SECTION – IV

(TECHNICAL SPECIFICATIONS & GTP FORMATS)

11KV & 33 KV METERING UNIT

TENDER NOTICE NO- NESCO Utility/MU / 20/ 13663

Date: 14.12.16

TECHNICAL SPECIFICATION FOR 11KV & 33 KV METERING UNITS

1. SCOPE:

This specification covers design, engineering, manufacture, ***assembly, stage testing, inspection***, testing before dispatch, supply and delivery of 11KV & 33KV CT PT Combined Metering unit Sets of class of accuracy **0.5 for 11 KV MU, 0.2 for 33 KV MU** as per the particulars given in the schedule attached.

2. STANDARD: Except where modified by this specification the component parts of the equipment shall comply with the following ISS available (the latest versions).

Current Transformers	:	IS 2705/1992
Potential Transformers	:	IS 3156/1992
HV Porcelain Bushing	:	IS 2099/1986
Oil	:	IS 335/1983
Galvanization	:	IS 2633
Primary Terminals	:	IS 10601
Oil	:	IS 335

3. TYPE FOR 11 KV: The metering transformer equipment should be of pole mounting type for outdoor use. They are to be used in 11KV Three Phase with solidly earthed neutral and suitable for 3 Phase 4 Wire 50 cycles network. The equipment is required for operation of HT Trivector Meters and should be oil cooled.

The CTPT sets shall have the following ratings:

i) Rated Voltage: 11 KV
ii) Highest system voltage: 12 KV
iii) Insulation level: 12 KV
iv) Standard Impulse withstand voltage: 75 KV Peak
v) One minute power frequency withstand Voltage
   a. Primary: 28 KV
   b. Secondary: 3 KV
vi) Short time thermal current and its duration
   1. 6 KA for 1 sec for CT ratio below 50/5 A
   2. 1 3 . 1 K A for 1 sec for CT ratio > 50/5 A (including 50/5 A)
vii) Class of Accuracy: 0.5 (Negative (-ve) errors will not be acceptable.)

viii) Rated burden per phase
   1. For CTs: 15 VA
   2. For PTs: 50 VA

ix) Frequency: 50 HZ
x) Maximum attainable winding temperature =80 deg C
xi) Minimum Phase to Phase distance=255 mm
xii) Shortest distance between metal part & earth = 190mm
xiii) Creepage distance of HV bushing 300mm (Min)
xiv) Gauge of MS Tank Min 5mm for top & bottom cover and 3.15 mm all other sides.

xv) Entire tank shall be hot dip galvanized.

xvi) Bi-metallic terminal connector with a nut, plane washer, spring washer & Check nut suitable for 55 to 100 mm² aluminum conductor required for different rating of metering units. Six nos. to be provided with each metering units.

4. TYPE FOR 33 KV: The metering transformer equipment should be of pole mounting type for outdoor use. They are to be used in 33 kV Three Phase with solidly earthed neutral and suitable for 3 Phase 4 Wire 50 cycles network. The equipment is required for operation of HT Trivector Meters and should be oil cooled.

The CTPT sets shall have the following ratings.

i) Rated Voltage: 33 KV

ii) Highest system voltage: 36 KV

iii) Insulation level: 36 KV

iv) Standard Impulse withstand voltage: 170 KV peak

v) One minute power frequency withstand Voltage

a. Primary: 70 KV

b. Secondary: 3 KV

vi) Short time thermal current and its duration

1. 6 KA for 1 sec for CT ratio below 50/5 A
2. 13.1 KA for 1 sec for CT ratio for > 50/5 A (including 50/5A)

vii) Class of Accuracy: 0.2 (Negative (-ve) errors will not be acceptable.)

viii). Rated burden per Phase

1. For CTs: 5 VA up to 50/5 A & 10 VA for => 50/5 A
2. For PTs: 50 VA

ix). Frequency: 50 HZ

x). Maximum attainable winding temperature =80 deg C

xi). Minimum Phase to Phase distance=430 mm

xii). Shortest distance between metal part & earth = 380 mm

xiii). Creepage distance of HV bushing 900mm (Min)

xiv).Thickness of MS Tank Min 5mm for top cover & bottom and 3.15 mm all other side.

xv). Entire tank shall be hot dip galvanized.

xvi). **Bi-metallic terminal connector with a nut, plane washer, spring washer & check nut suitable for 100mm² or 232 mm² aluminium conductor required for different rating of metering units. Six nos to be provided with each metering units**.

