SPECIFICATION FOR 11 kV SF6 RING MAIN UNIT

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1.0 GENERAL

This section of the specification describes and specifies requirements of the supply, installation, testing, commissioning, handing over in approved working order and maintenance during the Defects Liability Period of the 11 kV SF6 ring main unit all in accordance with the Specification, Supplementary Notes, Bill of Quantities, Conditions of Contract, Drawings, etc.

2.0 STANDARDS AND APPROVAL

The ring main unit shall comply with the latest British Standard Specifications or IEC Recomendations and shall be of the type approved by JKR.

If the Tenderer offers equipment which conforms to standards/recomendations other than those published by the British Standards Institution or the IEC, full details of the difference between the proposed standard and the equivalent British Standard or IEC Recomendations, in so far as they affect the design and performance of the equipment, shall be submitted with the Tender.

3.0 TECHNICAL PARTICULARS AND GUARANTEES▾

Tenderers shall submit at the time of tendering detailed Technical Particulars and Guarantees in respect of the equipmnet offered, which shall be binding. No departure from these Technical Particulars and Guarantees will be permitted except with the written approval of the S.O.'s Representative. Not withstanding any description, drawings, illustrations or pamphlets which may be submitted with the Tender, all details other than those stated by the Tenderer in the Schedule of Departures from Specification at the time of tendering, will be deemed to be in full conformity with the Specification.

The Electrical Contractor shall guarantee the equipment to be supplied under this Contract agaainst faulty design, materials and workmanship at the manufacturer's works within the Defects Liability Period.

4.0 SWITCHGEAR EQUIPMENT

The switchgear equipment shall be suitable for service on an electrical power system of 11kV, 3-phase, 50 Hz. They shall be of single busbar, metalclad, floor mounting type provided with integral earthing and testings terminals. They shall be fully tropicalised and suitable for used at an ambient temperature of 40 Degree Celsius, relative humidity up to 100% and at altitude up to 1000 metres above sea level.

Unless otherwise specified, each ring main unit shall consist of the following equipment :-

(a) Two 630 a load break switches
(c) One 200 A switch fuse
(c) Earth switches
(d) 630 A coper busbar, fully encapsulated.

All the above equipment shall be SF6 insulated and housed in a cast resin module or modules hermetically sealed for life at atmospheric pressure or at a pressure slightly higher than atmospheric pressure so as to minimize the risk of leakage.

The ring main unit shall be totally safe for operation with fully fool proof interlocking system and provided with padlocks.

4.1 RATING OF SWITCHGEAR.

The ring main unit shall be suitable for continuous operation on a 11 kV, 3-phase, 50 Hz, neutral earthed electrical system with fault level up to 350 KVA. The impulse voltage withstand level, on 1.2/50 microsec, shall not be less than 75 kV peak.

The various components of the switchgear equipment shall have the following rating:-

(i) **Load Break Switches**

(a) Rated Voltage : 12 kV.
(b) Continuous Normal Current Rating : 630 A.

(c)	Breaking Capacity	: 630 A
(d)	Making Capacity	: 46.9 kA peak at 11 kV
(e)	Short Time Rating (3 seconds)	: 18.4 kA r.m.s at 11 kV

(ii) **Switch Fuse**

(a)	Rated Voltage	: 12 kV.
(b)	Continuous Normal Current Rating	: 200 A.
(c)	Prospective Breaking Capacity	: 18.4 kA r.m.s. at 11 kV
(d)	Prospective Making Capacity	: 46.9 kA peak at 11 kV

(iii) **Earth Switches**

(a)	Rated Voltage	: 12 kV.
(b)	Making Capacity	: 46.9 kA peak at 11 kV
(e)	Short Time Rating (3 seconds)	: 18.4 kA peak

(iv) **Busbars**

(a)	Rated Voltage	: 12 kV
(b)	Continuous Normal Current Rating	: 630 A
(e)	Short Time Rating (3 seconds)	: 18.4 kA peak

An ASTA or KEMA or PHELA type test certificate shall be submitted with the Tender.

4.2 LOAD BREAK SWITCHES

4.2.1 TYPE

Each load break switch shall be of triple pole, gang operated, non-automatic type with quick break contacts housed in a sealed module filled with sulphur hexafluoride (SF6) gas. It shall be provided with integral feeder earthing equipment without the use of loose accessories.

