**Ref. No.: CC-CS/TWT/Amend–7** **Date: 17.06.2022**

**<< TO ALL THE BIDDERS THROUGH PORTAL>>**

**Sub: Package for procurement of Smart Meters including associated Communication Infrastructure, Head End System (HES), Meter Data Management system (MDM) for implementation of Advanced Metering Infrastructure Project(s) in Central & Western India; Specification No.: RTN1001566/OTHERS/DOM/A02; GeM Bid Number: GEM/2022/B/2006757 dated 08.03.2022**

***...Reg. Amendment No. 7 to the Bidding Documents***

Dear Sir(s),

1.0 This has reference to the bidding documents for the subject package uploaded on Government e-Marketplace (GeM) Portal [GeM Bid No. GEM/2022/B/2006757 dated 08.03.2022] and subsequently issued Corrigendum/Amendments/Clarifications.

2.0 **Amendment No. 7** to the bidding documents enclosed herewith are uploaded on the GeM Portal.

3.0 Save and Except for the changes brought-out in the above-mentioned amendments, all other terms and conditions of the original bidding documents shall remain unaltered.

Thanking you,

**For and On behalf of**
**Power Grid Corporation of India Limited**

6/17/2022

X Aakash Khandelwal

Aakash Khandelwal
Manager (CS)
Signed by: AAKASH KHANDELWAL

**Encl: As above**

**Amendment No.-7 (Technical Part) dated 17/06/2022 to the Bidding Documents for Package for procurement of Smart Meters including associated Communication Infrastructure, Head End System (HES), Meter Data Management system (MDM) for implementation of Advanced Metering Infrastructure Project(s) in Central & Western India; Specification No.: RTN1001566/OTHERS/DOM/A02; GeM Bid Number: GEM/2022/B/2006757 dated 08.03.2022**

| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| 1. | Volume-II-Technical Specifications, Section-1, Clause 2.A.i. a. | i. Supply, installation, integration, testing and commissioning of following as technical specification in the tender document:<br><br>a. Smart pre-paid metering | **i**. Supply, installation, integration, testing and commissioning of following as technical specification in the tender document<br><br>a. Smart pre-paid metering **along with Smart meter box and service cable for consumers, DTs and Feeders.** |
| 2. | Volume-II-Technical Specifications, Section-1, Clause 2.A. viii, ix & x | [No clause] | viii. Laying of service cable from LT line to meter and from Meter to consumer premises, removal of existing cable, if required, connection, taping, laying and termination of DT cables (i.e. on LT side), wherever applicable. Material, tools and other accessories (not covered in BoQ) required for dismantling, civil work and installation of the new, shall also be in the scope of contractor.<br>ix. Installation of Cabinet boxes with requisite cabling wherever applicable<br>x. Other activities as below to be carried out to ensure successful installation and commissioning:<br>a. Dismantling of existing meter boxes and other scrapped service cables from site and erection and commissioning of service cable and meter boxes along with necessary items like CTs, lugs etc. as per the guidelines of the Utility. The installation work of meter boxes, cables etc. should be carried out as per the safety guidelines of the Utility, while meeting all requisite quality standards. For Service cable provided by Utility/Employer (if any), the laying/installation/termination of such service cable along with all required accessories including suitable lugs etc., shall be in the scope of contractor with no additional cost.<br><br>**b.** All the associated necessary civil work for dismantling existing structures / equipment and to put in place the new structures / equipment, shall be |

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<table>
<tr><th>S. No.</th><th>Clause Ref.</th><th>Existing Provision</th><th>Amended Provision</th></tr>
<tr><td></td><td></td><td></td><td>carried by the Contractor.</td></tr>
<tr><td>3.</td><td>Volume-II-Technical Specifications, Section-1, Clause 3. h) (Specific Exclusions)</td><td>h) As such, Service cable including electrical neutral connectivity to the transformer, wherever applicable is excluded from Scope of the contractor. Same shall be provided by Utility and laid by the contractor without any extra cost.</td><td>Deleted</td></tr>
<tr><td>4.</td><td>Volume II, Technical Specifications, Section 2, Clause 2.1 (Applicable Standards)-15,16</td><td>[No Clause]</td><td>
<table>
<tr><th>S.No.</th><th>Standard No.</th><th>Title</th></tr>
<tr><td>15</td><td>IS 13779 with latest amendments</td><td>AC Static Watt-hour Meter class 1& 2</td></tr>
<tr><td>16</td><td>IS 15884 with latest amendments</td><td>Alternating Current Direct Connected Static Prepayment Meters for Active Energy (Class 1 and 2)- Specification</td></tr>
</table>
</td></tr>
<tr><td>5.</td><td>Volume II, Technical Specifications, Section 2, Clause 3.6</td><td>3.6 Data display facility (auto/manual)<br>As per IS 16444. However minimum requirement should include the following:<br>Data Display shall be in two modes-<br>1. Auto Scroll<br>2. Scroll with Push Button<br><br>The display parameters shall be:<br>▪ Auto Scroll<br>• Display Check<br>• Date and Time</td><td>3.6 Data display facility (auto/manual)<br>As per IS 16444. However minimum requirement should include the following:<br>Data Display shall be in two modes-<br>1. Auto Scroll<br>2. Scroll with Push Button<br><br>The display parameters shall be:<br>▪ Auto Scroll<br>• Display Check<br>• Date and Time<br>• Last Recharge Amount</td></tr>
</table>

**Amendment No.-7 (Technical Part) dated 17/06/2022 to the Bidding Documents for Package for procurement of Smart Meters including associated Communication Infrastructure, Head End System (HES), Meter Data Management system (MDM) for implementation of Advanced Metering Infrastructure Project(s) in Central & Western India; Specification No.: RTN1001566/OTHERS/DOM/A02; GeM Bid Number: GEM/2022/B/2006757 dated 08.03.2022**

| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | | • Last Recharge Amount<br>• Last Recharge Time<br>• Current Balance Amount<br>• Cumulative Active Energy kWh with legend.<br>• Current calendar month MD in kW with legend.<br>• Instantaneous voltage<br>• Instantaneous Phase current<br>• Instantaneous Load kW<br>• Instantaneous average Power Factor<br>• Total amount at last recharge | • Last Recharge Time<br>• Current Balance Amount<br>• Cumulative Active Energy kWh with legend.<br>• Current calendar month MD in kW with legend.<br>• Instantaneous voltage<br>• Instantaneous Phase current<br>• Instantaneous Load kW<br>• Instantaneous average Power Factor<br>• Total amount at last recharge<br>• **Current Balance Time** |
| 6. | Volume II, Technical Specifications, Section 2, Clause 3.6 | ▪ **Scroll with Push-button: -**<br>All Parameters mentioned under Auto-Scroll mode should be displayed. Additionally, the following Parameters shall also be displayed:<br>• Internal diagnostics (display check)<br>• Meter Serial No.<br>• Last month cumulative kWh with legends<br>• Last month MD in kW with legends<br>• Current month Average Power Factor<br>• Last month Average Power Factor | ▪ **Scroll with Push-button: -**<br>All Parameters mentioned under Auto-Scroll mode should be displayed. Additionally, the following Parameters shall also be displayed:<br>• Internal diagnostics (display check)<br>• Meter Serial No.<br>• Last month cumulative kWh with legends<br>• Last month MD in kW with legends<br>• Current month Average Power Factor<br>• Last month Average Power Factor<br>• **Cumulative Energy in kVArh Lag/ Lead with legend**<br>• **Cumulative Active Energy kWh ToD wise with legends.**<br>• **Cumulative Apparent Energy kVAh ToD wise with legends.** |

**Amendment No.-7 (Technical Part) dated 17/06/2022 to the Bidding Documents for Package for procurement of Smart Meters including associated Communication Infrastructure, Head End System (HES), Meter Data Management system (MDM) for implementation of Advanced Metering Infrastructure Project(s) in Central & Western India; Specification No.: RTN1001566/OTHERS/DOM/A02; GeM Bid Number: GEM/2022/B/2006757 dated 08.03.2022**

| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | | | • **Current month MD in kVAh with legends**<br>• **Last month cumulative kVAh with legends** |
| 7. | Volume II, Technical Specifications, Section 2, Clause 3.6 | ▪ **Scroll with Push-button**<br>……..<br>Further, the Meter should display high resolution energy values with resolution of **2** digits before decimal and **3** digits after decimal in push button mode | ▪ **Scroll with Push-button**<br>……..<br>Further, the Meter should display high resolution energy values with resolution of **3** digits before decimal and **2** digits after decimal in push button mode. |
| 8. | Volume II, Technical Specifications, Section 2, Clause 4.6 | **4.6 Data display facility (auto/manual)**<br>As per IS 16444. However minimum requirement should include the following:<br>Data Display shall be in two modes-<br>1. Auto Scroll<br>2. Scroll with Push Button<br><br>The display parameters shall be:<br>▪ Auto Scroll<br>• Display Check<br>• Date and Time<br>• Last Recharge Amount<br>• Last Recharge Time<br>• Current Balance Amount<br>• Cumulative Active Energy kWh with legend.<br>• Cumulative Apparent Energy | **4.6 Data display facility (auto/manual)**<br>As per IS 16444. However minimum requirement should include the following:<br>Data Display shall be in two modes-<br>1. Auto Scroll<br>2. Scroll with Push Button<br><br>The display parameters shall be:<br>▪ Auto Scroll<br>• Display Check<br>• Date and Time<br>• Last Recharge Amount<br>• Last Recharge Time<br>• Current Balance Amount<br>• Cumulative Active Energy kWh with legend.<br>• Cumulative Apparent Energy kVAh with legend.<br>• Current month MD in kW with legend.<br>• Current month average Power Factor |