5. DESIGN:

a) The equipment shall be designed to ensure satisfactory operation under all conditions of service to facilitate easy inspection, cleaning and repairs.

b) The design shall incorporate every reasonable precaution and provisions for safety of all those concerned in the operation and maintenance of the equipment. A pressure relief valve shall be invariably provided to the CTPT set. It shall be provided at the top cover of the tank.

c) All outdoor apparatus shall be so designed that water cannot collect at any point and enter the CT/PT set. The top cover should have slops from centre line to both the

edges. The top cover of the tank, secondary terminal cover are also suitably bent at the edges ***(at least 25mm bent)*** so that the gaskets are not exposed to moisture.

d) All connections and terminals shall be of sufficient size for carrying the specified currents continuously without undue heating.

e) All bolts, nuts, washers in contact with non-ferrous parts shall be of brass.

f) All ferrous parts including bolts & nuts liable to corrosion, forming integral part of the equipment shall be smoothly and continuously hot dip galvanized.

g) The secondary terminal box, inspection cover and oil gauge shall be arranged with MU.

h) The core shall be high grade non-ageing electrical silicon laminated steel or of better grade of low hysteretic loss and high permeability to ensure high accuracy, at both normal and over current/ voltage.

i) All winding shall be of insulated high grade Electrolytic copper wire and the manufacturing of the units shall be done in completely closed and air-conditioned room otherwise Fibre glass insulation sleeves are to be provided for primary winding. Details of winding and core shall be furnished.

j) The CTPT set should have Three CTs and Three PTs with star / star connection.

6. <u>SEALING</u>:

Sealing bolts for sealing at 4 points on the secondary terminal box (both inner & outer door), inspection cover, the top cover of the tank shall be *provided***.** This may be made by providing a hole ***on tail of corner bolts*** of adequate size to pass the sealing wire or above13 SWG.

7. FLUCTUATION IN VOLTAGE AND FREQUENCY : For continuous operation, entire equipment shall be subjected to variation of voltage up to ***plus 20 minus 30*** percent and frequency of plus or minus ***4*** percent.

8. INSTRUMENT TRANSFORMERS:

a) The voltage and current transformers shall have normal continuous rating as per the schedule of requirement.

b) The voltage transformer shall be so designed that the increased magnetizing currents due to any persisting over voltage, does not produce injurious over heating Phase barriers shall be provided.

c) The peak value of the rated dynamic current shall not be less than 2.5 times the rated short time thermal current unless stated otherwise. (4.62 of ISS: 2705/Part-I of 1992, latest version).

d) Modified polyester enamel copper wire is to be used for winding and it shall conform to IS-4800/Part-V (latest version).

e) The terminals of the instrument transformer shall be clearly marked by distinctive letters as stated in Annex "C" of ISS: 3156/Part.I/1992 (latest version) for voltage transformer and Annex "C" of IS-2705/Part.I/1992 (latest version) for current transformers.

f) The winding shall be neatly laid and anchored.

g) **The metering set tank and other metal parts shall be galvanized both inside & outside as per latest IS applicable.**

9. INCOMING SIDE:

a) **TERMINALS: Brass rods 16mm dia for Primary and 10 mm dia for secondary.**

b) Bushing for outgoing side of CT/PT set :

The porcelain portion of HT bushings shall be of standard make and conform to IS-2099/1996.