4.2.2 OPERATING MECHANISM

Each load break switch shall be fitted with a direct manually operated mechanism having three operating positions `ON', `OFF' and `EARTH'. Inadvertent operation from `ON' direct to `EARTH' or vice versa shall be prevented by a manually operated gate type mechanical interlocking arrangement of a fool proof design. The interlocks may operate either in

conjunction with the re-location of single operating handle or with two separate operating handles.

It shall possible to lock the operating mechanism in any of the three positions when the contacts have fully homed, and also independantaly lock off the `ON' and `EARTH' positions. The positions `ON', `OFF' and `EARTH' of the switch shall be clearly indicated such that the direction of movement of the operating handle from one position to another is readily apparent.

The switch mechanism shall give a quick make and quick break operation to all positions by the use of one set of springs. The speeds of make and break shall be independent of the rate of movement of the operating handle and the operator's strength and skill. In addition, the operating handle shall have an anti-reflex feature to ensure an inherent delay between the closing and re-opening of either the main load break switch or the earth switch.

4.2.3 **TESTING FACILITIES**

Each load break switch shall be provided with facilities for carrying out applied high voltage tests and injected current tests on the circuit connected to the earth. These may be effected by the insertion of a 3 phase testing device when the switch is in `EARTH' position, to become effective only when the main contacts are in the `OFF' positions. Alternatively these may take the form of a 3 phase built in test/earth bushing terminals enclosed within a cover which shall be fully interlocked with the operating handle to prevent access until the switch is in the `EARTH' position. A full complement of fool proof mechanical interlocking shall be provided to prevent the folowing operations :

(a) The opening of the testing access when the switch is in any other then `EARTH' position.
(b) The Testing device being inserted or withdrawn when the switch is in any other than `EARTH' position.
(c) The movement of the switch to the `ON' position when the testing access is open, whether or not the testing device has been inserted.
(d) The movement of the switch away from the `EARTH' position, in cases where testing entails the removal of an earth connection from built in test/earth bushing, until the earth connections is restored.

The testing facilities shall provide for the attachment of

test connections external to the switch for applied voltage and injected current tests. The test connections shall be capable of withstanding 25kV d.c to earth for 15 minutes and capable of carrying 630 A continuously.

One set of 3 phase testing device suitable for use with the type of load break switches offered under this Tender shall be provided by the Electrical Contractor whether or not this item is separately itemised in the Bill of Quantities of the Tender Document.

4.3 **SWITCH FUSE**

4.3.1 **TYPE**

Each switch fuse switch shall be of triple pole, gang operated, fully automatic type using striker pin plunger type HRC fuses with quick break contacts housed in a sealed module filled with SF6 gas. It shall be provided with integral earthing equipment without the use of loose accessories. The fuse shall be contained in an air insulated fuse chamber preferrably at the front of the unit. Access to the fuses shall be by means of a door/cover which is fully interlocked to ensure that it can be opened only after the earth switch has been closed.

4.3.2 **OPERATING MECHANISM**

Each switch fitted shall be fitted with independent manual operating mechanism together with a cable earthing operating mechanism, duly interlocked with each other via a robust mechanical interlocking arrangement of fool proof design, to prevent inadvertent mal-operation from `ON' position direct to `EARTH' or vice versa. It shall be possible to lock the operating mechanism in any of the `ON', `OFF' and `EARTH' positions and also to lock off independantaly the `ON' and `EARTH' positions. A visible `ON', `OFF' and `EARTH' indicator shall be provided to indicated the position of the switch fuse. Further, the various positions shall be clearly marked such the movement of the operating handle from one position to another is readily apparent. The switchfuse shall also be provided with an aumatic tripping device such that the blowing of any one fuse and consequently the actuation of any one of the striker pins of the three HRC fuses shall trip all three phases simultaneously, and the mechanical indicator shall then indicate `OFF'. Conversely, if any one fuse is blown, it should not be possible to close the switch cpntacts.

The speeds of make and break of switch mechanism shall be

independent of the rate of movement of the operation handle and the operator's strength and skill. In addition, the operating handle shall have an anti-reflex feature to ensure and unherent delay bbetween the closing and re-opening of either the main switch or the earth switch.