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| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | | kVAh with legend.<br>• Current month MD in kW with legend.<br>• Current month average Power Factor<br>• Instantaneous voltage VRN<br>• Instantaneous voltage VYN<br>• Instantaneous voltage VBN<br>• Instantaneous current IR<br>• Instantaneous current IY<br>• Instantaneous current IB<br>• Instantaneous current IN<br>• Instantaneous Load kW and kVA<br>• Instantaneous average Power Factor<br>• Total amount at last recharge | • Instantaneous voltage VRN<br>• Instantaneous voltage VYN<br>• Instantaneous voltage VBN<br>• Instantaneous current IR<br>• Instantaneous current IY<br>• Instantaneous current IB<br>• Instantaneous current IN<br>• Instantaneous Load kW and kVA<br>• Instantaneous average Power Factor<br>• Total amount at last recharge<br>• **Current Balance Time** |
| 9. | Volume II, Technical Specifications, Section 2, Clause 5.4 (Other Specifications) | [No Clause] | **Digital Input (DI):** The Smart meter should have the provision of sensing digital inputs via DI (Digital Input) port provided at the terminal block. The smart meter should register the digital input(s) sensed, upon reaching respective threshold (configurable) and the event shall be communicated to HES. The OBIS code required for this shall be provided during detailed engineering. The requisite power supply requirement (AC to DC auxiliary supply/ charger) for the DI should be made internal to the smart meter itself. In case the same is not feasible to be provided, bidder should provide external power supply with following specifications. a) Input voltage: 63.5V AC b) Operating voltage: 12V DC c) Contact Rating: 5A Continuous @30V DC, 25A for 3 sec No. of DIs - 04 Nos. DI for 4V(DC), 10 mA |

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| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| 10. | Volume II, Technical Specifications, Section 2, Clause 6.4 (Other Specifications) | [No Clause] | **Digital Input (DI):** The Smart meter should have the provision of sensing digital inputs via DI (Digital Input) port provided at the terminal block. The smart meter should register the digital input(s) sensed, upon reaching respective threshold (configurable) and the event shall be communicated to HES. The OBIS code required for this shall be provided during detailed engineering. The requisite power supply requirement (AC to DC auxiliary supply/ charger) for the DI should be made internal to the smart meter itself. In case the same is not feasible to be provided, bidder should provide external power supply with following specifications. a) Input voltage: 63.5V AC b) Operating voltage: 12V DC c) Contact Rating: 5A Continuous @30V DC, 25A for 3 sec No. of DIs - 04 Nos. DI for 4V(DC), 10 mA |
| 11. | Volume II, Technical Specifications, Section 5, Clause 6. (System Sizing Requirements) | The system shall be suitably designed to meet all the performance, storage and other requirement as specified in the technical specification.<br>• The AMI system (MDM, HES and other systems) shall be suitably sized based on expansion requirements as specified in technical specifications.<br>**• The auxiliary memory and utilization of any of the Servers shall not exceed 30% and 25% respectively of their delivered capacity at any time even under peak loading conditions involving a combination of the following –**<br>**o 400 alarms per minute for 5 minutes.**<br>**o 10 concurrent display requests from 5 users. Including graphical trends** | The system shall be suitably designed to meet all the performance, storage and other requirement as specified in the technical specification.<br>• The AMI system (MDM, HES and other systems) shall be suitably sized based on expansion requirements as specified in technical specifications.<br>**CSP should offer auto-scaling of the compute resources based on the defined threshold of resource utilization. There should be a minimum and maximum limit defined for auto-scaling for a workload**.<br>• This memory utilization includes the memory used for storage of data (including expansion requirement defined in specification) for the defined duration as specified in the Technical Specification. The system architecture and the network design shall have the ability to handle the growth with respect to functions, and user as defined. |

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| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | | **o Restoration of 100%-meter data after system failure.**<br>**o VEE and billing determinant calculations involving 10,000 consumer meters**<br>**o System activity alarms**.<br>• This memory utilization includes the memory used for storage of data (including expansion requirement defined in specification) for the defined duration as specified in the Technical Specification. The system architecture and the network design shall have the ability to handle the growth with respect to functions, and user as defined. | |
| 12. | Volume II, Technical Specifications, Section 5, Clause 3. q) | [No clause] | q) The data collection and computation for the purpose of SLA penalties (**as per the SLA parameters table in section 8**) should be automated and visualized in Utility Interface. |
| 13. | Volume II, Technical Specifications, Section 5 | **Appendix-A to Section 5- HES and MDM** | **Appendix-A to Section 5 (REVISED)- HES and MDM** |
| 14. | Volume II, Technical Specifications, | f) TIA 942 A/B &/or Uptime Tier III or higher – Telecommunication infrastructure standard for Data Centre | f) The CSP's Data Center should conform to at least Tier III standard (preferably certified under TIA 942 or Uptime Institute certifications by a 3rd party) and implement tool-based processes based on ITIL standards. |

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| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | Section 7, Clause 3.2 (MeitY's Guideline) | | |
| 15. | Volume II, Technical Specifications, Section 7, Clause 3.3.2. f) | [No Clause] | f) CSP should provide capability to import a Virtual Machine (VM) as an image and support standard formats such as OVA, VMDK, VHD, and raw. |
| 16. | Volume II, Technical Specifications, Section 10, Clause 1.1 | [No Clause] | **1.1 Scope of Work for Consumer Indexing (CI): -**<br>a. Obtaining details of existing consumer indexing available with the utility as a starting reference point.<br>b. Capturing of all the mandatory attributes asper design engineering.<br>c. Updation of consumer details within the geographical boundary covered by the utility as part of the scope. The details of new/shifted consumers shall be provided by the Employer/Utility.<br>d. Consumer indexing for added/shifted consumers based on the ledger/field survey with physical verification of the existing consumer database. Modification/correction of consumers based on electrical system with the help of Employer/Utility.<br>e. Capturing of complete attributes of the consumers; viz, consumer code present in utility legacy system, consumer name, address, mobile number, asset id of source of power supply, service type(poles, feeder/pillar box, OH/UG), meter make, meter location, meter serial number etc.<br>f. Capturing of GPS co-ordinates (Latitude/Longitude) of consumer premises through the Mobile Application (developed by contractor) which must have facility of capturing Latitude/Longitude. During the CI, Field Team must click on the location and Mobile App must automatically take the Latitude/Longitude of the consumer |

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| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | | | premises.<br>g. Carrying out QA/QC on the collected consumer data.<br>h. Submission of data of the consumers in computerized file to the Employer/Utility. The file shall have the facility to edit, update and create data. Further, (2) hard copies of the deliverables, for approvals/comments by the employer/utility, shall also be submitted by the Contractor.<br>i. Getting the CI data verified/validated by the employer/utility. The Contractor is expected to obtain approval from Employer/utility. The contractor shall obtain the acceptance/take over certificate by the employer/utility.<br>j. Surveyor/Field Team shall walk along with the line and identify the consumers to whom supply is released from each pole / service pillar and identify the Distribution Transformer from where each Consumer is fed.<br>k. For the purpose of data validation and quality check, the sample size would be 10% of the total consumers under the assignment. The error toleration level shall be 5% of the sample size.<br>l. In case of comments by Employer/Utility, the same would be incorporated and resubmitted by the Contractor. It will be the responsibility of the Contractor to ensure that Consumer data collected does not become stale during the course of the execution of the project.<br>After meter installation, details of consumer connections, such as consumer identification no., meter ID, its hardware & software configuration, name plate details, make, type i.e. 1 Phase or 3 Phase shall be automatically updated in the AMI system. The information would also be updated on the consumer portal and app for providing information to consumers. |
| 17. | Volume II, Technical Specifications, | [No Clause] | 1.2 Consumer Indexing & Meter Installation APP: -<br>Consumer Indexing & Meter Installation should be carried out through a robust CI/MI Application for better tracking and record of field activities. |

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| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | Section 10, Clause 1.2 | | **Consumer Indexing (CI):** Site Survey of electrical device and conduct door to door survey to obtain consumer details by consumer indexing (CI), we can find Division/sub division wise location of the consumer through which feeder, or transformer, or circuit number and or pole consumer is being supplied. Mobile App should have functionality of capturing the asset condition, Meter Condition , Meter Height , Meter Location (Inside/outside) , Cable Type, Consumer Connection Status ( Active /IDF /TD /PD), Others ( Consumer Denial /Door Locked) and other required information through automated tool or manual screens, most important Longitude & Latitude (auto-populated) of location using Google map.<br>**Meter Installation (MI):** Smart meter installation on the premises as per order received from employer/utility. Meter installation is the process where contractor needs to install smart meter physically on the consumer premises based on the order finalized. There may be different scenarios i.e. New Service connection, old meter change, smart meter to smart meter change, Net meter, IDF, Load Enhancement etc. The provision to capture the details against each case as mentioned above to be provided in the application for paperless activity and the consumer/ old meter information/new information data should be seamlessly updated to the System.<br>**Inventory Management:** Inventory Management is to have readily availability of stock. All inventory of Meters devices and its accessories are maintained in warehouse and system will provide the actual inventory status of all devices. This system would be real-time or offline integrated with meter installation system or other system. Selection of Meter or Asset from Inventory for installation, meter or device will be automatically deduct the balance of asset from the inventory. In case of Smart Meter to Smart Meter replacement, inventory will be added as defective and as well as deducted from the inventory management with meter status (in case of faulty) with a maker and checker concept. Contractor shall maintain the inventory of all the meters in designated warehouse, maintenance and security including full |

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| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | | | responsibility for protection from theft and fire. Meter Inventory Management and Warehousing to be maintained by the Contractor on real-time basis.<br>**Mobile application for Consumer Information, Meter Installation & Meter Advising (MC): -** During consumer indexing and meter installation contractor will use android/iOS based mobile application. Consequently, following are the major scope of work for installation in the field.<br>• Consumer Indexing team (for capturing consumer's information)<br>• Documentation and Approval of prescribed format for Consumer indexing & Smart Meter installation and sealing information.<br>• Resource deployment and Responsibility allocation<br>• Quality and Safety Assurance during field work |
| 18. | Volume II, Technical Specifications, Section 5, Clause 9. l) vii | [No Clause] | vii Data-driven Analytics reports by leveraging AI/ML based technologies |
| 19. | Volume II, Technical Specifications, Section 5, Clause 9. m) | [No Clause] | m) DT condition monitoring. |