The dimensions of the bushings shall conform to I S - 33 4 7 /Part.III/19

The minimum phase-to-phase clearance shall be as per IS.

The tests as per IS-2099/1962 shall be conducted on the transformer bushings as detailed below:

a) Dry flash over voltage.
b) Wet flashover voltage.
c) Dry 1 Min. withstand volt.
d) Impulse withstand voltage (1.2/50 Micro Seconds –ve wave)

e) Manufacturer's test certification may be furnished for every lot of offer.

The bushings shall be of reputed manufacturers like M/s. Jayashree Insulators, M/s. WS Industries, M/s. BHEL, M/s. Allied Ceramics, M/s. India Potteries and M/s. IEC & others having complete testing facilities.

The bushing stems shall be provided with suitable **Bimetallic connectors** so as to connect the jumper without disturbing the bushing stem.

f) The bush rod stem length should be at least 100 mm and 3 nuts with 2 flat washers of brass material should be provided with each bush rod.

10. STEEL TANK:

a) The oil filled container incorporating the voltage transformers and current transformers should be fitted with incoming and outgoing primary terminals and secondary terminal box. The secondary terminal box shall be arranged on sides. The general arrangement drawing with 3 bushing on the incoming side and 3 bushings on the outgoing side shall be submitted along with tender.

b) The tank shall be built with a plate of 5 mm thick top & bottom and 3.15 mm sides

and with all fittings shall be capable of withstanding without leakage or distortion at the standard test pressure. All joints of the tank and fittings shall be hot oil tight and no leakage should occur during service. Both side of the joint should have continuous welding.

c) It shall be provided with an oil gauge as shown. The oil gauge glass shall be fixed to the side of the raised wall of the inspection box.

The tank shall be provided with necessary lifting lugs. Tank including top cover shall be hot deep Galvanized.

d) The secondary terminal box cover, tank cover and inspection cover and other vertical joints where gaskets are used shall be suitably bent at least 25 mm bent with necessary sealing arrangement with sealing bolts at all corners and bolts should be at least 10 mm diameter GI bolts spaced maximum 70 mm apart. This is to safeguard against seepage of water into tank in case of damaged gasket.

e) The 6 mm gaskets shall be dovetailed without joints to prevent moisture entry. In case of dovetailed joint, they shall not be more than two. The gaskets shall be of good quality Neoprene or superior quality rubberized gasket.

f) **EARTHING:** Two earthing terminals shall be of adequate size protected against corrosion and metallically clean and identified by means of the sign marked in a legible and indelible manner on or adjacent to the terminals.

g) All bolts should be provided with 2 flat washers and a spring washer with a nut.

h) Conservator should not be provided for these CTPT sets.

i) The Secondary terminal box incoming hole should be 32 mm diameter and at a suitable height from bottom to avoid replacement/modification of secondary wires pipe when CTPT set is replaced. The secondary terminals size should be 6 mm diameter, 25 mm stem length, 2 flat washers with 3 nuts of brass material should be provided. The terminals should be provided at least 70 mm height from incoming hole and clearances shall be as per IS to avoid shorting terminals due to secondary wires pipe.

j) Secondary chamber shall have double door (inner & outer) with suitable arrangement for sealing of both the doors. The inner door shall be of transparent Polycarbonate so that secondary terminal connections can be viewed with out breaking the inner door seals.

k) The following details of equipment shall be engraved on tank with at least 1 0 mm letters.
1. Make 2. Ratio 3. Class of accuracy 4.Serial No: 5. Month & year of manufacturing
6 . Property of NESCO Utility

l) 66 months guarantee embossed plate shall be welded opposite side of name plate.

11. MOUNTING ARRANGEMENT:

The under base of all CTPT sets shall be provided with two 75x40x5 mm GI channels and foundation dimensions shall be suitable placing with tank base uniform for all sets with only ±2 mm tolerance, to avoid modification of structure / plinth, whenever CTPT set is replaced

12. OIL: The insulation oil used in the tank shall comply with the requirements specified in latest relevant IS: 335/93 and as per Annexure-C.