4.33. **TESTING FACILITIES**

Each switch fuse shall be provided with facilities for carrying out applied high voltage tests and injected current tests on the circuit connected to the earth. These may be effected by the insertion of a 3 phase testing device when the switch is in `EARTH' position, to become effective only when the main contacts are in the `OFF' positions.

Alternatively these may take the form of a 3 phase built in test/earth bushing terminals enclosed within a cover which shall be fully interlocked with operating handle to prevent access until the switch is in the `EARTH' position. A full complement of fool proof mechanical interlocking shall be provided to prevent the folowing operations :

(a) The opening of the testing access when the switch is in any other then `EARTH' position.
(b) The Testing device being inserted or withdrawn when the switch is in any other than `EARTH' position.
(c) The movement of the switch to the `ON' position when the testing access is open, whether or not the testing device has been inserted.
(d) The movement of the switch away from the `EARTH' position, in cases where testing entails the removal of an earth connection from built in test/earth bushing, until the earth connections is restored.

The testing facilities shall provide for the attachment of test connections external to the switch fuse for applied voltage and injected current tests. The test connections shall be capable of withstanding 25 kV d.c to earth for 15 minutes and capable of carrying at least 200 Amperes continuously.

One set of 3 phase testing device suitable for use with the type of load break switches offered under this Tender shall be provided by the Electrical Contractor whether or not this item is separately itemised in the Bill of Quantities of the Tender Document.

4.3.4 **FUSES AND FUSE CARRIERS**

Fuse used in the switchfuse shall be air insulated, HRC type with striker pin plungers suitable for 11 kV 3 phase, 50 Hz system and complying with BS 2692, IEC 282 or the equivalent DIN standards.

It shall not be possible to gain access to any part of the fuse carriers unless the switch fuse is in the `OFF' position and the fuse terminals are fully isolated from the busbar as well as the circuit ends. Conversely it shall not be possible to switch `ON' when the access to the fuses or fuse carriers is possible. A full complement of fool proof interlocks shall be provided for this purpose.

A similar quantity of fuses in all switch fuse for the installation shall be provided by the Electrical Contractor as spares whether or not this item is separately itemized in the Bill of Quantities of the Tender Document.

4.4 **CABLE TERMINATION**

The cable termination for the load break switches shall be of dry type suitable for 11 KV 3 core PILCDSTAS cable to BS 6480 of conductor size up to 300 sq. mm. Cable termination for switch fuse shall be suitable for type and size of cable specified in the Drawings and/or Bill of Quantities. The termination shall normally be for a cable entering vertically from below. Howeever, due to site conditions, a bottom angled entry or a vertical top entry may be required. In such case, the Electrical contractor shall supply the appropriate termination accessories at no extra cost.

5.0 **EARTHING**

All metal parts of the ring main unit shall be provided with a main earth bar of not less than 25 mm x 6 mm flat hard drawn copper. The earth bar shall be bolted to the main frame and located so as to provide convenient facilities for earthing cable sheaths and for use with earthing device. Means shall be provided for coupling earths bars of adjacent units. The joints shall be tinned and bolted. A similar earth bar shall run around the four walls of the switchroom at a height of 300 mm from the finished floor level. The earth bars shall be painted with a approved green enamel.

Earth electrodes shall be of copper jacketed steel core rods with 16 mm diameter and supplied in 2.4 m length and shall have provision for screw coupling with another standard length. The copper jacket shall be of minimum thickness 0.25 mm and shall be metallically bonded to the steel case to ensure that the copper jacket and steel core are not separable. Where the desired earth resistance value cannot be achieved after the first set of earth electrodes have been driven, sufficient number of sets of earth electrodes shall be installed outside the resistance area until required value is reached. Each set of earth electrodeshall be provided with brass connecting clamp and approved type of precast heavy duty concrete inspection chamber with removable cover.

The earthing point shall be identified by permanent label legibly marked with the words "Ring Main Unit Earth' permanently fixed at the point of connection of every earthing conductor to an earth electrode.

6.0 STEEL CABINET

A steel cabinet of suitable dimensions shall be supplied and installed in each substation for storing the HV switchgear testing devices, HV fuses etc. The cabinet shall be completed with lock and keys. The design of the cabinet shall be submitted to the S.O.'s Representative for approval prior to fabrication.

