
 - 800 kVA, 415/230 V AC
 - 850 kVA, 415/230 V AC
 - 900 kVA, 415/230 V AC
 - 950 kVA, 415/230 V AC
 - 1000 kVA, 415/230 V AC
 - 1125 kVA, 415/230 V AC
 - 1250 kVA, 415/230 V AC
 - 1500 kVA, 415/230 V AC

- The generator set shall be 3 phase with four wires (all the three phases and neutral).

- The generator shall be of heavy duty compact design. Insulation shall be Class H as recognised by B.S.5514.

The voltage regulation shall not exceed 2.5 %, from no load to full load, including cold to hot variations at any power factor between 0,8 lagging or higher (unity) and inclusive of speed variations within the limits. Upon application of full load at a power factor of 0,8 lagging, the alternator voltage shall recover to within 2.5 % of the steady state value within approximately 300 milliseconds.

The maximum voltage dip shall not exceed 20 % of the nominal voltage during transients when measured at the alternator terminals.

2.5. CONTROL SYSTEM

The control panel shall be controlled by a dedicated generator controller, which shall be suitable for 12 Volt/24 Volt DC power supply. It shall have suitable amount of inputs and outputs for the control of a standby diesel generator plant with all the related indications and alarms required in the specification.

The panel shall be a front panel graphic user interface and it must be remotely configurable (via IP network) with separate access levels (operator, programmer). This must be via a Network All Control Circuits to be protected with Circuit Breakers. The control panel shall be fitted with a suitable Circuit Breaker sized to the set output and in some instances change-over equipment is required

The control panel shall be supplied and due consideration shall be given to protecting it from ingress of moisture. Adequate working space shall be provided in front of the panel and it shall be complete with the following instruments and facilities:

- Stop/start buttons where applicable.
- Frequency
- Alternator output available" LED indicating lamps
- "Mains available" LED indicating lamps
- Auto/manual/test selector switch
- Over speed alarm indication
- Engine temperature high alarm indication
- Engine oil pressure low alarm indication
- Engine low coolant indication
- Mains contactor or Motorized breaker failure
- Alternator overload alarm indication
- Start failure alarm indication
- Low and high voltage alarm indication
- Battery charger warning alarm indication.

The operation of any alarm condition should cause the engine to stop. Should the engine stop due to the operation of any of the protection circuits, a light shall indicate why the engine has stopped. This indication shall remain on until cancelled.

2.6. ELECTRICAL

2.6.1 Cable Feeders

The main supply cable and the control cables to and from the diesel generator set AMF panel will be supplied and installed by the Contractor.

2.6.2. Terminations

The cables are to be made off with suitable cable glands as C.C.G., Pratley or other approved. The cable glands at the control panel shall be secured to the gland plate in the base section of the panel and at the generator end to the terminal box. The cable conductors shall be terminated with suitably rated pressure crimped cable lugs.

2.6.3 Earthing

All metal parts shall be solidly bonded and electrically connected to each other and to a common earth point.

The neutral point shall be solidly earthed to that point through appropriate size of insulated earth conductors.

All plant, ancillary equipment and steel work in the stand-by plant canopy shall be suitably bonded together with an appropriate size of bare copper tape which shall also be connected to the earthbar.

The contractor shall also test the integrity of the earthing at the kiosk, low voltage panels, etc. as appropriate.

2.7. CANOPY OR ENCLOSURE

Where outdoor generators is required, the unit will complete with control panel and change-over panel shall be supplied and installed in weather proof enclosure (container). The enclosure shall be made of minimum 2 mm sheet mild steel and properly treated against rust and powder coated.

The canopy shall be provided with lugs to enable it to be lifted with ease. Appropriate danger signs shall be mounted on the enclosure.

2.8. GENERATOR SELF-TEST

The generator set shall be set to run a self-test at no-load for 15 minutes. The dates and times vary from one facility to the other and thus will be communicated during actual installation of the works.

SCHEDULES OF EQUIPMENT

The tenderer must complete the following schedule of equipment and submit as part of the tender

1 ENGINE

1.1 COMMERCIAL

Name of Manufacturer _____

Country of Origin _____

Manufacture Type No. _____

Make of fuel injection system _____

Make of governor _____

Governor type no. _____

1.2 MECHANICAL DATA

Nominal speed (rpm) _____

Number of cylinders _____

Strokes per working cycle _____ N/A

Bore (mm) _____ N/A

Stroke (mm) _____ N/A

Swept volume (litres) _____ N/A

Mean piston speed (m/s)

Compression ratio _____ N/A

Method of starting _____

Number of starter motors _____

Method of cooling _____

Type of heater _____

Capacity of heater (kW) _____ N/A

Method of protection against _____

high temperature and low oil pressure

Mass of engine (kg) N/A

Is the engine turbo-charged? (yes/no) _____

1.3 RATING

Continuous standby sea level rating after allowing for ancillaries (kW) N/A

% Derating for site conditions: N/A

For altitude (%) N/A

For temperature (%) N/A

For humidity (%) N/A

Total percentage derating N/A

Nett continuous site output N/A

Minimum time for assumption of full load (s) N/A

Are performance curves attached (yes/no) _____

Is the engine strictly in accordance with specification (yes/no) _____

1.4 MAINTENANCE INTERVALS

Lubricating oil change after (hours) - typical _____

Oil filter element change after (hours) _____

Fuel filter element change after (hours) _____

Air filter element change after (hours) _____

1.5 PERFORMANCE (Attach typical performance curves)

Fuel consumption of the complete set at site in litres of electrical output:

Full load

70% load

50% load

2 ALTERNATOR

2.1 COMMERCIAL

Name of Manufacturer

Country of origin

Manufacturer's type No.

2.2 ELECTRICAL DATA

Terminal voltage

Method of excitation

Transient voltage dip after instantaneous application of full load

Voltage recovery (ms)

Steady state voltage regulation

Class of winding insulation (F/H/200)

Is the alternator brushless? (yes/no)

Is the insulation tropicalized? (yes/no)

2.3 MECHANICAL DATA

Nominal speed (rpm) _____

Maximum percentage overspeed _____

Number of bearings _____

Type of bearings _____

Mass of alternator (kg) _____

Type of enclosure _____

2.4 PERFORMANCE

Derating for site conditions (%) _____

Efficiency @ Cos Phi (lagging) _____

Full load (%) _____

75% Load _____

50% Load _____

3 CONSTRUCTION

3.1 GENERAL DETAILS

Type of base _____

Type of coupling _____

Type of battery _____

Voltage of battery (V) _____

Capacity of battery (Ah) _____

Capacity of fuel service
Tank (litres) _____

Are electric fuel pumps
provided (yes/no) _____

Type of silencer _____

