TECHNICAL SPECIFICATION FOR 3-PHASE 4-WIRE THREAD THROUGH TYPE COMPOSITE UNIT – BUILT IN CT FULLYSTATIC AMR COMPATIBLE TRI-VECTOR ENERGY METERS SUITABLE UPTO 160KVA DISTRIBUTION TRANSFORMER

1.0 SCOPE

Design, manufacturing, testing, supply and delivery of AC, 3 Phase, 4 Wire, in-built CT operated fully Static and AMR compatible Tri-Vector Energy Meters (Lag only) for measurement of different electrical parameters listed elsewhere in the d o c u m e n t including Active Energy(KWH),Reactive Energy(KVARH),Apparent Energy(KVAH) etc. The detail scope is given below.

2.0 APPLICATION

- On Distribution Transformers (Upto 160 kVA)

3.0 STANDARDSTOWHICH METERS WILL COMPLY

Guidelines on "Data Exchange for Electricity Meter Reading, Tariff and Load Control – Companion Specification" enclosed with this document as annexure.

IEC 62056-21Electricity metering:Data exchange for meter reading,tariff and load control-Part 21:Directlocal data exchange

IEC 62056-31Electricity metering:Data exchange for meter reading, tariff and load control–Part 31:Local Area Network data exchange

IEC 62056-61Electricity metering:Data exchange for meter reading, tariff and load control-Part 61: Object identification system (OBIS)

IS-13779Specification forAC StaticTransformer operated Watt Hour&VAR-Hourmeters (class 1.0 & 2.0S);

IEC 62052-11 Electricity metering equipment (AC) –General requirements, tests and test conditions -Part 11: Metering equipment;

IEC62053-21Electricity metering equipment (AC)–Particular requirements-Part-21:Static Meters for Active Energy(Class 1.0 & 2.0S);

IS-15707 Specificationfor Testing, evaluation, installation & maintenance of AC Electricity Meters-Code of practice
IS 15959 DLMS Indian Companion Standard – Category A for Energy Accounting and Audit Metering
The equipment meeting with the requirements of other authoritative standards, which ensure equal or better quality than the standard mentioned above, also shall be considered; in case of conflict the guidelines on "Data Exchange for electricity meter reading, Tariff and Load Control – Companion Specification" enclosed with this document as annexure shall prevail upon.

4.0 GENERALTECHNICALREQUIREMENTS

1	TYPE	AMR Compatible Static,3 Ph, 4WireTri-Vector Energy Meter (with in-built CT)for DistributionTransformers. CAT – A Type
2	FREQUENCY	50Hz±5%
3	ACCURACYCLASS	Overall composite unit accuracy class 1
4	REFERENCE VOLTAGE	Suitable for operation for 415V ph-ph/ or 240V (Ph-N),
5	VOLTAGE VARIATION RANGE	70% Vref TO 120% Vref
6	BASICCURRENT(Ib)	50 AMPS

7	MAXIMUM CONTINUOUS CURRENT	250 AMPS
8	STARTING CURRENT	0.2% of Ib
9	MAXIMUM SHORTTIME CURRENT	As per IS 13779
10	POWER CONSUMPTION	The active and apparent power consumption, in each voltage circuit, at reference voltage, reference temperature and reference frequency will not exceed 1.5W and 8 VA. The apparent power taken by each current circuit, at basic current, reference frequency and reference temperature will not exceed1.0 VA
11	POWERFACTOR	0.0Lag-Unity- 0.0Lead
12	DESIGN	Meter will be designed with application specific integrated circuit (ASIC) or microcontroller; shall have no moving part; electronic components will be assembled on printed circuit board using surface mounting technology; factory calibration using high accuracy (0.05 class) software based test bench. Assembly of electronic components will be as per ANSI/IPC-A-610 standard.

4.1 The METER SHALL BE SUITABLE FOR SATISFACTORY CONTINUOUS OPERATION UNDER;

a)	Maximum ambient temperature	:	50 °C
b)	Maximum ambient temperature in shade	:	45 °C
c)	Relative Humidity	:	10 to 95%
d)	Maximum annual rainfall	:	1450 mm’
e)	Maximum wind pressure	:	150 Kg/m. sq.
f)	Maximum altitude above mean seal level	:	1000 meters
g)	Isoceraunic level	:	50 days/year
h)	Seismic level (Horizontal acceleration)	:	0.3g

5.0 CONSTRUCTIONAL REQUIREMENT/ METER COVER &SEALINGARRANGEMENT

Wherever polycarbonate cover is specified, it will conform to IS11731 (FH-1category) besides meeting the test requirement of heat deflection test as per ISO75, glow wire test as per the IS:11000(part2/SEC-1)1984OR IECPUB,60695-2-12,Ball pressure test as per IEC-60695-10-2and Flammability Test As per UL94or As per IS11731(Part-2) 1986.