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<tr>
<td>20.</td>
<td>Volume II, Technical Specifications, Section 8, Clause 1.25.A.4 (Scheduled billing profile data for the bill period)</td>
<td>
<table>
<tr><th>Data Type</th><th>Performance Requirement (Averaged over a month)3</th><th>Penalty</th><th>SLA Penalty Calculation (For understanding purpose only)</th></tr>
<tr><td>Collection of billing data for the bill period</td><td>From 100% of meters within 72 hours of the scheduled periodic collection/ end of the billing period.</td><td>Deduction of 0.5% of CONTRACTOR’s Notional Monthly Service Charge for every 0.5% or part there of capped at 3% penalty</td><td>Maximum Penalty of 3% if action takes place for <97.5% of Meters</td></tr>
</table>
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<td>
<table>
<tr><th>Data Type</th><th>Performance Requirement (Averaged over a month)3</th><th>Penalty</th><th>SLA Penalty Calculation (For understanding purpose only)</th></tr>
<tr><td>Collection of billing data for the bill period</td><td>From 99.5% of meters within 72 hours of the scheduled periodic collection/ end of the billing period and From remaining 0.5% of meters within 168 hours of the scheduled periodic collection/ end of the billing period.</td><td>Deduction of 0.5% of contractor’s Notional Monthly Service Charge for every 0.5% or part there of capped at 3% penalty</td><td>Maximum Penalty of 3% if action takes place for <97.5% of Meters</td></tr>
</table>
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| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| 21. | Volume II, Technical Specifications, Section 9, Clause 1.5.5.2 | **1.5.5.2 Sample Routine & Acceptance Tests for Smart Meters: -**<br>These tests for Smart Meters are in addition to the Type Test requirements specified and the Routine and Acceptance tests that the Contractor will carry out as a part of their FAT procedure.<br><br>The sample Routine and Acceptance tests as per IS 13779 and IS 14697 for **any one lot** shall be conducted in third Party NABL accredited laboratory. The employer shall have the authority of selecting the samples (in accordance with IS 13779 and IS 14697) for carrying out the Routine and Acceptance Tests. The contractor shall be obliged to undertake these tests at their own cost. The sampling criteria and conformity requirement shall follow IS 13779 and IS 14697 as the case may be. | **1.5.5.2 Sample Routine & Acceptance Tests for Smart Meters: -**<br>These tests for Smart Meters are in addition to the Type Test requirements specified and the Routine and Acceptance tests that the Contractor will carry out as a part of their FAT procedure.<br><br>The sample Routine and Acceptance tests as per IS 13779 and IS 14697 shall be performed in a third-party **NABL** accredited laboratory. The employer shall have the authority of selecting the samples (in accordance with IS 13779 and IS 14697) for carrying out the Routine and Acceptance Tests. The contractor shall be obliged to undertake these tests at their own cost. The sampling criteria and conformity requirement shall follow IS 13779 and IS 14697 as the case may be.<br><br>The contractor shall be responsible for packing, handing over the material to the respective labs and ensuring transportation of the material directly from the manufacturer's location to the Labs for testing and delivering the material to site after successful test results are obtained. The contractor shall be obliged to undertake all expenditures that shall be incurred towards packing, transport, inspection, testing charges etc.<br><br>The lot wise testing shall be as per following methodology:<br><br>i. Sample Routine & Acceptance Tests shall mandatorily be carried out for the 1st lot through NABL Accredited Lab, before installation commencement. and thereafter the same can be done at discretion of utility on subsequent lots on random basis not exceeding a total of 6 times.<br>**ii.** In addition to the above, the Employer reserves the right to carry out accuracy tests, in line with the above guidelines, in their own Meter |

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<tr><th>S. No.</th><th>Clause Ref.</th><th>Existing Provision</th><th>Amended Provision</th></tr>
<tr><td></td><td></td><td></td><td>testing Laboratory for each lot. The sample size for such test would be [5%] of the smart meters of each lot.</td></tr>
<tr><td>22.</td><td>Volume II, Technical Specifications, Section 9, Clause 1.5.7.1</td><td>[No clause]</td><td>1.5.7.1 Tests on receipt of complaint by consumer<br>During the project period, in case of receipt of complaint by consumer of faulty meter reading within three months of installation, the contractor would follow the policies of the utility/employer or corresponding regulations that have been laid out. For this purpose, the Utility may also install its own check meter. In case of any discrepancy, based on the process followed as per the prevalent utility policy / regulation, the lot shall be subjected to Routine & Acceptance Test through Third Party NABL Accredited Lab. If the lot is found faulty, the same shall be replaced by the Contractor at its own cost.</td></tr>
<tr><td>23.</td><td>Volume II, Technical Specifications, Section 9, Clause 1.5.8</td><td><table><tr><td>Data Type</td><td>Performance Requirement</td></tr><tr><td colspan="2">…….</td></tr><tr><td colspan="2">3. On-Demand Remote reads of meters</td></tr><tr><td>Collection of 7 days of interval energy data and</td><td>From 90% of the meters in 2 minutes</td></tr></table></td><td><table><tr><td>Data Type</td><td>Performance Requirement</td></tr><tr><td colspan="2">……</td></tr><tr><td colspan="2">3. On-Demand Remote reads of meters</td></tr><tr><td>Collection of 7 days of interval energy data and the current total accumulated energy from</td><td>Within 2 minutes</td></tr></table></td></tr>
</table>

**Amendment No.-7 (Technical Part) dated 17/06/2022 to the Bidding Documents for Package for procurement of Smart Meters including associated Communication Infrastructure, Head End System (HES), Meter Data Management system (MDM) for implementation of Advanced Metering Infrastructure Project(s) in Central & Western India; Specification No.: RTN1001566/OTHERS/DOM/A02; GeM Bid Number: GEM/2022/B/2006757 dated 08.03.2022**

| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | | the current total accumulated energy from a selected individual meter | a selected individual meter |
| | | …… | …… |
| | | 6. Ping Response with acknowledgement/ response for selected meters | 6. Ping Response with acknowledgement/ response for selected meters |
| | | For installed meters: Action performed at 99.9% of meters within [1] Minute; and | For installed meters: Action performed at 98% of meters within [5] minute; and |
| | | …… | …… |
| | | 10.Firmware upgrade with acknowledgement / response for selected meters | 10.Firmware upgrade with acknowledgement/ response for selected meters |
| | | For installed AMI meters: Action performed at 99% of meters within [1] hour; and Action performed at 99.9% of meters within [2] hours | For installed AMI meters (for a batch of at least 20% of installed base): Action performed at 99% of meters within [18] hours; and Action performed at 99.9% of meters within [24] hours |
| | | 11. Remotely altering settings in meter | 11. Remotely altering settings in meter |
| | | For installed AMI meters: Action performed at 99% of meters within [30] minutes; | For installed AMI meters (for a batch of at least 20% of installed base): Action performed at 99% of meters within [8] hours; and Action performed at 99.9% of meters within [24] hours |
| | | | ……. |
| | | | 15. Prepaid Recharge |
| | | | Payment success to consumer acknowledgement: Within 5 mins |
| | | | Payment success to meter update (From MDM to HES to Meter): • From 90% of meters within 30 minutes • From 99% of meters within 1 (one) hour |
| | | | ……. |
| | | | 18. On-Demand Remote reads of meters |
| | | | Collection of 7 days interval energy data and the current total: • 95% complete within 2 hrs • 100% complete within 4 hrs |

**Amendment No.-7 (Technical Part) dated 17/06/2022 to the Bidding Documents for Package for procurement of Smart Meters including associated Communication Infrastructure, Head End System (HES), Meter Data Management system (MDM) for implementation of Advanced Metering Infrastructure Project(s) in Central & Western India; Specification No.: RTN1001566/OTHERS/DOM/A02; GeM Bid Number: GEM/2022/B/2006757 dated 08.03.2022**

| S. No. | Clause Ref. | Existing Provision | | Amended Provision | |
|---|---|---|---|---|---|
| | | | and Action performed at 99.9% of meters within [1] hour | accumulated energy from a group of 10% of installed base of meters (configurable) | |
| | | ……. | | | |
| | | 15. Prepaid Recharge | | | |
| | | Payment success to consumer acknowledgement | Within 5 mins | | |
| | | Payment success to meter update | Within one hour | | |
| | | ……. | | | |
| | | 18. On-Demand Remote reads of meters | | | |
| | | Collection of 7 days interval energy data and the current total accumulated energy from a group of 10% of installed base of meters | Action performed within 2 hours | | |

**Amendment No.-7 (Technical Part) dated 17/06/2022 to the Bidding Documents for Package for procurement of Smart Meters including associated Communication Infrastructure, Head End System (HES), Meter Data Management system (MDM) for implementation of Advanced Metering Infrastructure Project(s) in Central & Western India; Specification No.: RTN1001566/OTHERS/DOM/A02; GeM Bid Number: GEM/2022/B/2006757 dated 08.03.2022**

| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | | (configurable) | |
| 24. | Volume II, Technical Specifications, Section 2, Clause 9 (Meter Box Requirement) | All the meters shall be supplied with meter box, specification of the same shall be as under:<br>The meter box shall be intended to house one number smart meter. The meter box shall comply with relevant Indian standard IS: 14772:2000 / IS:13410 with latest amendment. The thickness of the box shall be minimum 2.0 mm on all sides. The base and cover of meter box shall be made of hot press moulded, unbreakable, high-grade fire-retardant Engineering Plastic / Polycarbonate, having good di-electric and mechanical strength. LTCT Meter Boxes shall be manufactured from Sheet Moulding Compounds (SMC). Meter box shall be weather proof, capable to withstand temperature of minimum 85° C. **The thickness of the box shall be minimum 2.0 mm on all sides.** The overall dimensions of the box shall be such that a minimum 30 mm clearance from left, right and top, 25 mm from front and 10mm from back side & 75 mm from meter terminals and bottom side shall be maintained in between meter and box | All the meters shall be supplied with meter box, specification of the same shall be as per "**Appendix - Specification for Smart Meter Box"** attached in the bidding document. |

**Amendment No.-7 (Technical Part) dated 17/06/2022 to the Bidding Documents for Package for procurement of Smart Meters including associated Communication Infrastructure, Head End System (HES), Meter Data Management system (MDM) for implementation of Advanced Metering Infrastructure Project(s) in Central & Western India; Specification No.: RTN1001566/OTHERS/DOM/A02; GeM Bid Number: GEM/2022/B/2006757 dated 08.03.2022**

| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | | surface. The box cover shall be fixed with concealed hinge. It would be open by at least 90 degrees. Meter Box shall comply with IP – 55 protection class. Handle shall be provided on the box door for ease of door opening. All metallic parts would be well protected against corrosion. The overall dimension of the meter box shall vary according to the size of meters. However, it shall comply with the minimum requirements as described above. A viewing window made up of scratch & break resistant, UV resistant, transparent Polycarbonate material shall be provided on the door for reading the meter without inconvenience. The minimum thickness of the viewing window shall be 2.0 mm (flashing with top). The window shall be securely fixed with meter enclosure from inside. No viewing window is required for transparent polycarbonate meter box. | |