13. GUARANTEED TECHNICAL PARTICULARS:

The Technical Particulars as specified in IS shall be guaranteed. Every tenderer should furnish the particulars required and guarantee the values so furnished for the supplies.

14. TESTS:

TYPE TESTS: The equipment offered shall be fully type tested from recognized standard govt. national laboratory by the bidder as per the relevant standards. The bidder shall furnish three copies of type test certificates with the bid (for 0.5 accuracy , 11kv & 0 . 2 accuracy , 33kv MU). These type test certificates shall be furnished along with tender documents. The bidders also furnish type test certificates for bushings and oil along with the Bid. **The type test certificates shall be not older than (5) years.**

TYPE TESTS FOR CTs:

a) Verification of terminal marking and polarity
b) Short time current Test.
c) Temperature rise test.
d) Lightning Impulse test
e) High Voltage Power frequency wet withstand voltage test.
f) Determination of errors or other characteristics according to the requirements of the appropriate designation or accuracy class.

TYPE TESTS FOR PTs:

a) Verification of terminal marking and polarity.
b) High voltage Power frequency wet withstand voltage test.
c) Power frequency dry withstand tests on Primary winding.
Power frequency dry withstand test on Secondary winding.
d) Determination of errors according to the requirements of the appropriate accuracy class.
e) Temperature rise test.
f) Impulse Voltage test.
g) Lightning Impulse test

TYPE TESTS FOR TRANSFORMER BUSHINGS:

a) Dry flash over voltage.
b) Wet flash over voltage.
c) Dry 1 Minute withstand voltage.
d) Impulse withstand voltage (1.2/50 Micro Seconds –ve wave)

ACCEPTANCE AND ROUTINE TESTS:

The following shall be conducted as per IS: 3156 (Latest version).

a) Verification of Terminal marking and polarity.

b) Power frequency/ dry withstand tests on primary windings.
c) Power frequency dry withstand tests on secondary windings.
d) Determination of errors according to the requirements of the appropriate accuracy class.
e) Temperature rise test.
f) Air pressure test on empty tank of MU opened for verification test (One for every lot offered for pre-dispatch inspection)

All acceptance and routine tests as stipulated in the relevant standards shall be carried out by the supplier in presence of purchaser's representatives.

Immediately after finalization of the programme of acceptance/ routine testing, the manufacturer shall give advance intimation to the purchaser, to enable him to depute his representative for witnessing the tests.

15. DRAWINGS AND LEAFLETS (along with tender):

Two sets of drawings showing clearly the general arrangements, sectional views, fitting details, electrical connections, *foundation details, overall dimensions* and design features of each component part should accompany the tender. The bidder has to submit clear & detail drawing with description how he will arrange the double door system in secondary chamber with sealing. Technical leaflets giving the operating instructions should also be furnished along with tender. Tenders without details are liable to be rejected. Literature and drawings are to be sent along with each equipment while dispatching, after approval by this office.

16. DEVIATIONS:

The deviations between these CTPT sets and NABL approved Standard Lab (CPRI, ERDA, etc.,) type tested CTPT set along with detailed reasons for deviations if any shall be submitted along with tender.

17. TOLERANCES:

Unless otherwise specified herein the test value of the transformers supplied should be within the tolerance permitted in the IS on the guarantee values.

18. SEALING OF CTPT SETS AFTER TESTING AND INDIVIDUAL TEST REPORTS:

After witnessing testing on sample quantity and physical inspection of all offered CTPT sets, the purchaser"s representative will provide numbered plastic seal bits to two opposite corners of tank, Secondary Chamber and inspection cover of all offered CTPT sets, for delivery of correct inspected materials only. The manufacturer has to provide test report duly mentioning all test results, seal bit numbers and name & address of purchaser"s representative after inspection is over. The seal bit numbers shall also be mentioned in the test reports signed by purchaser"s representative submitted for delivery instructions.