5.1 CONSTRUCTION

The case, winding, voltage circuit, sealing arrangements, registers, terminal block, terminal cover & name plate etc. will be in accordance with the relevant standards. The meter would be compact &reliable in design, easy to transport &immune to vibration & shock involved in the transportation &handling. The construction of the meter would ensure consistence performance under all conditions especially during heavy rains/ very hot weathers. The insulating materials used in the meter would be non-hygroscopic, non-ageing& have tested quality. The meter would be sealed in such a way that the internal parts of the meter becomes inaccessible and attempts to open the meter will result in viable damage to the meter cover. This is to be achieved by using continuous Ultrasonic welding on the Meter body or any other technology which is either equally or more efficacious.

The meter would comply latest technology such as Microcircuit or Application Specific Integrated Circuit(ASIC) to ensure reliable performance. The mounting of the components on the PCB would compulsorily be Surface Mounted Technology(SMT)type. Power supply component will be of PTH type. The electronic components used in the meter would be of high quality and there would be no drift in the accuracy of the meter for at least ten years. The circuitry of the meter would be compatible with 16 Bit (or better) ASIC with compatible processor and meter would be based on Digital measuring and sampling technique.

The meter would be housed in a safe, high grade, unbreakable, fire resistant, UV stabilized, virgin Polycarbonate casing of projection mounting type. The meter cover would be transparent, for easy reading of displayed parameters, and observation of operation indicators. The meter base may or may not be transparent, but it would not be black in colour. The meter casing would not change shape colour, size, and dimensions when subjected to 200hrs.on UV test as per ASTMD53.It would withstand 650deg.C. glow wire test and heat deflection test as per ISO 75.

The meter cover would be sealable to the meter base with at least 2 nos. seals.

The bidder shall submit relevant documents regarding procurement of polycarbonate material. The polycarbonate material of only the following manufacturers shall be used.

a) G.E. Plastics: LEXAN 943A or equivalent for cover & Terminal Cover/LEXAN 503R or equivalent base
b) BAYER: Grade Corresponding to above
c) DOW Chemicals: - Do –
d) MITSUBISHI: - Do –
e) TEJIN: - Do –
f) DUPONT: - Do -

5.2 METER CASEANDCOVER

The meter would have a case, which can be sealed in such a way that the internal parts of the meter are accessible only after breaking the seal and cover. This is achieved by using of Ultrasonic

Welding (Ultrasonically continuously welding or Spot welding in proper places at three sides so that the cover cannot be separated from the basic with out breaking/damaging the case& cover) or any other technology which is either equally or more efficacious. In case, ultrasonic welding using plate/strip is used the materials of plate/strip should be same as that of cover and base and the strip. The manufacturer's logo should be embossed on the strip/plate. The material of the meter body(case and cover)will be of Engineering Plastic.

The meter cover would be fixed to the meter base (case) with Unidirectional Screws/ any other screws, so that the same can not be opened by use of screw drivers. These unidirectional screws should be covered with transparent caps, ultrasonically welded with the meter body and the screw covers should be embedded in the meter body in the groove.

Reliable sealing arrangement should be provided to seal the meter and avoid fiddling or tampering by unauthorized persons. For this, minimum two (2) nos. seals on meter cover and one no. (1) seal on MD reset button shall be provided. All the above seals should be provided on front side only. Rear side sealing arrangement will not be preferred.

The meter will withstand external magnetic influence as per latest amendments of CBIP Technical Report No. 304.

5.3 TERMINAL COVER:

The terminal cover will be transparent re-inforced Polycarbonate, Engineering Plastic with minimum thickness 2.0 mm and the terminal cover will be of extended type completely covering the terminal block and fixing holes.

5.4 CONSTRUCTIONAL REQUIRMENT OF TERMINAL BLOCK:

A) The meter shall have provision in such a way that secondary cable of distribution transformer shall be directly passed through the meter for measurement. A set of piercing screws shall be used in the meter for voltage connection.