**Amendment No.-7 (Technical Part) dated 17/06/2022 to the Bidding Documents for Package for procurement of Smart Meters including associated Communication Infrastructure, Head End System (HES), Meter Data Management system (MDM) for implementation of Advanced Metering Infrastructure Project(s) in Central & Western India; Specification No.: RTN1001566/OTHERS/DOM/A02; GeM Bid Number: GEM/2022/B/2006757 dated 08.03.2022**

| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| 25. | Volume II, Technical Specifications, Section 2, Clause 15 | [No clause] | **Appendix- Specification of Polycarbonate Seals** |
| 26. | Volume II, Technical Specifications, Section 3, Clause 1.1.5.2 (j) | [No clause] | j) The communication network shall have dynamic & self-healing capability. If one of the communication elements fails, then nodes connecting to that element shall switch to best available element for communication of data to HES. |
| 27. | Volume II, Technical Specifications, Section 2, Clause 1.1 | [No clause] | **1.1 Certification & Accreditation Requirements**<br><br>All Smart Meter Suppliers shall compulsory meet the following criteria :<br>**(**a): Smart meters shall have all the valid test certificate (issued within the last 5 years) and BIS certificate, compliant to IS 16444 Part-1[#]<br><br>*Note: [#] At the time of supply of LT-CT operated Meters, the smart meters shall have all the valid test certificate and BIS Certificate, compliant to IS 16444 Part-2.* |

**Amendment No.-7 (Technical Part) dated 17/06/2022 to the Bidding Documents for Package for procurement of Smart Meters including associated Communication Infrastructure, Head End System (HES), Meter Data Management system (MDM) for implementation of Advanced Metering Infrastructure Project(s) in Central & Western India; Specification No.: RTN1001566/OTHERS/DOM/A02; GeM Bid Number: GEM/2022/B/2006757 dated 08.03.2022**

| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | | | (b): Should have in-house NABL or ISO/ IEC -17025 accredited Laboratory<br>(c): Should have a valid ISO 9001:2015 certification |
| 28. | Volume II, Technical Specifications, Section 1, Clause 5 (General Requirements) Smart Meter (d) | **d)** Smart Meters shall be supplied along with Meter Boxes compliant to this specification. Cost of Smart Meters shall be inclusive of Smart Meter Boxes. | **d)** Smart Meters shall be supplied along with Meter Boxes compliant to this specification. Cost of Smart Meters shall be inclusive of **Seal and** Smart Meter Boxes. |
| 29. | Volume II, Technical Specifications, Section 2, Clause 8.4 | **8.4 Circuitry**<br>Each fully assembled and finished meter shall undergo 'burn-in' test process for 12 hrs. at 55 degree Celsius (Max. temperature not to exceed 60 degree Celsius) under base current (Ib) load condition. | **8.4 Meter Circuitry & LCD Requirement**<br>Meter Supplier(s) shall include 'burn-in' test process in their Quality Assurance Plan (QAP). Fully assembled and finished meters from each completed lot, shall undergo the test for 12 hrs. at 55-degree Celsius (Max. temperature not to exceed 60 degree Celsius) under base current (Ib) load condition. Sampling frequency shall be decided during detailed engineering/ QAP Approval.<br>The LCD display shall be of STN (super twisted pneumatic type) constructing suitably for temperature withstand of 80°C (storage) & 65°C (operation) i.e.<br>(i) When the meter is placed over at a constant temperature of 65°C for a period of 30 minutes, the character of LCD should not deform.<br>(ii) After keeping the meter at a constant temperature of 80°C for a period of 30 minutes and when restores at normal temperature, LCD display should work satisfactorily. The LCD display should have a wide viewing angle of 120° and up to one-meter distance, for clear visibility of the display of the meter reading at distance. Large viewing area with large display icons is preferred. The registered |

**Amendment No.-7 (Technical Part) dated 17/06/2022 to the Bidding Documents for Package for procurement of Smart Meters including associated Communication Infrastructure, Head End System (HES), Meter Data Management system (MDM) for implementation of Advanced Metering Infrastructure Project(s) in Central & Western India; Specification No.: RTN1001566/OTHERS/DOM/A02; GeM Bid Number: GEM/2022/B/2006757 dated 08.03.2022**

| S. No. | Clause Ref. | Existing Provision | Amended Provision |
|---|---|---|---|
| | | | parameters shall not be affected by loss of power. The display shall not be affected by electrical and magnetic disturbances. These tests related to LCD shall also be incorporated in Manufacturer's QAP. |
| 30. | Volume II, Technical Specifications, Section 14, Clause 3 (xv) (TECHNICAL SPECIFICATION OF 11 KV CTPT METERING SETS) | xv) The 11 KV CT PT sets shall have one No. of Three Phase Potential Transformer. The primary winding of single phase PT shall be connected in star formation in the tank with common external neutral. | xv) The 11 KV CT PT sets shall have one No. of Three Phase Potential Transformer. The primary winding of **three** phase PT shall be connected in star formation in the tank with common external neutral. |

## Appendix – Specification for Smart Meter Box

**Specifications of 1-ph and 3-ph Polycarbonate Meter Box: -**

***SCOPE***

This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at store/site and performance of single-phase meter box intended to contain one number single phase whole current energy meter complete with all accessories for trouble free and efficient operation.

***APPLICABLE STANDARDS***

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest edition of the following Indian/international standards and shall conform to the regulations of the local statutory authorities.

| S. No. | Standard Name | Title |
|---|---|---|
| i. | IS:14772-2000 | General requirements for Meter boxes for accessories for household and similar fixed electrical installations- specifications. |
| ii. | IS:11731(Part-II)-1992 | Methods of test for determination of Flammability of solid electrical insulating material when exposed to an igniting source. |
| iii. | IS:4249-1967 | Specification for classification and method of test for non- ignitable and self-extinguishing properties of solid electrical insulating materials. |
| iv. | IS:5133(Part-II)-1969 | Specification for boxes far the Meter box of electrical accessories. |
| v. | IS:2500(Part-I)-2000 | Sampling procedure for inspection by attributes part-I sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection. |
| vi. | UL 746-C | Polymeric Materials in Electrical equipment. |

**GENERAL TECHNICAL REQUIREMENTS PROPERTIES OF PLASTIC MATERIAL**

The plastic material, which is to be used by the bidder for these molded Meter Box, must have the following properties:

| S. No | Property | Units | Value |
|---|---|---|---|
| 1. | Physical Water Absorption | % | Max. 0.35 |
| 2. | Thermal HDT | Deg. C | Min. 125. |
| 3. | Flammability<br>a) Rating<br>b) Glow wire test @ 650 Deg. C | | <br>FV2<br>Passes |

| | | | |
|---|---|---|---|
| 4. | Mechanical<br>a) Tensile Strength<br>b) Flexural strength<br>c) Modulus of Elasticity<br>d) Izod impact strength notched 23OC. | <br>Mpa<br>Mpa<br>Mpa<br>KJ/Sq.m. | <br>Min. 50<br>Min. 90<br>Min. 2000<br>Min 8 |

**Technical Requirements**

| S. No. | Description | Requirement |
|---|---|---|
| i. | Application | Outdoor |
| ii. | Degree of protection | IP 55 |
| iii. | Flammability requirement | FV2 |
| iv. | Grade of material | Polycarbonate with fire retardant, Self- Extinguishing, UV stabilized and anti-oxidation properties having good dielectric and mechanical strength. |
| v. | Material<br><br>a) Base:<br><br>b) Cover: | Meter box (base and Cover) shall be made of polycarbonate material which complies following properties;<br>• Meter box shall be weather proof<br>• Capable to withstanding temperatures of boiling water for 5 minutes continuously without distortion or softening.<br>• It shall withstanding Glow-wire test at 650DC as per IS:14772.<br><br>Polycarbonate with fire retardant, Self- Extinguishing, UV stabilized and anti-oxidation properties having good dielectric and mechanical strength.<br>Opaque.<br><br>Polycarbonate with fire retardant, Self- Extinguishing, UV stabilized and anti-oxidation properties having good dielectric and mechanical strength.<br>Transparent. |
| vi. | Material of the gasket | Rubber gasket |
| vii. | Material withstand | $125^{O}C + 2^{OC}$ |

***GENERAL CONSTRUCTIONS:***

i The meter box shall be weatherproof, tamper proof and shall be made of Injection moulded polycarbonate material with self-extinguishing, UV stabilized, recyclable and Anti oxidation properties having good dielectric and mechanical strength. The box shall be of adequate strength, unbreakable and shall be made in two pieces (base and cover). The base shall be opaque whereas the cover shall be completely transparent.

ii. The meter Box shall have roof tapering down to both the sides for easy flow of rainwater and shall have IP 55 degree of protection for affording protection against dust and water.

iii. The thickness of the box shall not be less than 3.0 mm on the load bearing side and other sides, door and roof shall not be less than 2.5 mm.

iv. The box shall be designed in such a way that there should be the following clearances between the meter and the Meter box:

| S. No. | Parameter | Minimum Clearance |
|---|---|---|
| i. | Between Sides of the meter body and meter box<br>(Excluding the flanges on the meter body for sealing screws.) | 30 mm |
| ii. | Between the lower edge of the terminal block and the box | 70 mm |
| iii. | Between the back of the meter and the meter box base | 10 mm |
| iv. | Between the front of the meter and the meter box front | 10 mm |
| v. | Between the top of the meter and the meter box cover | 20 mm |

v. The meter base supports inside the box should have adequate strong enough moulded supports within the block to avoid damage during tightening of screws and raised by about 10 mm in the box for ease of wiring. While fixing, the meter screws should not protrude outside.

vi. The design of the meter box shall be such that it may facilitate easy wiring and access to the meter terminals. Suitable circular holes shall be provided at the bottom of the cupboard for inlet & outlet cables with glands of size 15/16mm suitable for service cable(s) and for three phase meter, for internal gland diameter shall be 22-26 mm made of engineering plastic for the cable securely fixed to the bottom of the meter box on both sides by chuck-nuts. A suitable arrangement like clamping nut may be provided with the gland so that opening diameter can be reduced to the size of cable.

vii. The box cover shall be fixed to the base through two number hinges (approx. length 30 - 60 mm). The arrangement for hinges shall be provided on the side of the base and shall be such that it may avoid unauthorized access to inside of the box. Hinges should be outside and enclosed by polycarbonate material and once the box is closed and sealed, hinges should not be approachable. Box cover shall be openable by more than 90 degrees.