19. INSPECTION AND TESTING OF TRANSFORMER OIL:

To ascertain the quality of transformer oil the manufacturer"s test report should be submitted at the time of inspection. Arrangements should also be made for testing the transformer oil, after taking out the samples from the manufactured CTPT sets and tested in the presence of NESCO,WESCO,SOUTHCO representative (or) if desired, in an independent laboratory.

20. DEPARTURE FROM SPECIFICATION:

If the tenderer wishes to depart from this specification in any respect, he shall draw the attention to such points of departure explaining fully the reasons therefore. Unless this is done the requirements of this specification will be deemed to have been accepted in every respect.

21. NAME PLATE: -

The Purchase order No. and Date of purchase order, the words **"PROPERTY OF NESCO Utility** on the Name Plate. **The name plate shall be non-detachable type & fixed with rivets, not with bolts& nuts. The nameplate should bear year & month of manufacture& other data as per IS. Space should be provided to punch the date of installation by user group.**

22. WARRANTY:

The supplier will warrant for the satisfactory functioning of the material / equipment as per specification for a minimum period of 66 months from the date of dispatch of the material / equipment in good condition indicating GP covering date upto ----------

23. The tenderer shall indicate the source of all materials. He shall also indicate the name of the supplier and make of conductor, Transformer oil Electrical Steel Laminations, Construction Steel etc.

24. FITTINGS:

The following standard fittings shall be provided.

a) Rating and terminal marking plates non detachable -1no.
b) Earthing terminals with bolt, nuts & washers for connecting earth wire - 2Nos.
c) Lifting lugs -4Nos.for main tank and 2Nos. for top cover.
d) Pressure relief valve. – 1 no.
e) Bimetallic terminal connectors on the HV bushings – 6 Nos.
f) HV bushings Outdoor – 6 Nos.
g) Secondary terminals bushings – 10 Nos
h) Base channels 75 x 40 mm.
i) 66 months guarantee embossed plate welded to tank opposite side of name plate.
J) Tank and over all dimensions.
k) Weight content of a) core b) windings c) tank & fittings d) weight/qty. of oil e) over all weight.

ANNEXTURE – A

GUARANTEED TECHNICAL PARTICULARS OF OUTDOOR OIL IMMERSED 11 KV MU (CT: PT UNITS)

(To be submitted along with TECHNICAL BID)

Sl n	Particulars		Requirement	Offered By BIdder
1	Maker's name & address		To be indicated	
2	Manufacturer's Type & Design		To be indicated	
3	Type of cooling		To be indicated	
4	Nominal System Voltage		11 KV	
5	Highest System Voltage		12 KV	
6	Frequency.		50 HZ	
7	Specification of CT & PT of Metering Unit			
A	**Current Transformer**			
	i	Type	Oil immersed	
	ii	Accuracy Class	0.5	
	iii	Rated output	15 VA	
	iv	Insulation level	28KVrms/ 75 KVpk	
	v	Short time thermal current rating for 3 sec	CT Primary 6 KA for 1< 50/5A & 13.1KA for 1sec for =>50/5A	
	vi	Saturation factor	To be indicated	
	vii	Normal current density of primary winding	=<1.6 Amps per Sq.mm	
		Knee Point Voltage	To be indicated	
		Continuous percentage over load	120%	
		ISF	As per IS	
B	**Potential Transformer**			
	i	Type	Oil immersed	
	ii	PT ratio	11 KV/√3V /110/ √3V	
	iii	Rated output VA/phase	50	
	iv	Class of accuracy	0.5	
	v	Insulation level	28KVrms / 75 KVpk	
	vi	Winding connection	Star/Star	
	vii	Rated voltage factor & duration	To be indicated	
8.	Dimension of MS hot dip Galvanized tank			
	a	Height mm	To be indicated	
	b	Breadth mm		
	c	Length mm		
9.	Thickness of MS Tank , Side walls		3.15mm	
	Top & Bottom		5 mm	
	Edge bending in the Top Cover		To be provided	