B) The meter shall be suitable to accommodate aluminum cable up to 185 mm^2 for a 250A current carrying capacity

C) The meter connection arrangement should be such that so there is no need to remove insulation for connecting cable for current measurement.

Design should support thread through concept where connecting cable directly passed through the meter for measurement.

D) As the cable directly passed through the meter, the offered meter should not have provision for meter terminal connection as well as terminal block similar to conventional meters. This shall help in reducing the meter circuit tampers

6.0 WORKINGENVIRONMENT

As per IS 13779-1999 (reaffirmed 2004).Meter to perform satisfactorily under Non-Air Conditioned environment (within stipulations of IS).

Meter body will conform to IP54 degree of protection. The meter will be suitable designed for satisfactory operation under the hot and hazardous tropical climate conditions and will be dust and vermin proof. All the parts and surface, which are subject to corrosion, will either be made of such material or will be provided with such protective finish, which provided suitable protection to them from any injurious effect of excessive humidity.

7.0 MANUFACTURINGPROCESS, ASSEMBLY AND TESTING

Meters will be manufactured using latest and state of the art technology and methods prevalent in

electronics industry. The meter will be made from high accuracy and reliable surface mount technology (SMT) components. All inward flow of major components and sub assembly parts(CT, RTCs / Crystal, LCDs, LEDs, power circuit electronic components
etc.) will have batch and source identification. Multi-layer PCB assembly with PTH (Plated through Hole) using surface mounted component will have adequate track clearance for power circuits. SMT component will be assembled using automatic pick-and-place machines, Reflow Soldering oven,for stabilized setting of the components on PCB. For soldered PCBs, cleaning and washing of cards, after wave soldering process is to be carried out as a standard practice. Assembly line of the manufacturing system will have provision for testing of sub-assembled cards. Manual placing of components and soldering, will be minimized to items, which can not be handled by automatic machine. Handling of PCB with ICs/C-MOS components, to be restricted to bare minimum and precautions to prevent ESD failure to be provided. Complete assembled and soldered PCB would undergo functional testing using computerized Automatic Test Equipment.

Fully assembled and finished meter will undergo burn-in test process on sample basis for 24 Hours at 55 degree Celsius (Max. temperature not to exceed 60degreeCelsius)under base current(Ib) load condition.

Test points would be provided to check the performance of each block/stage of the meter circuitry.

RTC will be synchronized with NPL time at the time of manufacture. Meters testing at intermediate and final stage will be carried out with testing instruments, duly calibrated with reference standard, with traceability of source and date.

8.0 DISPLAYS

The meter will have 7 digits (with suitable indication),parameter identifier, backlit Liquid Crystal Display (LCD)of minimum 10mm height, wide viewing angle. Dot-matrix type LCD displays shall not be acceptable. Auto display cycling push button required with persistence time of 10 Seconds.LCD will be suitable for temperature withstand of $70\pm5^{0}C$; Sequence of display of various instantaneous electrical parameters will be as desired by Purchaser at the time of order.

The data stored in the meters will not be lost in the event of power failure. The meter will have Non Volatile Memory (NVM), which does not need any battery backup. The NVM will have a minimum retention period of10 years.

9.0 PERFORMANCE UNDER INFLUENCE QUANTITIES

The meters performance under influence quantities will be governed by IS13779-1999 (reaffirmed2004).The accuracy of meter will not exceed the permissible limits of accuracy as per standard IS: 13779 (latest version).

10.0 OUTPUT DEVICE

Energy Meter will have test output, accessible from the front, and be capable of being monitored with suitable testing equipment while in operation at site. The operation indicator must be visible from the front and test output device will be provided in the form of LED. Resolution of the test output device will be sufficient to enable the starting current test in less than10minutes.

11.0 REAL TIME INTERNAL CLOCK (RTC)

RTC will be pre-programmed for 30 Years Day/date with out any necessity for correction. The maximum drift will not exceed ± 300Secondsper year.

The clock day/date setting and synchronization will only be possible through password/Key code command from one of the following:

a) Hand Held Unit (HHU) or Meter testing work bench and this will need password enabling for meter;
b) From remote server through suitable communication network or Sub-station data logger PC.