viii. For holding and sealing the box, two U-shaped latches shall be provided. The latch shall be Gl sheet with minimum thickness 2 mm, to secure it with the base of the box. The latch shall be provided along with suitable clamp assembly in base as well as cover, such that these are fully covered by the latch after closing. The clamp along with the latch shall have a sealing hole such as to provide a through sealing arrangement in the assembly.

ix. For fixing the box to flat wall or wooden board 4Nos. holes (2Nos. key holes at top) of minimum 6 mm dia. shall be provided at the four corners of the meter box. For fixing of Box on flat wall, 4 Nos. 5mm diameter 40mm long, pan head self- taping screws and washers shall be provided by the supplier with every Box. 4 Nos. plastic fixing plugs of 50mm length suitable for self-tapping screws shall also be provided.

x. The meter is to be installed in the Meter Box and the Meter Box in assembled condition shall have provision to fix it to a pole or on wall.

xi. A provision in form of depression should be provided on the meter box cover to download the meter data from the meter using the CMRI probe without opening the meter box cover. This shall be provided in such a way that the optical probe of the CMRI cable can be placed on top of the meter box cover in a suitable depression in the meter box cover, which is aligned suitably with the meter optical port. The meter box cover shall have provision of sealing this depression. The depression so provided should be covered so that there is no physical access to the meter optical port while using this depression.

xii. Suitable rubber gasket of round shape all around the cover along its periphery shall be provided for protection.

xiii. After closing and sealing the meter box, it should not be possible to allow entry of any sharp object even forcefully inside the box without breaking base/cover.

xiv. Suitable overlapping (approx. 10 mm) shall be provided between base and cover to avoid access to the meter or its accessories inside the meter box by any means after sealing the box.

xv. The tolerance permissible in overall dimension of Meter Box shall be ± 2 %.

***Meter Body Material:*** Base body and top cover shall be made of UV stabilized, unbreakable high grade flame retardant insulating material of good dielectric and mechanical strength with FV2/V2 in-flammability level.

***Terminal Block:***

a) The terminal block shall be moulded type made of non-hygroscopic, flame-retardant material having good dielectric and mechanical strength.

b) The moulded terminal block shall be made from best quality phenol formaldehyde/Poly carbonate conforming to IS:13779-1999 (latest amended) having adequate insulating properties and mechanical strength with brass inserts for connecting terminals.

c) The terminal block should satisfy all the conditions specified in IS:13779 and IEC 62052 - 11.

The material of the terminal block should fulfil the requirement of following tests:

- The flame retardant rating of V0 as per UL 94 testing.
- The glow wire test for temperature of 960OC. as per IS:11000 (Part 2/Sec.1) or IEC 60695-2-1.
- Heat deflection temperature (HDT) test of 135OC. as per ISO 75 or ASTM D-648
- Ball pressure test at 125OC. as per IEC 60335-1.

**Specifications of LTCT Meter Box**

***Scope:***

- This specification covers the design, manufacture, testing and supply of anti-corrosive, dust proof, rust proof, shock proof, vermin and water proof, U.V. stabilized and pilfer resistant meter boxes made of Glass reinforced, polyester sheet moulding compound (SMC) confirming to IS:13410:1992/IS:14772:2000 (with latest amendment thereof) for installation on distribution transformers of various ratings.
- Meter boxes shall consist of two separate chambers, one suitable to accommodate LT TVM and other suitable for installation of 4 nos. single core, single ratio, Current Transformers (CTs) of current ratios as per requirement Tender Documents.

***Constructional Features of Meter Box:***

- LTCT SMC Box: Meter Box shall be made of minimum 2.5 mm. thick Glass reinforced Polyester sheet moulding compound (SMC) conforming to IS:13410:1992/IS:14772:2000 with latest amendments thereof.
- LT meter box shall contain two separate chambers. The upper chamber shall be suitable to house 3 phase 4 wire energy meter. The lower chamber of the box is intended for housing 04 nos. LT CTs. Both the chambers of box shall be independent from each other.
- The appropriate size of cables from the secondary of distribution transformer shall pass through ring type LT CTs.
- If any portion of box is closed, it shall not be possible to approach it by opening the other portion and vice-versa. It shall be moulded in a single piece forming the body of the Meter Box and CT chamber with SMC lid/shed fitted with the base by two nos. concealed brass hinges.
- The concealed brass hinges shall be fitted with the meter Box body base and the cover rigidly in such a way that the same are neither visible nor accessible from outside, thereby making the Meter Box pilfer proof.
- The door/cover in closed position should house properly within collar of meter box/ body base, which shall also house the edges of the lid/cover so that no direct entry or access is possible. The box should have a front door opening with a window provided with toughened glass of minimum 4.0 mm. thickness for viewing and taking meter reading.
- The meter box shall be of moulded type without any fabrication joint made by the process of hot press compression moulding.
- The body of the Meter Box shall have such construction that while installing on the grouted bolts of base-wall/ mounting bracket, the top surfaces of the box shall have little tapering shape frame centre towards both sides of the meter box so that easy flow of rainwater etc. is facilitated.
- The meter box should be anti-corrosive, rust-proof, dust-proof, vermin-proof, water-proof, UN, stabilized and pilfer resistant. The meter box becomes completely closed by providing locking arrangement in the shape of two nos. clamps.
- Clamp shall have separate holes of 1 mm. dia. each across the meter box body base as well as covers for both the chambers separately
- The meter box shall have four wall mounting bracket with proper screws to fix with the bottom base and provision for Four nos. holes each of 6 mm. dia.

- The meter box should neither melt nor become soft or distort when tested up to temperatures 2500C. ( As per IS 13360 part 6 sec 10 1992 by 'A' capillary tube method The thickness of these boxes shall not be less than 2.5 mm on all sides including floor. The box shall have 3 mm thickness on the tongue and groove area. The meter box cover shall have a groove to hold minimum of 2.5 mm Neoprene gasket.
- The tongue of the base shall ensure tongue, Groove and sealing arrangement against rainwater and dust entering inside the box. The box shall have its roof tapering down to both sides for easy flow of water.
- The boxes shall generally comply with the provision of IS: 14772:2000. The boxes shall be suitable for outdoor / indoor application. The box shall be with good workmanship. There should be a minimum of 25 mm clearance on all sides and 25 mm clearance on the front and 10 mm clearance on the back of the meter.
- Sufficient space should be available inside the meter box for making out-going connections of the leads with the terminal block of the meter.

***Material of Meter Box:***

- LTCT SMC Box: Material for construction of meter box shall be glass reinforced polyester sheet moulding compound (SMC) as per IS: 13410:1992 Grade S-1 with latest amendment thereof. Thickness of boxes shall be 2.5 mm from all sides. However, thickness of partition plate shall be 2.0 mm.
- LTCT Polycarbonate boxes: The meter box shall be weather proof, tamper proof and shall be made of Injection moulded reinforce polycarbonate material with FV0 fire retardant, self-extinguishing, UV stabilization and Anti oxidation properties. The box shall be of adequate strength , unbreakable and shall be made in two pieces(base and cover). The base shall be dark grey color whereas the cover shall be completely transparent for polycarbonate material. The material for base and cover shall be polycarbonate with minimum cover thickens of 2.5mm & base 3 mm thickness.
- The material of meter box should be anti-corrosive, rust proof, waterproof, shock proof and U.V stabilized.
- Material of meter box should not get soften on heating. (Heat distortion temperature should be above 1702 C.)
- The material of Meter box should be self-extinguishing as per IS: 4249 with latest amendment thereof.
- All MS parts of the meter boxes shall be anti-corrosive treated.

***Rating Plate:*** Manufacturers should Screen Print the following information on each meter box.

- Name of Manufacturer
- Year of manufacturing
- Type of Meter
- PO NO with Date
- Meter Box Number
- Property of Utility

The same shall be finalized during GTP approval stage.

## Appendix: Specification of Polycarbonate Seals

**Specification of Poly Carbonate Seals required for Sealing of Single / Poly Phase Meters**

| | | |
|---|---|---|
| **1** | **SCOPE** | The specification covers the design, manufacture, testing at manufacturers works, supply and delivery at destination stores of tamper evident poly-carbonate security seals (Anchor type) heat resistant for sealing of Meter body and terminal covers of energy meters, Meter Box, CT-PT Units etc. with non-corrosive, non-magnetic stainless-steel sealing wire. The required no of seals shall be finalized during design engineering as per utility requirement.<br>It is not the intent to specify completely herein all the details of technical design and construction of material. However, the material shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in manner acceptable to the employer/utility, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered material shall be complete with all components necessary for their effective and trouble-free operation. |
| **2** | **APPLICABLE STANDARDS** | The equipment covered by this specification shall conform to the requirements stated in latest editions & amendments of relevant Indian/ IEC Standards and shall conform to the regulations of local statutory authorities. |

| | | |
|---|---|---|
| A | IS 9000 | Basic Environmental testing procedure for electrical and electronic items. |
| B | IS 15707 : 2006 | Testing, evaluation, installation and Maintenance of ac electricity meters — Code of practice |
| C | ASTM F 997 | Standard Specification for Polycarbonate Resin |
| D | ASTM D792-08 | Specific Gravity |
| E | ASTM G154 | Exposure to UV radiations |
| F | ASTM B 117 -09 | Salt Spray Test |
| G | IS 15707 : 2006 | Testing Evaluation installation and maintenance of AC Electricity Meters- Code of practice. |
| H | IEC 60068 | Environmental testing. |
| I | CBIP–TR No.325 | Specification for A.C. Static Electrical Energy Meters (latest amendment) |
| J | CEA Regulation : 2006 | Installation and operation of meters Dtd: 17/03/2006 or latest amendment |
| K | Supply code | Delhi Supply Code 2006 |

**3 CLIMATE CONDITIONS OF THE INSTALLATION**

| Sl. No. | Parameters | Specified Values |
|---|---|---|
| 1 | Maximum Ambient temperature | 50°C |
| 2 | Yearly average temperature | 32°C |
| 3 | Daily average temperature | 42°C |
| 4 | Minimum temperature | -25°C |
| 5 | Height above sea level | 1500-2200 Mtrs. |
| 6 | Max. relative humidity | 100% |
| 7 | Min. relative humidity | 10% |
| 8 | Average No. of thunder storm days per Year | 54 days |
| 9 | Average rainfall | 118 cm |
| 10 | Max. wind pressure | 130 kgs/m2 |
| 11 | Average number of rainy days per year | 106 days |

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g.