7.0 PADLOCKS

The Electrical Contractor shall supply two 40 mm padlocks of 'Yale' make or equivalent for every ring main unit. All padlocks in the same substaion shall be supplied with keys aliked.

8.0 LABELLING

Labels of size not less than 50 mm x 150 mm shall be fitted on then front of all ring main units by means of non-corrodable screws or any other method approved by the S.O.'s Representative. The labels shall be of black laminated plastic with engraved white lettering with details such as rating, over current setting, earth fault setting to which it is connected etc. The exact wording of the labels shall be

agreed with the S.O.'s Representative.

9.0 PAINTING

The ring main unit shall have one coat of primer, one undercoat and a third finishing coat of paint applied at the manufacturer's works. The final coat shgall be of an oil resisting enamel paint.

10.0 INSPECTION, TESTING AND COMMISSIONING

10.1 INSPECTION

The whole of the plant and equipment to be provided under the Tender may be subjected to inspection and test by the S.O.'s Representative prior to installation. The approval by the S.O's Representative of the results of any such inspection or test shall not prejudice the right of the Superintending Officer to reject the plant if it fails to comply with the Specification when erected or to give complete satisfaction in service within the Defects Liability Period. The costs of all tests including the provision of the necessary test equipment shall be deemed to be included in the Tender Price.

Adequate notice shall be given when the plant is ready for inspection or test and every facilitry shall be provided by the Electrical Contractor to enable the S.O.'s Representative to carry out the necessary inspection and tests.

10.2 TESTING

On completion of the installtion work on site, the Electrical Contractor shall, at his own expense, arrange for all necessary tests to be carried out on the equipment by either TNB or a Service Engineer approved by the Jabatan Bekalan Elektrik as part of the tests required of him for the whole installation under this Contract. The tests to be carried out shall be as prescribed in the relevant British Standards Code of Practice for High Voltage Switchgear, The IEE Wiring Regulation 15th Edition, the Electricity (Board Supplies) Rules 1949 and other tests deemed necessary by the S.O.'s Representative. In the event the installation fails to pass any of these tests, The Electrical Contaractor shall take such measures as are necessary to remedy the defects and the insatallation shall not be considered as completed until all such tests have been passed.

The tests to be carried out by the Electrical Contractor shall consists of the following tests as the minimum requirements:-

(a) 2000 V insulation resistance tests.

(b) Current injection test.

(c) 24 KV a.c. pressure test for 1.0 minute.

(d) Other tests as recommended by the manufacturer and the supplier.

The S.O.'s Representative reserves the right to be present at all tests and the Electrical Contaractor shall give at least one week notice in writing to the S.O.'s Representative for thsi purpose. In any case no test shall be carried out without prior approval of the S.O.'s representative. Copies of all the test certificates shall be submitted to the S.O.'s Representative within one week after the completion of the testing.

10.3 **COMMISSIONING**

On succesful testing of the complete installation, the Electrical Contractor shall arrange to commission the equipment in the presence of the S.O.'s Representative on a date to be decided by the S.O.'s Representative.

11.0 **REJECTION OF PLANT**

Any item of plant or component which fails to comply with the requirments of the specification in any respect whatsoever at any stage of manufacture, test or erection or on completion at site within the Defects Liability Period of the Contract may be rejected by the Superintending Officer either in whole or in part as he considers necessary. After adjustment or modification if so directed by the Superintending Officer, the Electrical Contractor shall submit the item for further inspection and/or tests. Plant or components with defects of such nature that, in the opinion of the Superintending Officer, the requirements of this specification cannot be fulfilled by adjustment or modification shall be replaced by the Electrical Contractor at his own expense and to the satisfaction of the Superintending Officer.

12.0 OTHER ITEMS TO BE SUBMITTED WITH THE TENDER

12.1 MANUFACTURER'S CATALOGUE AND DRAWINGS

Manufacturer's catalogues and drawing giving detailed information on the general arrangement of the ring main unit, overall dimensions, general construction, position of main cable, grouting bolts, loading on foundation, minimum clearance to rear end wall, trenchind details, technical specification and other useful details shall be submitted together with the Tender.