12.0 QUANTITIES TOBE MEASURED &DISPLAYED

The meter will be capable of measuring and displaying the following electrical quantities within specified accuracy limits for poly-phase balanced or unbalanced loads:

a. Instantaneous Parameters such as phase and line voltages, currents, power factors, overall kVA, kW, kVAr, power factor, frequency etc as per details given in the table 22 of IS 15959 : 2011

b. Block Load Profile Parameters such as kVAh, kWh, kVArh (lag, lead), phase voltages, currents etc as per details given in the table 23 of IS 15959:2011

In addition to above, the meter will also record the Nameplate details as per Table 30 of IS 15959:2011programmable parameters (readable as profile), occurrence and restoration of tamper events along with the parameters (Table32,33,34,35,36 & 37 respectively of IS 15959:2011)

As reference of above, here given some examples;

The meter shall be able to provide the following data in line with Category 'A' type as per IS 15959 - Indian Companion Specification.

a) Instantaneous Parameters
b) Block Profile / Load Survey data
c) Abstract quantities
   • Name Plate Details
   • Programmable parameters
d) Event Conditions

The meter shall be able to measure and provide the parameters listed in the guideline document. The OBIS code for each parameter shall be as identified as per DLMS /COSEM protocol in line with Indian companion standard.

The display parameters that can be provided with the CAT A meter are showing in Table - 1
Where Meter should support parameters as mentioned in IS-15959 for Category "A".
In addition to providing serial number of the meter on the display plate, the meter serial number shall also be programmed into meter memory for identification through CMRI/meter reading print out.

Following parameters shall be made available for last 60 days with integration period of 15 min for load survey;

- Current, Ir
- Current, Iy
- Current, Ib
- Voltage ,V Rn
- Voltage ,V Yn
- Voltage ,V Bn
- Active forwarded Energy
- Reactive lag forwarded energy
- Reactive lead forwarded energy
- Apparent Energy

These load survey can be retrieved with the help of Meter Reading Instrument on local interrogation or remotely using the remote communication interface.

It shall be possible to select either demand or energy view at the BCS end. The above load survey data should be available in the form of bar charts as well as in spreadsheets. The BCS shall have the facility to give complete load survey data both in numeric and graphic form.

The load survey data, abnormality event information and instantaneous parameters data shall all be retrievable through the meter's communication port from a common meter reading instrument (CMRI)/ Hand Held Unit and shall be transferred (downloaded) to a PC with Windows based software to get complete details in numerical and/or graphic form. The necessary base computer software (BCS) for this purpose shall be provided by the supplier with complete details.

The meter shall have sufficient non-volatile memory for recording history of energy parameters for last twelve billing cycles (Bill date shall be 00 hrs of the 1st date of the calendar month by default – programmable) and information should be made available at the BCS end.

12.1 Measurement of Harmonics

The meter would be capable of measuring fundamental energy as well harmonic energy i.e. total energy. Total energy will be made available on meter- display and the same only will be used for billing purpose.

The total energy will be logged in the meter memory and be capable of downloading to the BCS through the Modem/HHU and be available for viewing at the BCS end.

13.0 DEMAND INTEGRATION PERIOD

Considering 15 min I.P.

1. TIME OF DAY (TOD) TARIFF / DEMAND

The meter should be capable of registering the time-of- day energy and maximum demand. It shall be possible to define TOD register for active forwarded, reactive lag and apparent forwarded energy type.

The meter should have in-built capacity to define up to eight (8) time zones through operation of CMRI .The change of the TOD time-period(s) or changing number of TOD zones should be possible through CMRI with special authenticated command from the BCS so that only authorized person(s) can make such changes. The main control of this system along with proper security password/code should be available on one or more computers located at the authorized location(s) as per the directions to be given by the Purchaser.

14.0 MD RESET

It would be possible to reset MD by any of the following options:

- Remote MD reset
- Local MD Reset for manually triggered at site.
- MD reset by HHU through Authenticated command.

15.0 MARKINGOFMETERS

The marking of meters will be in accordance with IS: 13779/1999 (reaffirmed2004).
The meter will also store name plate details as stated in clause no.12.0.These will be readable as a profile as and when required.

16.0 COMMUNICATION CAPABILITY

The meter will be provided with two ports for communication of the measured/collected data as per document stated below;

Local communication port:

The energy meter shall have a galvanically isolated IEC 1107 optical communication port located in front of the meter for data transfer to or from a hand held Data Collection Device. The sealing provision should be available for optical port.

Remote Communication Mode for data retrieval from meter:

For remote meter reading, compatible GSM/GPRS modem and suitable accessories shall be provided for automatic and remote data transfer from energy meters installed at the consumer premises. The GSM/GPRS modem shall be an integral part of the meter. The modem shall be accessible only after opening the front cover of the meter.