**4 GENERAL TECHNICAL REQUIREMNTS**

| S. No. | DESCRIPTION | REQUIREMENT |
|---|---|---|
| 4. 1 | Material of seal | Polycarbonate grade 143R or equivalent |
| 4.2 | UV resistance properties | Should not get affected by UV rays |
| 4.3 | Boiling water, acid or chemicals resistance | Seal shall not be affect by boiling water, acid or chemicals |
| 4.4 | Seal wire | Seal should have 6-inch-long 26 gauges, twisted strand stainless steel wire non-corrosive & non-magnetic |
| 4.5 | Temperature Withstand | 147 deg. Cel. |
| 4.6 | THICKNESS OF SEAL | Minimum 1mm thick |
| 4.7 | Serial number printing &visibility | Serial number should be laser printedon male & female part & should be separately visible after closing of seal |
| 4.8 | Company MONOGRAM | Utility Monogram to be embossed as specified. |
| 4.9 | Embossing quality | Embossing should have superior quality with good smooth finish. |
| 4.10 | Seal design | Seal should be constructed/mouldedwith one piece twisted sealed wire & polycarbonate male & female part such way that no extra seal wire is required. |
| 4.11 | Surface finish | The surface should be free from any burr or casting voids etc. |
| 4.12 | Colour shade | The colour shades of all seals of specific color should be same. The color code will be provided by Utility. |

**5 GENERAL CONSTRUCTIONS**

| | | |
|---|---|---|
| | | 5.1.1 The seal shall be capable to withstand temperature upto 147 deg. C without any damage / deformation.<br><br>5.1.2 The seal shall be designed for a single use only and if tampered with the help of plier, knife or any other sharp instruments, the seal shall be damaged and due to its transparent property, the sign of internal tampering shall be easily detected. Also, once opened, it cannot be re-used.<br><br>5.1.3 The seal shall be made in such a way that, it can be easily locked with the help of finger and thumb pressing no tools shall be required to close the seal in the laboratory or at site.<br><br>5.1.4 Both the parts shall be designed in such a way that they cannot be separated and the attachment shall be flexible and shall not break. After inserting the seal wire through female part, the cap of the male part shall be fitted in the female part in such a way that it should not leave any space to avoid insertion of any sharp tools for opening of seal body of the female part in hot or cold condition. |
| **5.1** | **Design** | 5.1.1<br>double locking.<br><br>5.1.2<br>seal than the approved tender samples. If the seal is found different than the approved design / shape / size, the same shall be out rightly rejected.<br><br>5.1.3<br>pressed before sealing, so that after pressing the seal cannot be opened.<br><br>5.1.4<br>not require plier to press fit. Should be easily press fit with hand/ thumb pressure.<br><br>5.1.5<br>(1mm).<br><br>5.1.6<br>reinforced Insulating material with FV0 Fire Retardant, self -extinguishing, UV stabilize, recyclable and Anti oxidation properties. |

<table>
<tr><td></td><td></td><td>5.1.7<br>etched / embossed during moulding (it shall not be screen printed) in contrast color on one side of capsule body (female).<br><br>5.1.8<br>moulding (it shall not be screen printed) in contrast color on top of the male part.<br><br>5.1.9<br>of the polycarbonate.<br><br>5.1.10<br>± 0.1mm tolerance.</td></tr>
<tr><td>5.2</td><td>Color of Seal</td><td>5.2.1<br>available in Clear color and should be transparent (see through) type, which shall give complete visualization of its fixing mechanism and shall show clear indication if tampered.<br><br>5.2.2<br>Green/ Violet/ Orange or as per requirement of Utility. The color of seal should not fade with UV radiations of sunlight.<br><br>5.2.3<br>any visual color shade difference.</td></tr>
<tr><td>5.3</td><td>Marking/ Monogram</td><td>The seal shall have laser etched printing of monogram of Utility on front side and month and year embossed of manufacture in figure on the backside. The laser etched printing should be through complete thickness of polycarbonate.</td></tr>
<tr><td>5.4</td><td>Seal material</td><td>The raw material used for polycarbonate plastic seals shall be M/s GE plastic, (Grade 143R or 943 AA), any other equivalent manufacturer having similar material properties as under:
<table>
<tr><td>Sr. No</td><td>Item</td><td>Polycarbonate</td></tr>
<tr><td>1</td><td>Melting Temperature</td><td>2800 C to 2950 C</td></tr>
<tr><td>2</td><td>USE</td><td>Engineering</td></tr>
<tr><td>3</td><td>Softness</td><td>Hard</td></tr>
<tr><td>4</td><td>Durability</td><td>Weather effect resistant</td></tr>
<tr><td>5</td><td>Transparency</td><td>Fully Transparent ( long time transparency)</td></tr>
</table></td></tr>
<tr><td>5.5</td><td>Seal Wire</td><td>The non-corrosive, non-magnetic stainless steel twisted wire (26 guage) confirming to IS : 280 shall be used . The seal wire shall not have effect of magnet i.e. it should not attract to magnet. The length of the sealing wire should be minimum 6” twisted two strand pull resistant stainless steel wire fixed to the seal. The diameter of each individual stand should be of 0.46mm (26 gauge) to 0.5 mm. dia and overall diameter of the seal wire shall be 0.92 to 1.0 mm (± 0.05). The No. of turns shall be minimum 20 per inch. The seal wire should be inserted at the female and male part during the process of moulding itself and with a visible projected and continuously length of the wire. The wire shall be intact such that it cannot be pulled out after sealing.</td></tr>
</table>

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| | | The seal wire insert hole should be just sufficient for passing the seal wire and hole of larger dia. is discouraged. |
| **5.6** | **Tolerance** | Any dimension Tolerance shall be max. 0.5mm or below. |
| **5.9** | **Special feature** | A secret code shall be given in each seal by contractor/supplier on whom the Utility/employer places the order. The name of the contractor/supplier embossed/laser printed on the seals along with Utility logo, Sr. No., Month and Year of manufacture or any other symbolgiven by the Utility/employer shall be embossed/ laser printed. Before commencing mass manufacturing & supply Six Nos. of sample seals of each color shall have to be approved from the employer/utility. |
| **5.10** | **Patent** | Seals should be patented, or design is registered with patent office. Copy of patent certificate /lease & patent drawing/design should be submitted for verification along with the offer of the employer/utility. This should comply tothe latest CEA guidelines & its contractor responsibility to provide genuine documents complying to statutory guidelines. |
| **6.0** | **NAME PLATE AND MARKING** | Seals shall have embossed marking clearly visible and effectively secured against removal. Following marking to be done on seals.<br>i. Manufacturer's name on female part side below date & month<br>ii. Serial number – unique seven digit no (Seal serial number shall be laserprinted on top of the male part & bottom of the female part).<br>iii. Utility monogram with logo on high-rise moulding in 8mm dia. On sideof female part<br>iv. Month and Year of manufacture in MM/YY format on other side of the<br>female part in high-rise moulding in 8mm dia. |
| **7.0** | **TESTS** | All routine, acceptance & type tests shall be carried out on the seals separately in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by the employer/his authorized representative. All the components shall also be type testedas per the relevant standards. Following tests shall be necessarily conducted. |
| **7.1** | **TYPE TEST** | As per acceptance tests. |
| **7.2** | **ROUTINE TEST** | 1. Dimension check – Dimensions as per approved GTP & within min. tolerances in specs.<br>2. Surface finish- Male & female part – The surface should be free from any burr or casting voids etc.<br>3. Embossing quality- embossing should have superior quality &good finish.<br>4. Colour shade- the colour shades of all seals of specific color should be same.<br>5. The steel seal wire shall be properly placed in insulating material. |

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| **7.3** | **ACCEPTANCE TEST** | The seals shall be inspected / tested as a acceptance test at the manufacture's works before dispatch in presence of authorized representative of employer/utility for the following tests:<br>i) **Physical Dimensional Check-up :** The seals shall be subjected to visual check-up for verification of workmanship and other features as mentioned above including shape / design / dimensions as per approved drawing /Samples & dimensions should be within min. tolerances mentioned in specs./drawings.<br>ii) **Boiling Water Test:** The seal when immersed in the boiling water for two hours there shall not be any effect on the seal and it shall remain intact condition i.e. the seal should not become soft, but instead should turn out to trail and easily break thus showing easily the tampering signs if it eventually happens. Even, with the help of any sharp instrument, pulling with plier i.e. by applying mechanical force, the male portion shall not come out from the female part (body seal). In case, it comes out, the same shall damage the seal, so that it cannot be re-used.<br>iii) **Pull Out Test:** After locking the seal, if the male part / insert is pulled with mechanical force with the help of plier or any other instrument, sharp instrument etc. at normal condition, the seal should not get unlocked without any damage and when such condition occurs, it should leave traces of tampering.<br>**iv) Seal Wire :** In case, if someone tries to pull the seal wire and in any of the tests as mentioned above at (ii) & (iii) in that case the male / female portion of the seal should be damaged and the same can be seen visually being a transparent one.<br>**v) Chemical Test:** The seal be kept in the concentrated acid for minimum one hour. The same shall remain intact condition and if try to unlock the seal, the same shall be damaged**.**<br>vi) **Temperature withstand test:** The seal should be capable to withstand temperature up to 147 deg. C without damage/deformation.<br>vii) **Effect of oil, chemical & sunlight :** The seal shall be so designed made that there shall not be any effect of temperature, chemicals, oil and sunlight etc. on the performance of the seal.<br>Other checks -<br>1. Surface finish- Male & female part – The surface should be free from any burr or casting voids etc.<br>2. Embossing quality- embossing should have superior quality & good finish.<br>3. Colour shade- the colour shades of all seals of specific color should be same.<br>4. Marking & embossing - The LOGO embossing shall be as per Utility standard logo & making as mentioned in specs. The steel seal wire shall be properly placed in insulating material.<br><br>In short, if the seal is tested for any of the above tests, in no condition the male and female part shall be separated out without affecting / damaging the seal. In case, if they are separated, the seal shall have sufficient tamperevident. Also, if seal wire is pulled out from the seal in any of the above tests, it shall not come out from the seal without damaging seal. |