12.2 RECOMMENDED SPARES

The Tenderer shall submit with his Tender separate Schedule of Spares recommended by the supplier of the equipment. This Schedule should contain the price and delivery period of each item of the spares recommended. The Tenderer shall also recommend the quantity of each item to be stored for the purpose of maintenance. The prices of these spares shall not be included in the total Tender Price and the purchase of all or any of the spares listed shall be at the option of the Superintending Officer. The prices quoted shall be valid for acceptance during Contract Period (extended if applicable) of the project.

All the spare parts shall be original and fully interchangeable with the corresponding part used in the main items of the equipment and with each other without having to resort to machining or additional, fittings at site. All spares shall be finished, protected, packed and labelled in suitable manner to prevent deterioration during prolonged storage in tropical climate.

13.0 WORKING DRAWINGS, INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS.

13.1 WORKING DRAWINGS

Within two weeks after award of the Tender or such shorter period as may be required by the S.O.'s Representative, the Electrical Contractor shall submit to the S.O.'s Representative for his approval four sets of details of the layout of the ring main unit in the switchroom provided. The drawings submitted are to be modified if necessary as requested by the S.O.'s Representative and resubmitted for final approval. It is to be understood, however, that

approval of the drawing will not exonerate the Electrical Contractor from any responsibility in connection with the work.

13.2 INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

As soon as the general arrangement and details of the equipment to be supplied have been finalised at and before the delivery of the equipment, the Electrical Contractor shall submit to the S.O.'s Representative two copies of detailed installation, operation and maintenance instructions in respect of the equipment to be supplied. The instructions shall cover the main as well as any associated equipment. For this purpose , manufacturer's standard brochures will be acceptable provided that they refer particularly to the equipment to be supplied and are free from extraneous matter.

The instruction shall include essential details, drawings and sketches of the equipment installation, operation and maintenance techniques, make mention of special materials where used and include schedules of recommended lubricants etc. Each of the above two sets of manuals submitted shall be in a stiff cover ring file and with tittles to the satisfaction of the S.O.'s Representative. The cost of these manuals shall be deemed to be included in the Tender Price.

14.0 SWITCHROOM

Approved type of rubber mat shall be provided in front of the ring main unit. The rubber mat shall extend to the full length of the switchgear panels and shall be of thickness not less than 5 mm and width 1000 mm.

'BAHAYA' sign, 'DILARANG MASUK' sign, sign indicating 'Substation No: ' and shock treatment chart shall be installed to the requirement of the Jabatan Bekalan Elektrik and to the satisfaction of the S.O.'s Representative. 'DILARANG MEROKOK' sign shall also be installed.

All trenches in the switchrooms shall be filled up with clean sand to a level above cable ducts.

As fitted layout plans, shematic wiring diagrams, and plans showing cable routes and positions of earthing point with reference to easily recognised buildings and structures shall be suitably framed up in the switchroom. These plans

and diagrams shall be in addtion to the four sets of prints required to be submitted to the S.O.'s Representative after completion of the project as stated in clause 15.0 below.

One 9 kg. dry powder fire extinguisher for A/B/C class of fire and complete with discharge hose, nozzle and wall bracket shall be supplied and installed in every switchroom.

15.0 SERVICE AND MAINTENANCE

During the Defects Liability Period, The Electrical Contractor shall be responsible for trhe service and maintenance work for the complete installation. All works shall be carried out by competent personnel. All labvour, material, tools and parts necessary to rectify the defects due to manufacturing/ installation faults shall be supplied/ executed at the Electrical Contractor's cost.

The service and maintenance to be performed shall include but not be limited to the following:-

(a) Replacing or making good all parts and components of the ring main unit, fuses, wiring, etc.
(b) Replacing or making good all loose and burnt cables and terminations, all mechanical support and linkage, earth electrodes, earth electrode chambers and covers, conduits, trunking etc.
(c) Making good any damage to roads, buildings drains, cables, pipes, concrete areas, paved areas etc. which had not been properly made good arising out of his work.
(d) All other works as deemed necessary by the S.O.'s Representative.

All works shall be carried out as soon as the Electrical Contractor has been informed by the S.O.'s Representative or the Occupant and shall be completed within a reasonable time except under emergrncy situation as stipulated in the Electrical Works Additional General Conditions. If the Electrical Contractor fail to comply with the above requirement, the S.O.'s Representative reserves the right to engage another party to carry out the works, in which case, the Electrical Contractor shall be responsible for all the expenses incurred.