For placing the SIM Card, a SIM Card Holder shall be provided and shall be accessible by removing the terminal cover. A data enabled SIM card shall be procured by purchaser (Separately from the Service Provider) for the location where the meter & GSM/GPRS modem is to be fitted.

Both ports will support the default and minimum baud rate of 9600 bps.

17.0 HAND HELD UNIT(HHU)

To enable local reading of meters data a DLMS compliant HHU will be used. The HHU will be as per specification given in the enclosed guidelines document. It will be compatible to the DLMS compliant energy meters that are to be procured/supplied on the basis of this specification.

18.0TAMPER & FRAUD MONITORING FEATURES

The meter will work satisfactorily under presence of various influencing conditions like External Magnetic Field, Electromagnetic Field, Radio Frequency Interference, Vibrations, harmonic Distortion, Voltage/Frequency Fluctuations, and electromagnetic High Frequency Fields etc. The meter will be immune to abnormal voltage/frequency generating devices and will record the occurrence and restoration of such tamper events along with parameters such as current, voltages, kWh, power factor, event code, date & time etc.(as stated in clause no: 12.0)

Tamper details will be stored in internal memory for retrieval by authorized personnel through either of the following:

i) HHU.
ii) Remote access through suitable communication network.

Minimum 300 numbers of events (occurrences & restoration with date & time) would be available in the meter memory.

Properly designed meter event logic should be provided. There shall be preferably separate compartments for logging of one or more related events for convenience in analyzing the event data. The bidder should explain the events details in each compartment under their offer.

The logging of various events in each compartment should be such once one or more compartments have become full, the last event pertaining to the same compartment will be entered and the earliest (first one)-event should disappear (FIFO Basis). Thus, in this manner each succeeding event will replace the earliest recorded event, compartment wise. Events of one compartment/category should overwrite the events of their own compartment/category only.

19.0 TYPETESTS

The meter offered should have successfully passed all type tests described in IS 14697 /13779 and the Meter Data Transfer and Communication capability as per enclosed guidelines document. Type Test certificate shall be submitted along with the offer and the same shall not be more than 36 months old at the time of bid submission. Make & type of major components used in the type-tested meter shall be indicated in the QAP. The bidders shall have to submit the required type test certificate along with tested energy meters (as per bid requirement) to the purchaser (utility) at the time of meters delivery.

Further the purchaser shall reserve the right to pick up energy meters at random from the lots offered and get the meters tested at third party lab i.e. CPRI/agencies listed at Appendix C of CBIP 304/NPL/CQAL/ERTL/ERDA at the sole discretion of the purchaser. The supplier has no right to contest the test results of the third party lab or for additional test and has to replace/take corrective action at the cost of supplier.

It shall be the responsibility of the supplier to arrange such tests and purchaser shall be informed of the date and time of conduction of tests well in advance to enable him to witness such tests. Test charges of the testing authority, for such successful repeat type tests, shall be reimbursed at actual by the purchaser.

Manufacturers shall have to submit a certificate conforming that as the basic design of the meter as per IEC 62056 protocol & DLMS compliant has not been changed & only firmware has been modified, no fresh type test for such type of meters is required.

Conformity test certificates with DLMS logo issued by CPRI, Bangalore i.r.o. additional features/tests should be submitted with the bid as per guideline of CEA dt. 25.01.2010.

20.0 ACCEPTANCE&ROUTINE TESTS

Criteria for selection for such tests and performance requirements will be as per IS13779-1999 (reaffirmed2004)

Additional acceptance will include Surge withstand (SWC) for 6kV as per IEC62052-11, Lightning impulse and HF disturbance as per IS 13779.One sample meter per order from one of the offered lot will be subjected to these specified tests. Meters subjected to these tests will not be used after tests.

Accuracy tests will be performed at the beginning and at the end of the acceptance tests specified.

20.1 INSPECTION

The inspection will be carried out at any stage of manufacture, by the WBSEDCL's authorized representatives, with 15 days prior intimation to the supplier. We will grant all reasonable facilities free of charge for inspection and testing to satisfy the purchaser that the materials to be supplied are in accordance with our offer.

The representative/Engineer of the WBSEDCL attending the above testing will carry out testing as per relevant standards and issue test certificate approval to us and give clearance for dispatch.