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| **7.4** | **Sampling Plan** | For carrying out above acceptance tests at manufacturer's works shall be Selected at the rate of 0.2% of the offered quantity with minimum 5 samples selected at random from the each lot offered as per IS 4905. The seals used in testing shall be destroyed in the presence of Utility Inspecting Officer. |
| **8.0** | **TYPE TEST CERTIFICATE** | The contractor shall furnish the type test certificates of the meter for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI or ERDA or UL or accredited laboratoryas per the relevant standards. Testing from any national approved laboratory or international acclaimed lab or equivalent will also suffice at the discretion of Utility/employer. Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to Utility/employer. |
| **9.0** | **PRE-DESPATCH INSPECTION** | The successful contractor shall submit Six samples of each color seal (non- returnable) for further testing and compliance as per specifications and getting approval before mass manufacturing. Out of Six samples, five samples to be submitted in Meter testing lab & one in Utility.<br><br>Inspection may be made at any stage of manufacture at the discretion of the employer/utility and if found unsatisfactory as to workmanship or material,the same is liable to rejection.<br>Equipment shall be subject to inspection by a duly authorized representative of the employer/utility. Contractor shall grant free access to the places of manufacture to Utility/employer's representatives at all times when the work is in progress. Inspection by the Utility/employer or its authorized representatives shall not relieve the contractor of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MICC (Material Inspection and Clearance Certificate) is issued by employer.<br>Following documents shall be sent along with material<br>a) Test reports<br>b) MICC issued by Employer<br>c) Invoice in duplicate<br>d) Packing list<br>e) Drawings & catalogue<br>f) Guarantee / Warrantee card<br>g) Delivery Challan<br>h) Other Documents (as applicable)<br><br>Stage Inspection: If desired by Utility/employer, Utility/employer will arrange stage inspection for the material used for manufacturing of seal and also during the process of manufacturing. If desired, during the surprise checking Utility/employer shall take sample of raw material and will check for the material properties. In case, the same is not found as per the specification, the entire lot under process shall be rejected. |

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| **10.0** | **INSPECTION AFTER RECEIPT AT STORE** | The material received at employer/utility's store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection or approved GTP & drawings and one copy of the report shall be sent to the Utility/employer. |
| **11.0** | **GUARANTEE** | Contractor shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the employer/utility up to a period of at least 24 months from the date of commissioning or 30 months from the date of last supplies made underthe contract whichever is earlier, contractor shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the employer/utility, failing which the employer/utility will be at liberty to get it replaced/rectified at contractor's risks and costs and recover all such expenses plus the employer's own charges (@ 20% of expenses incurred), from the contractor or from the "Security cum Performance Deposit" as the case may be. |
| **12.0** | **PACKING** | The contractor shall be responsible for suitable packing of seals, colour wise. The contractor shall have to supply each 100 seals in chronological order i.e. arranging in serially, tied with the steel wire forming a loop and same shall be packed in polythene bag with labels furnishing serial no., colour etc. & further packed in cardboard boxes for safety in transit. |
| **13.0** | **TENDER SAMPLE** | Contractors are required to manufacture 05 sample seals of each colour as per the Utility/employer specification and submit (non-returnable) the sample along with bid for approval. These samples to be submitted in Meter Testing Lab & intimated to Utility/employer.<br>The tender sample seals shall be provided with trademark and logo of firm on front side & month and year of manufacturing on back side of the female part of the seal. The offer without samples shall be out rightly rejected and the offer shall not be considered. The samples seals shall be tested as per the specifications, either in Utility/employer's laboratory or at third party govt approved laboratory, as per the discretion of Utility/employer. The tender sample seals not conforming to the specifications shall be straight war rejected and accordingly, their offer will not be considered for further evaluation. |
| **14.0** | **QUALITY CONTROL** | The contractor shall submit with the offer Quality assurance plan indicating the various stages of internal factory inspections, tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and after finishing final product.<br>Quality should be ensured at the following stages:<br>· Inwards raw material<br>· At Female part moulding along with seal wire<br>· At male part moulding with seal wire<br>· On finished product<br>· Prior to packing<br><br>The Utility/employer's engineer or its nominated representative shall have free access to the manufacturer's works to carry out inspections of QAP. |

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| **14.1** | **IDENTIFICATION OF DUPLICATES** | Contractor shall ensure that process cannot be duplicated to prevent duplicate seals.<br>However, in case Utility/employer finds any doubtful seal at site, manufacturer/contractor shall visit the site for certifying whether the seals are genuine or duplicate.<br>Manufacturer/contractor shall give a letter stating reason's for duplicate and technical report needs to be provided along with conclusions. A copy of the report should be sent to Plant Egg. Department. |
| **15.0** | **MINIMUM TESTING FACILITIES** | Contractor shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards/Utility/employer specification. The contractor shall have good/digital/calibrated instruments to check minute difference in dimensions & logo etc. |
| **16.0** | **MANUFACTURING ACTIVITIES** | The successful contractor will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart shall be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order. |
| **17.0** | **SPARES, ACCESSORIES AND TOOLS** | Not Applicable |
| **18.** | **SEAL WITH TRACKING & RECORDING SOFTWARE** | As per relevant regulations, seal tracking and recording software for all new seals shall be provided by the meter manufacturer/contractor. The software shall have following features<br>• Software should have facility of defining the system controller<br>• Facility to enter serial number of seals with the help of bar codescanner.<br>• Receiving of seal in the system and with authentication like signature.<br>• Facility to identify the concern who is responsible for receiving ofseals and nominated by system supervisor.<br>• Provision to define different type of seals for various uses.<br>• Software should have facility of report generation for inventory &issue records.<br>• Facility to track for relevant data for individual seal entered in the system. |

**19.0** **DRAWINGS AND DOCUMENTS**

Following drawings & Documents shall be prepared based on Utility/employer specifications and statutory requirements and shall be submitted withthe bid:

**a)** Completely filled-in Technical Parameters.

**b)** General arrangement drawing of the meter

**c)** Terminal Block dimensional drawing

**d)** Mounting arrangement drawings.

**e)** General description of the equipment and all components withmakes and technical requirement

**f)** Type Test Certificates

**g)** Experience List

**h)** Manufacturing schedule and test schedule

After the award of the contract, soft copies or hard copies of following drawings, drawn to scale, describing the equipment indetail shall be forwarded for approval:

| S. No. | Description | For Approval | For Review Information | Final Submission |
|---|---|---|---|---|
| 1 | Technical Parameters | √ | | √ |
| 2 | General Arrangementdrawings | √ | | √ |
| 3 | Manual/Catalogues | | **√** | |
| 4 | Transport/ Shippingdimension drawing | | √ | √ |
| 5 | QA &QC Plan | √ | √ | √ |
| 6 | Routine, Acceptance and Type Test Certificates | √ | √ | √ |

All the documents & drawings shall be in English language.

Instruction Manuals (If applicable) : Contractor shall furnish softcopies and one hard copies of nicely bound manuals (In English language) coveringinstructions for use & application and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices if any.

| | | | | |
|---|---|---|---|---|
| **20.0** | **GUARANTEED TECHNICAL PARTICULARS** | **Sr. No.** | **PARTICULARS** | **TO BE FURNISHED BY Contractor** |
| | | 1 | Name & address of manufacturer | |
| | | 2 | Work's address | |
| | | 3 | Raw material of polycarbonate seals | |
| | | 4 | UV resistance properties | |
| | | | Seal shall not be affect by boiling water & acid | |
| | | 5 | Seal should have 6 inch long 26 gauges,twisted strand stainless steel wire non corrosive & non magnetic | |
| | | 6 | Max. Withstand temperature (upto 147deg.c.) | |
| | | 7 | Thickness of seal | |
| | | 8 | Serial number should be laser printedon male & female part & should be separately visible after closing of seal | |
| | | 9 | Embosing of monogram is as Per specification | |
| | | 10 | Colour of the seals | |
| | | 11 | Seal should be constructed/moulded with one piece twisted sealed wire & polycarbonate male & female part such way that no extra seal wire is required. | |
| | | 12 | Seal design should be such that once seal is closed, the two parts should not be separated. | |
| | | 13 | Seal should permanently secure steel wire inside seal after closing of male & female part. | |
| | | 14 | Seal should have positive locking &locking should be easy & should be possible with pressure of thumb. | |
| | | 15 | 1. Surface finish- Male & female part – The surface should be free from any burr orcasting voids etc.<br>2. Embossing quality- embossing should have superior quality<br>3. Colour shade- the colour shades of all seals of specific color should be same. | |
| | | 16 | Guarantee of seal | |

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|---|---|---|---|---|
| | | 17 | SEAL IS PATENTED (Provide patent no.& patent drawing/design along with COPY OF PATENT certificate. | |
| | | 18 | Seal wire details | |
| | | 19 | Supplier/Contractor should have supplied minimum 1 lakh such seals to power utility. Give details. | |
| | | 20 | a. Color of female part<br>b. Color of male part | |
| | | 21 | Manufacturer specific secret code - (Yes/No) | |
| | | | | |

## Appendix-A to Section 5 (REVISED)- HES and MDM

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 1. | **Collection of Daily Meter Profile** | | | |
| 1.1 | At scheduled frequency HES should pull the Daily Meter Data from Smart Meter over communication Channel | HES | Meter | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF, Non-critical Event Code / Date |
| 1.2 | Meter should send the data to HES. Provision for retrial should be there if Meter data is not collected within time. Consumption details including non-critical events will be in 15 min/30 min block data, and data could be incremental to what was sent by meter in preceding Instance. **Meter Shall have the provision to sent the data to HES on push Mode**. | Meter | HES | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF, Non-critical Event Code / Date |
| 1.3 | HES should send the data to MDM | HES | MDM | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF |
| 1.4 | MDM should send the required parameter to Prepaid system for daily charge calculation at least once on daily basis | MDM | Prepaid Engine | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF, Non-critical Event Code / Date |
| **2.** | **Monthly Billing profile collection** | | | |
| 2.1 | Command from Billing system triggered and send to MDM / HES for collection of Monthly billing Data | Billing System | MDM / HES | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF, Non-critical Event Code / Date |
| 2.2 | At scheduled frequency HES should pull the monthly meter data from Smart Meter over the communication channel | HES | Meter | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF, Non-critical Event Code / Date |
| 2.3 | Meter should send the data to HES. Provision for retrial should be there if Meter data is not collected within time. | Meter | HES | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF, Non-critical Event Code / Date |
| 2.4 | HES should decrypt and validate the data collected and send to MDM | HES | MDM | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF, Non-critical Event Code / Date |
| 2.5 | MDM should send the required parameter to Billing system for Monthly Bill calculation | MDM | Billing Engine | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF, Non-critical Event Code / Date |
| 3. | **Remote Meter disconnection** | | | |