	Standard pressure & duration that can		To be indicated	
10.	Weight of core and winding			
A.	**Current transformer**			
	i	Core	To be indicated in separate sheet for each rating	
	ii	Primary winding		
	iii	Secondary winding		
B.	**Potential transformer**			
	i	Core	To be indicated	
	ii	Primary winding		
	iii	Secondary winding		
11.	Quantity of oil in Ltr (Min 40 Ltrs)		To be indicated	
	Grade of Oil		To be indicated	
12.	Total weight of complete ME including all accessories and oil		To be indicated	
13	Resistance of primary & secondary winding per phase at 75° C:-			
	a	CT Winding (i) Primary	To be indicated in separate sheet for each rating	
		(ii) Secondary		
	b	PT Winding (i) Primary	To be indicated	
		(ii) Secondary	To be indicated	
14	Maximum attainable winding temperature		85° C	
15	a	Minimum phase to phase distance	255mm	
	b	Shortest distance between metal part & earth	190 mm	
16	a	Make & type of HT bushing	To be indicated	
	b	Creepage distance of HV bushing	300mm (Min)	
17	Bi-metallic terminal connector with nut, plain washer, spring washer & check nut suitable for aluminum conductor of 55/100 mm² size.		6 nos to be provided suitable for 100 mm² AAA conductor	
18	Type CT of core material		To be indicated	
19	Type & thickness of gasket used on			
	a	Top cover tank	To be indicated	
	b	Secondary terminal box	To be indicated	
	c	HV bushing	To be indicated	
20	Details of Metering Unit			
A	CT details			
	a	Cross section area of each turn of CT winding (in sq. mm.)		
	i.	Primary winding	To be indicated in separate sheet for each rating	
	ii.	Secondary winding		
	b.	No. of turns		
	i.	Primary winding	To be indicated in separate sheet for each	
	ii.	Secondary winding		
	c.	Winding material		
	i.	Primary winding	To be indicated	
	ii.	Secondary winding	To be indicated	
B	PT details			
	a	Cross Section area of each turn of PT (in sq. mm.)		

	i.	Primary winding	To be indicated	
	ii	Secondary winding	To be indicated	
	b	Number of turns		
	i.	Primary winding	To be indicated	
	ii	Secondary winding	To be indicated	
	c	Winding materials		
	i.	Primary winding	To be indicated	
	ii	Secondary winding	To be indicated	
21	Identification/marking of			
	i.	Primary terminals		
	a	Incoming	RM, YM, BM	
	b	Outgoing	RL, YL, BL	
	ii	Secondary terminals		
	a	CTs	1s1- 1s2, 2s1-2s2, 3s1-3s2	
	b	PTs	r,y,b,n	
22	Size and material of			
	i.	Primary studs	M 16	
	jj	Secondary studs	M 10	
23		Secondary Chamber shall have double door type & sealing arrangement in both the doors.(inner door Acrylic & outdoor Metallic)	To be provided	

Bidder's Signature with Seal

ANNEXTURE – B

GUARANTEED TECHNICAL PARTICULARS OF OUTDOOR OIL IMMERSED 33 KV MU (CT: PT UNITS)

(To be submitted along with TECHNICAL BID)