21.0 QUALITYASSURANCE

The manufacturers shall have a comprehensive quality assurance program at all stages of manufacture for ensuring products giving reliable, trouble free performance. Details of the bidders quality assurance and test setup shall be furnished with the bid. A detailed quality assurance program shall be finalized with the successful bidder during the award stage. Bidder shall furnish following information along with the bid:

i) Organization structure of the manufacturer and his main suppliers (PCBs, SMT cards, CT/PT) with details of QA setup, overall workflow
ii) Copy of system manual showing QAP (Quality Assurance Plan) as actually practiced during manufacturing and final testing
iii) List of raw materials and critical components (ASIC Chip, crystal clock, memory register Chip, transformers, optical ports etc.) with their suppliers
iv) Stage inspection of product before final testing
v) Procedure adopted for In-situ testing of PCBs, after replacement of surface mounted component, for quantitative parametric variation of tolerance by self or sub-contractor.
vi) Testing and calibration facility, date of calibration of test bench, manpower data of bench operators;
vii) Sample copies of test certificate of brought out components

22.0 QUALIFYINGREQUIREMENTS

i) The bidder shall be a manufacturer
ii) He should have all the facility in his works for design, assembly, quality assurance, burn-in test (Fully assembled energy meter), testing (all routine and acceptance tests), automatic calibration of energy meter on software based test bench, qualified team of technical and software engineers
iii) The average annual turnover of the manufacturer for energy meters for the three (3) best financial years out of last five (5) years, should be at least 60 crores
iv) Notwithstanding anything stated herein under, the purchaser reserves the right to assess the capacity and capability of the bidder to execute the work, should the circumstances warrant such assessment in the overall interest of the purchaser.

23.0 GUARANTEE

Equipment shall be guaranteed for a period of 66 months from the date of supply or 60 months from the date of installation, whichever ends later. Bidders shall guarantee to repair or replace the meters and meter boxes (if supplied), which are found to be defective/inoperative at the time of installation, or become inoperative/defective during guarantee period. Replacements shall be effected within 1 month from the date of intimation.

The bidder shall extend the guarantee period for another 5 years for the replaced meters. However the backup guarantee period provided by bidders shall be valid for 2 years only.

24.0 FIXING ARRANGEMENT

Meter shall be suitable for mounting on the support of Distribution transformer structure

25.0 SUPPLY OF POWER PACK &HHU

For every 100 meters and part there of one power pack unit for external use (not applicable for separate internal battery backup unit) and one HHU of 8MB RAM size (Dos Base) would be

supplied free of cost. Power pack unit & HHU shall be guaranteed for a period of 66 months from the date of supply. Bidders shall guarantee to repair or replace Power pack unit & HHU (if supplied), which are found to be defective/inoperative at the time of installation or become inoperative or defective during guarantee period. Replacements shall be effected within 1 month from the date of intimation.

26.0 SUBMISSIONOF SAMPLE &DOCUMENTS

Tender paper will be submitted to the Office of the Material Controller, WBSEDCL, BidyutBhawan, 4th floor, Block – B& D, Salt lake, Kolkata 91, on any working day, from 1100 Hrs to 1600 Hrs on week days and from 1100 Hrs to 1200 Hrs on Saturday within the specified period of submission of the tender document for which he will be given a receipt by the Office of The Material Controller.

The bidder shall submit his sample meters in sealed casing/cartoon along with relevant documents as per Schedule – D on any working day from 1100 Hrs to 1600 Hrs on week days and from 1100 Hrs to 1200 Hrs on Saturday within the specified period of submission of the tender documents latest by 1300 Hrs on the last day of submission of bid to the office of the Chief Engineer (DTD), Abhikshan, Sector V, Salt Lake, Kolkata 91.

The bidder will be given a receipt jointly signed by the bidder and DTD officials, mentioning the samples and papers submitted by the bidder as per check list.

a) While submitting the samples and required documents as per Schedule D, the bidder has to submit two numbers of sealed meters as per the specifications stated herein before, without the welding of the meter base and cover and body screw caps.
b) They should also submit one prototype of meter base and cover (with body screw caps) properly welded.
c) The date of testing of sample meters will be intimated to the bidders by CE(DTD) and on the date of testing of sample meters of a particular bidder, he shall come prepared with the following:
    - BCS (as per specification)
    - HHU compatible with BCS and loaded with HHU software and laptop compatible with BCS
    - Any other accessories required for observing the performance and capabilities of the meters
    - Operating/Threshold value at which the meter will record energy as per specified limits of errors and also logic at which meter log tamper at different tamper conditions
    - Power Pack Unit (if required)

During such testing other bidders will also be allowed to witness the testing.