16.0 AS INSTALLED DRAWINGS, MANUALS AND TOOLS

The drawings, manuals, tools etc. as mentioned below shall be

provided whether or not they are separately itemised in the Bill of Quantities of the Tender Documernt. The cost of all these drawings, manuals, tools etc is deemed to be included in the Tender Price.

16.1 **AS INSTALLED DRAWINGS**

Within three calender months after the practical completion of the project, one set of true to scale negatives (155/165 gm/sq.cm ISO AO or A1 size) and four sets of prints for each of the following drawings shall be submitted.

(a) Site plan.

(b) Schematic Wiring Diagrams and Electrical Layout Plans.

(c) Layout Plans of cable routes and earthing points with referrence to easily recognisable buildings and structures.

These drawings shall be properly stencilled and shall have at the lower right hand corner the Electrical Contractor's name and address, date of commissioning, scale, drawing number (the drawing number to be obtained from S.O.'s Representative) title and the following particulars:-

JABATAN KERJA RAYA
CAWANGAN ELEKTRIK
CONTARCT NO.:
TENDER NO:

If the drawings submitted are not acceptable by the S.O.'s Representative, the Electrical Contractor shall amend and re-submit the drawings within two weeks from the date of return of the drawings.

16.2 **MANUALS**

Four sets of the following manuals and documents of the switchgear equipment, battery and battery charger shall be supplied:

(a) Installation manual.
(b) Operation manual.
(c) Service and maintenance manual.
(d) Parts List.
(e) Product data and catalogues.
(f) Test Certificates.

The installation, operation, service and maintenan manuals shall be the same as those described in clause 13.2. Each of

the above four sets of prints together with the manuals & parts list etc. shall be in a stiff cover ring file.

16.3 **TOOLS**

One set of 3 phase testing device for load break switches as mentioned in clause 4.2.3 and one set of 3 phase testing device for switch fuse as mentioned in clause 4.3.3 shall be provided. The testing devices shall be insulated to withstand 25 KV d.c. to earth for 15 minutes and shall be capable of carrying at least 200A continuously.

One set of standard tools as well as any special tools, gauges, handling appliance etc. as recommended by the manufacturer for the assembly, operation, checking adjustment and normal maintenance of the ring main unit shall also be supplied.

17.0 **TECHNICAL PARTICULARS AND GUARANTEES FOR 11 KV RING MAIN UNIT**
(To be filled in by the Tenderer)

1.0 **General**

(a) Name of Manufacturer :

b) Name of Supplier :

(c) Model/Type Reference No. :

(d) Type Testing Authority :

(e) Test Certificate Report/Reference :

(f) Rated Voltage (kV) :

(g) Rated Continuous Normal Current (A) :

(h) Rated Frequency (Hz) :

(i) Number of Phase :

(j) Impulse Withstand Voltage On 1.2/50 micro second (kVp) :

(k) One-minute Power Frequency Withstand Voltage (kV r.m.s) :

(l) Number of seals in the SF6 module :

(m) Relative Pressure of SF6 gas (Bar)
Withstand Voltage (kV r.m.s) :

2.0 **Load Break Switches**

(a) Rated Continuous Normal Current (A) :

(b) Breaking Capacity (A) :

(c) Making Capacity (kAp) :

(d) Short Time Current Rating.
3 seconds at 11 kV. (kA r.m.s) :

3.0 **Switche Fuse**

(a) Rated Continuous Normal Current (A) :

(b) Prospective Breaking Capacity
(kA r.m.s.) :

(c) Prospective Making Capacity (kAp) :

(d) Short Time Current Rating.
3 seconds at 11 kV. (kA r.m.s) :

4.0 **Earth Switches**

(a) Rated Normal Current (A) :

(b) Making Capacity (kAp) :

(c) Short Time Current Rating.
3 seconds at 11 kV (kA r.m.s) :

5.0 **Busbars**

(a) Material :

(a) Rated Continuous Normal Current (A) :

(c) Short Time Current Rating.
3 seconds at 11 kV (kA r.m.s) :

*6.0 **Schedule of Departures from Specification:-**

* Tenderer should enter details at time of tendering. If no details are entered, the equipment shall deemed to fully comply with the requirements of the Specification.

Signature : .....

Name of Tenderer : .....

Chop of Tenderer : .....

.....

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