Sl. no	Parti		Requirement	Offered
1	Maker's name & address		To be indicated	
2	Manufacturer's Type & Design		To be indicated	
3	Type of cooling		To be indicated	
4	Nominal System Voltage		33 KV	
5	Highest System Voltage		36 KV	
6	Frequency.		50 HZ	
7	Specification of CT & PT of Metering Unit			
A	**Current Transformer**			
	i	Type	Oil immersed	
	ii	Accuracy Class	0.2	
	iii	Rated output	5VA for up to 50/5 A,10 VA for =>50/5 A	
	iv	Insulation level	70KVrms/170 KVpk.	
	v	Short time thermal current rating for 3 sec	CT Primary 6 KA for < 50/5A & 13.1 KA => above 50/5 A.	
	vi	Saturation factor	To be indicated	
	vii	**Normal current density of primary**	=<1.6 Amps per Sq.mm	
		Knee Point Voltage	To be indicated	
		Continuous percentage over load	120%	
		ISF	As per IS	
B	**Potential Transformer**			
	i	Type	Oil immersed	
	ii	PT ratio	33KV/√3V/110/ √3V	
	iii	Rated output VA/phase	50	
	iv	Class of accuracy	0.2	
	v	Insulation level	70KVrms/170 KV pk	
	vi	Winding connection	Star/Star	
	vii	Rated voltage factor & duration	To be indicated	
8.	Dimension of MS hot dip Galvanized tank			
	a	Height mm	To be indicated	
	b	Breadth mm		
	c	Length mm		
9.	Thickness of MS Tank Side walls		3.15mm	
	Top & Bottom		5 mm	
	Edge bending in the Top Cover		To be provided	

	Standard pressure & duration that can		To be indicated	
10.	**Weight of core and winding**			
A.	**Current transformer**			
	i	Core	To be indicated in separate for each rating	
	ii	Primary winding		
	iii	Secondary winding		
B.	Potential transformer			
	i	Core	To be indicated	
	ii	Primary winding		
	iii	Secondary winding		
11.	Quantity of oil in Ltr		To be indicated	
	Grade of oil		To be indicated	
12.	Total weight of complete ME including all accessories and oil		To be indicated	
13	Resistance of primary & secondary winding at 75° C per phase :-			
	a	CT Winding (i) Primary	To be indicated	
		(ii) Secondary	To be indicated	
	b	PT Winding (i) Primary	To be indicated	
		(ii) Secondary	To be indicated	
14	Maximum attainable winding temperature		85° C	
15	a	Minimum phase to phase	430mm	
	b	Shortest distance between live part &earth.	380mm	
16	a	Make & type of HT bushing	To be indicated	
	b	Creepage distance of HV bushing	900mm (Min)	
17	Bi-metallic terminal connector with nut, plain washer, spring washer & check nut suitable for aluminum conductor 100/232 mm² size.		6 nos to be provided suitable for 100mm² AAA conductor	
18	Type of core material		To be indicated	
19	Type & thickness of gasket used on			
	a	Top cover tank	To be indicated	
	b	Secondary terminal box	To be indicated	
	c	HV bushings	To be indicated	
20	Details of Metering Unit			
A	**CT details**			
	a	**Cross section area of each turn of CT winding (in sq. mm.)**		
	i.	Primary winding	To be indicated	
	ii.	Secondary winding	To be indicated	
	b.	**No. of turns**		
	i.	Primary winding	To be indicated	
	ii.	Secondary winding	To be indicated	
	c.	**Winding material**		
	i.	Primary winding	To be indicated	
	ii.	Secondary winding	To be indicated	
B	**PT details**			
	a	**Cross Section area of each turn of PT (in sq. mm.)**		
	i.	Primary winding	To be indicated	
	ii	Secondary winding	To be indicated	

	b	**Number of turns**		
	i.	Primary winding	To be indicated	
	ii	Secondary winding	To be indicated	
	c	**Winding materials**		
	i.	Primary winding	To be indicated	
	ii	Secondary winding	To be indicated	
21	Identification/marking			
	i.	Primary terminals		
	a	Incoming	RM, YM, BM	
	b	Outgoing	RL, YL,	
	ii	Secondary terminals		
	a	CTs	1s1- 1s2, 2s1-2s2, 3s1-3s2	
	b	PTs	r,y,b,n	
22	Size and material of			
	i.	Primary studs	M 16	
	jj	Secondary studs	M 10	
23		Secondary Chamber shall have double door type & sealing arrangement in both the doors .(inner door Acrylic & outdoor Metallic).	To be provided	