27.0 DOCUMENTATION

Sets of operating manuals will be supplied to the office of the CE (DTD) and to different consignees at the time of delivery of meters.

One set of routine test certificates will accompany each dispatch consignment.

28.0 PACKING & FORWARDING

The equipment shall be packed in cartons/crates suitable for vertical/horizontal transport as the case may be, and suitable to withstand handling during transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit, due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbol. Wherever necessary, proper arrangement for lifting, such as lifting hooks etc. will be provided. Supplier without any extra cost shall supply any material found short inside the packing cases immediately.

The packing shall be done as per the standard practice as mentioned in IS 15707:2006. Each package shall clearly indicate the marking details (for e.g. manufacturer's name, sl. Nos. of meters in the package, quantity of meter, and other details as per supply order). However, he should ensure the packing is such that, the material should not get damaged during transit by Rail/Road.

SCHEDULES:
The bidder shall submit the following schedules, which is part and parcel of the specification.

Schedule A	Guaranteed Technical Particulars (As per enclosed standard format)
Schedule B	List of Raw Materials (as per enclosed standard format)
Schedule C	Pre qualifying conditions
Schedule D	List of documents to be submitted during sample submission
Schedule E	Deviations from Specified Standards (as per standard format of the bidder)
Schedule F	Deviations from specified test requirements (as per standard format of the bidder)
Schedule G	Deviations from Technical Specifications (As per annexure – IV – Deviation sheet of GCC)
Schedule H	Bidders experience (as per standard format of the bidder and also copies of orders executed along with GTP of the supplied meters)

Table - 1
Display Parameters as per following sequence of CAT-A
For AUTO MODE

Serial No.	Item	OBIS Code
1.	LCD	**All OBIS code will be as per IS:15959**
2.	Meter Serial Number	
3.	Real Time	
4.	Date	
5.	Raising demand (active) with elapsed time	
6.	Raising demand (apparent) with elapsed time	
7.	Active power	
8.	Reactive power	
9.	Apparent power	
10.	Cumulative active energy	
11.	Cumulative reactive energy (lag)	
12.	Cumulative reactive energy (lead)	
13.	Cumulative apparent energy	
14.	Maximum demand in kW	
15.	Maximum demand in kVA	
16.	Cumulative Billing Count	
17.	Cumulative tamper Count	
For MANUAL MODE		
1.	LCD	**All OBIS code will be as per IS:15959**
2.	Meter Serial Number	
3.	Real Time	
4.	Date	
5.	Raising demand (active) with elapsed time	
6.	Raising demand (apparent) with elapsed time	
7.	Active power	
8.	Reactive power	
9.	Apparent power	
10.	Cumulative active energy	
11.	Cumulative reactive energy (lag)	
12.	Cumulative reactive energy (lead)	
13.	Cumulative apparent energy	
14.	Maximum demand in kW	
15.	Maximum demand in kVA	
16.	Cumulative Billing Count	
17.	Cumulative tamper Count	
18.	Instantaneous voltage ($V_{RN,}$ V_{YN}, V_{BN})	
19.	Instantaneous Current (I_R, I_Y, I_B)	
20.	Signed Power factor Phase wise	
21.	Average Power factor	
22.	Frequency	
23.	TOD wise kW (Zone-1, 2 & 3)	
24.	TOD wise kVA (Zone-1, 2 & 3)	
25.	TOD wise kWh (Zone-1, 2 & 3)	
26.	TOD wise kVAh (Zone-1, 2 & 3)	
27.	High resolution Active forward energy	
28.	High Resolution Reactive (lag) Forward energy	
29.	High Resolution Reactive (lead) Forward energy	

30.	High Resolution apparent Forward energy	
31.	Cumulative Maximum demand in kW	
32.	Cumulative Maximum demand in kVA	
33.	Cumulative power failure count	
34.	Cumulative power failure duration	
35.	Phase sequence	
36.	First tamper occurrence status with date & time	
37.	Last tamper occurrence status with date & time	
38.	Last tamper restoration status with date & time	
39.	Cumulative programme count	
40.	Self diagnosis	
41.	Connection check	

SCHEDULE- A

GUARANTEEDTECHNICAL PARTICULARS

Sl.No.	Description	To be specified by Manufacturer
1	Maker's name and country	
2	Type of meter/model	
3	Standards Applicable	
4	Accuracy/Interface class	
5	Parameters displayed	
6	P.F.Range	
7	Basic Current (Ib) (50A)	
8	Maximum Current (Imax)	
9	Minimum starting current	
10	Rated Voltage	
11	Meter constant	
12	Variation of voltageat which meter functions normally	
13	Rated Frequency	
14	Power Loss in Voltage circuit (VA & watt) & Current circuits (VA)	
15	Dynamic range	
16	MD reset Provisions	
17	Display :	
	a) Type of Register	
	b) No. of digits of display and height of character	
	c) Auto display mode & scroll mode	
	d) Type of push button for scroll mode	
18	Non volatile memory	
19	Details of provision for taking reading during power off condition	
20	Principle of operation	
21	MD Integration period	
22	Weight of meter	
23	Dimensions	
24	Warranty	
25	Outline drawings & Leaflets	
26	a) Remote meter-readout facility	
	b) Communication protocol used.	
	c) Sealing provision for meter & optical port.	
	d) Baud rate of data transmission	
	e) Required software to be resident in HHU and BCS.	
	f) Ultrasonic welding of body	
	g) Manufacturers Seal provided	
27	Base Computer Software	
28	Type Test Certificates	
29	Time of Day Zones (Selectable)	
30	Whether meter measures both fundamental & Harmonic Energy	
31	Real Time Clock Accuracy	
32	Battery for Real Time Clock	
33	Anti Tamper Features	
34	Effect of accuracy under tamper conditions	

35	Drift in accuracy of measurement with time	
36	Name plate details	
37	Type of calibration	
38	Type of mounting	
39	Testing facility	
40	Data retention by NVM without battery back up and un-powered condition	
41	Type of material used	
42	Base	
43	Cover	
44	Terminal Block	
45	Terminal cover	
46	Screw	
	(i) Material	
	(ii) Size	
47	Internal diameter of Terminal Hole	
48	Centre to Centre clearances between adjacent terminals	
49	Security Profiles	
	a) Basic Security	
	b) Advance Security	
50	Past experience	

SCHEDULE- B

LIST OF RAW MATERIALS & CRITICAL COMPONENTS

S.No.	Component	Makes and Origin.
1.	Current Element.	The current transformer /shunt should withstand for D.C. Immunity test.
2.	Measurement / computing chips.	USA: Texas Instrument, Atmel, Analog Devices, Maxim (Teridian), Freescale, Cyrus Logic, AMS, Agilent. Japan: Renesas, NEC. Holland: Philips
3.	MemoryChips. .	USA: Atmel, National Semiconductors, Microchip, Texas Instruments, Maxim(Teridian),ST. Japan: Renesas (Hitachi or Oki). Holland / Korea: Philips.
4.	Display modules.	Sinqapore :BonafiedTechnologies Korea : Advantek Japan/Taiwan: Renesas(Hitachi), Sony, Haijing, Tianma USA: Truly semiconductors, HP. Components would be trans- reflective STN type industrial grade with extended temperature range.
5.	Communication modules	USA: National Semiconductors, HP, ST, Teridian(Maxim),Freescale,Fairchild, Texas Instrument,Avago,Agilent. Holland/Korea:Philips Japan:Ligitek, Renesas (Hitachi), NEC. Germany:Siemens Taiwan:Everlight,Tianma Details as per clause 13.9 of the technical offer.
6.	Optical port	USA: National Semiconductors, HP, Avago, Agilent, Texas Instrument. Holland/Korea: Philips Japan: Renesas(Hitachi) Taiwan: Ligitek, Osram, Everlight. Germany: Siemens.
7.	Power supply	Power integration
8.	Electronic Components:	USA: National Semiconductors, Atmel, Texas Instruments, ST, Onsemi, Fairchild Japan: Renesas(Hitachi), Oki, Ligitec, Toshiba, Rohm, Murata, EPCOS. Korea: Samsung, Phillips. Germany: Siemens.
9.	Mechanical parts	Complied
10.	Battery	Japan: Varta, Mitsubishi, Panasonic,

		Sanyo, Maxell, Switzerland: Renata. USA: Tediran, Duracell, Elegance. UK: Tekcell.
11.	RTC & Micro controller,	USA: Maxim(Teridian),Dallas Atmel, Motorola, Microchip, Freescale, Texas Instrument, ST Japan: NEC or Oki, Renesas(Hitachi), Mitsubishi, Epson, Xicor Holland / Korea: Phillips.