Bidder's Signature with Seal

GUARANTEED TECHNICAL PARTICULARS FOR OIL

(To be submitted along with TECHNICAL BID)

Sl. No.	Characteristic.	Particulars	To be furnished by the Bidder
1	Appearance.	The oil shall be clear and transparent and free from suspended matter or sediments and should conform to IS-335/93 or latest versions.	
2	Density at 27 degrees C (max)	0.89 g/cm.	
3	Kinematic Viscosity at 27 degrees C (max)	27 CST	
4	Interfacial Tension at 27 Degrees C (max)	0.04 N/M	
5	Flash point, pensky – marten (closed) (min)	140 °C	
6	Pour point (max)	10 °C	
7	Neutralisation Value:		
	a) Total acidity (max)	0.01	
	b) In-organic acidity alkalinity	Nil	
8	Corrosive sulphur	Non-corrosive	
9	Electric Strength (breakdown voltage/ minute)		
	a) New unfiltered oil.	50 KV (rms)	
	b) After filteration	50 KV (rms)	
10	Dielectric dissipation factor (Tan delta at 90 Deg. C (min))	0.005	
11	Specific resistance (Resistivity).		
	a) At 90 Deg. C (min)	$30x10^{12}$ ohms- cm	
	b) At 27 Deg. C (min)	$500x10^{12}$ ohms-cm	
12	Oxidation stability		
	a) Neutralisation value after oxidation (max)	0.2 mg KOH/g	
	b) Total sludge after oxidation (max)	0.05% by Weight.	
13	Ageing characteristics after accelerating ageing (open breaker method with copper catalyst) for 96 Hrs.as per ASTM D. 1934-1978)		

	a) Specific resistance (Resistivity)		
	i) At 27 Deg. C (min)	2.5×10^{12} ohms-cm	
	ii) At 90 Deg. C (min)	0.20×10^{12} ohms-cm	
	b) Dielectric dissipation factor Tan delta at 90 Deg. C (max)	0.20	
	c) Total sludge value (max)	0.5	
	d) Total acidity (max)	0.5	
14	Presence of oxidation inhibitor.	Nil	
15	Water content (max)	50 ppm	

THE ABOVE PARTICULARS ARE HEREBY GUARANTEED.

Name of the Firm :

Signature :

Designation :

Date :

SCHEDULE OF BIDS FOR TECHNICAL

(To be submitted along with TECHNICAL BID)

1. Name of tenderer with Office and factory address: Tel.No./Telex No./Fax No.
2. Specification No.
3. Address of Local Office and Tel.No./Telex/Fax No. :
4. Tenderer's Reference No. :
5. Last date and time of submission of Tender :
6. Date and time for opening of Tender :
7. Testing Facilities available :
8. Category of organization :
9. Whether qualifying certificates submitted :
10. Particulars of Earnest Money submitted :
11. Whether NESCO delivery clause accepted :
12. Whether agreed to :
    a) Inspection Clause :
    b) Packing Clause :
    c) Retesting Clause :
13. Whether the material/equipment offered conformed to the relevant ISS specification and drawing.
14. Whether executed orders previously for the items tendered now. Please give full details of supplies made.
15. Whether the product bears ISI mark
16. Offer valid up to :
17. Delivery Schedule :
    a) Commence with minimum quantity :
    b) Rate of delivery per month/quarter : And completion time
18. If any deviation, please mention in deviation Sheet enclosed. :
19. Technical literature/catalogue of the Materials offered enclosed. :
20. Manufacturer's supply experience including user's certificate furnished or not. :
21. Type test certificate from any NABL ACCRIDETED Testing Laboratory, Govt. of India :
23. Whether Guaranteed Technical Data Sheet Particulars submitted.

Signature of Bidder
With Name and Seal of company

(This form is to be duly filled up and duly signed by the Bidder & submitted along with the tender.