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 3.1 | Meter disconnect operation command after wallet balance calculation | Prepaid Engine/ Billing system | MDM | Meter Number, group of meters, instruction to close switch |
| 3.2 | Disconnection alert sent to consumer | MDM | Billing System | Meter Number, group of meters, instruction to close switch |
| 3.3 | Meter disconnection operator command | MDM | HES | Meter number, action (disconnect) |
| 3.4 | Consumer meter disconnection | HES | Meter | Meter Number, switch status |
| 3.5 | Disconnection Status Update | Meter | HES | Meter Number, switch status |
| 3.6 | Disconnection Status Update | HES | MDM | Meter Number, switch status |
| 4. | **Remote Meter Reconnection** | | | |
| 4.1 | Meter reconnect operation command after wallet recharge Billing | Billing system/ Prepaid Engine | MDM | Meter Number, group of meters, instruction to close switch |
| 4.2 | Meter reconnect operation command | MDM | HES | Meter Number, group of meters, instruction to close switch |
| 4.3 | Consumer meter reconnection | HES | Meter | Meter number, action (reconnect) |
| 4.4 | Reconnection Status Update | Meter | HES | Meter number, action (reconnect) |
| 4.5 | Reconnection Status Update | HES | MDM | Meter number, action (reconnect) |
| 5. | **Utility detects tampering at consumer site** | | | |
| 5.1 | High priority events captured by Meter sent to HES as and when occurred | Meter | HES | Meter Number, event date & time, event Code /description |
| 5.2 | High priority events reach MDM for further action. | HES | MDM | Meter Number, event date & time, event Code /description |
| 5.3 | Share with WFM to Notify utility personnel for site inspection | MDM | WFM | Consumer number, Meter Number, Tamper code, address |
| 5.4 | On analysis and detection of valid tamper event or malfunction, the tamper event must be sent / pushed by the meter to the HES /MDM | Meter | HES/ MDM | Consumer number, meter number, action to be triggered (disconnect), action date & time |
| 5.5 | HES sends disconnect command to meter | HES | Meter | Meter Number, action (disconnect) |

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 5.6 | Tamper event shared with CIS/CRM. Billing determinants are updated for tamper invoicing | MDM | CIS / CRM | Meter Number, event date & time, event Code /description |
| 5.7 | Meter re-connection order once tamper issue is resolved | MDM | HES | Meter number, action (re-connect) |
| 5.8 | HES sends re-connect command to meter | HES | Meter | Meter Number, action (re-connect) |
| 6. | **Missed interval readings** | | | |
| 6.1 | On identifying missed interval, HES will re-acquire data for the missing period from meter | HES | Meter | Meter Number, from date & time, to date & time (for which data is missing) |
| 6.2 | On receiving data request command, meter will send data to HES | Meter | HES | Meter Number, reading date & time, kW, kVA, kWh, kVAh |
| 6.3 | Missed Interval and Reads Data acquired by MDM | HES | MDM | Meter Number, readings with date & time |
| 7. | **Consumer connection outage/restoration event** | | | |
| 7.1 | Outage/restore event recorded by meter is sent to HES as and when event occurs | Meter | HES | Meter Number, Outage / restoration Date / Time, Power On or Off count |
| 7.2 | Outage / Restoration Notification | HES | MDM | Meter Number, Outage / restoration Date / Time, Power On or Off count |
| 7.3 | Sharing Outage / Restoration Notification | MDM | OMS/CIS-CRM | Meter Number, Outage / restoration Date / Time, Power On or Off count |
| 7.4 | Meter read request from OMS to identify service outage / restoration | OMS | MDM → HES | Meter Number, |
| 7.5 | Meter responds to event poll from HES | Meter | HES | Meter number, Status (live/dead) |
| 8. | **Remote firmware upgrades/ meter configuration changes** | | | |
| 8.1 | Remote firmware upgrade | HES | Meter | Firmware |
| 8.2 | Configuration Commands: Change tariff parameters, Synchronize clock, Registers reset (status, max, tampering) | HES | Meter | Meter number, tariff parameters, registers status, event type and priority |
| 8.3 | Status update of Firmware / Configuration | Meter | HES | |
| 9. | **Load monitoring at demand side** | | | |
| 9.1 | When there is a load violation event recorded in the meter, the information is sent to the CC | Meter | HES → MDM | Meter Number, max demand, date & time of load violation |
| 10. | **Time synchronization** | | | |
| 10.1 | Synchronizing RTCs of meters / DCUs/ACP | HES | DCU/Meter | Time Setting |
| 11. | **Metering network changes** | | | |

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 11.1 | Change / new installation in Meter / DCU Network Hierarchy | Meter / DCU | HES | Network identification info including DCUs |
| 11.2 | Change / new installation in Meter / DCU Network Hierarchy | HES | MDM | Network identification info including DCU |
| 12. | **New consumer connection** | | | |
| 12.1 | Receive verified pre & post-paid new consumer requests | CIS-CRM/ Billing | MDM | Consumer name, address. Connection request etc. |
| 12.2 | Generate meter installation order | MDM | /WFM | Consumer ID & details |
| 12.3 | Receive meter installation report | WFM | MDM | Meter number, DT no, Feeder & reading |
| 12.4 | Requesting instant, interval & events data from meters | MDM | HES → Meter | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 12.5 | Acquire instant, interval / events data from meter by HES which then reaches MDM system. | HES | MDM | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 12.6 | Once new meter remote read verification is over, confirm new connection with other applications | MDM | Billing / CIS-CRM | Consumer ID, Consumer address, Meter Number, initial reading etc. |
| 13. | **Migrate post-paid consumer to prepaid mode** | | | |
| 13.1 | Receive migration request | CIS-CRM/ Billing | MDM | Migration request for post-paid consumer with profile |
| 13.2 | Setup prepaid consumer profile in prepaid engine. If no change in meter is required, skip next two steps | MDM | Prepaid Engine | Prepaid consumer profile |
| 13.3 | Generate prepaid meter installation order if required | MDM | WFM | Consumer ID & details |
| 13.4 | Receive meter installation report | WFM | MDM | Meter number, DT no, Feeder & reading |
| 13.5 | Enable prepaid mode in meter | Prepaid engine | HES → Meter | Engineering token |
| 13.6 | Receive activation confirmation | HES | MDM | Activation status |
| 13.7 | Request instant, interval & events data from meter | MDM | HES → Meter | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 13.8 | Acquire instant, interval / events data from meter by HES which then reaches MDM system. | HES | MDM | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 13.9 | Once meter remote read verification is over, share migration request completion detail with other modules | MDM | Billing / CIS-CRM | Prepaid consumer profile |
| 14. | **Migrate prepaid consumer to post-paid mode** | | | |

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 14.1 | Receive migration request | CIS-CRM | MDM | Migration request for prepaid consumer with profile |
| 14.2 | Request meter data | MDM | HES → Meter | Meter Number, Consumer ID |
| 14.3 | Acquire instant, interval / events data from meter by HES which then reaches MDM system. | HES | MDM | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) with balance credit |
| 14.4 | Send meter disconnect command | MDM | HES → Meter | |
| 14.5 | Receive connection status | HES | MDM | Disconnect status |
| 14.6 | Enable post-paid mode in meter | MDM | HES → Meter | Engineering token |
| 14.7 | Receive activation of post-paid mode | HES | MDM | Activation Status |
| 14.8 | Request instant, interval & events data from meter | MDM | HES → Meter | Meter Number, Consumer ID |
| 14.9 | Acquire instant, interval / events data from meter by HES which then reaches MDM system. | HES | MDM | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 14.10 | Once meter remote read verification is over, share migration request completion detail with other modules | MDM | Billing / CIS-CRM | Post-paid consumer profile and meter data along with credit balance |
| 15. | **Consumer Registration in Consumer Portal/ App** | | | |
| 15.1 | Consumer clicks on new user on consumer portal/ App, provides RMN or email ID and submits data | Portal/ App | CIS/CRM | Request for registration with RMN/email ID |
| 15.2 | Utility receives request for registration and sends OTP after verification | CIS/CRM | Email/Message Gateway | OTP |
| 15.3 | Consumer submits OTP | Portal/ App | CIS/CRM | |
| 15.4 | Consumer receives registration detail | CIS/CRM | Email Gateway | Login ID and default password |
| 15.5 | Consumer submits first login request | Portal/ App | CIS/CRM | |
| 15.6 | System seeks password change | CIS/CRM | Portal/ App | |
| 15.7 | Consumer changes default password | Portal/ App | CIS/CRM | |
| 16. | **Consumer Access to Consumption, Billing & Profile Data** | | | |
| 16.1 | Consumer logs in to Portal/ App | Portal/ App | MDM | |
| 16.2 | Consumer Profile for Portal/ App | CIS-CRM | MDM →Portal/ App | Name, Account, Address, Service Points, K Number |
| 16.3 | Consumption Data | MDM | Portal/ App →UI | Consumption profile |

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 16.4 | Billing (post-paid) / Credit Balance (prepaid) | Billing → MDM | Portal/ App | Post-paid Billing history/ Current Bill, Prepaid Recharge history |
| 17. | **Prepaid Consumer Recharge** | | | |
| 17.1 | Consumer logs into Portal / Mobile App | Mob App / Portal | UI | Login |
| 17.2 | Consumer fills-in required detail in UI and requests recharge | UI→ Prepaid App | Payment Gateway | Consumer ID, Recharge amount |
| 17.3 | Consumer selects payment method | Payment Gateway | Net banking /Credit Card / Wallet etc. | |
| 17.4 | Consumer receives payment acknowledgement | Payment Gateway | Prepaid App→Portal→UI | |
| 17.5 | Calculate credit balance for prepaid consumer & update prepaid meter | Prepaid App | HES→Meter | Consumer credit balance (virtual token) |
| 17.6 | Notify credit balance to consumer | Prepaid App | Email/SMS Gateway | Credit Balance |
| 18. | **Post-Paid Consumer Bill Payment** | | | |
| 18.1 | Consumer logs into Portal / Mobile App | Mob App / Portal | UI | Login |
| 18.2 | Consumer is presented with Billing history and current outstanding Bill | Billing → MDM | Portal/ App→UI | Outstanding Bill |
| 18.3 | Consumer requests bill payment. Option to download bill | UI→Billing | Payment Gateway | |
| 18.4 | Consumer selects payment method | Payment Gateway | Net banking /Credit Card / Wallet etc. | |
| 18.5 | Consumer receives payment acknowledgement | Payment Gateway | Billing→ Portal/ App→UI | |
| 18.6 | Payment acknowledgement through email/SMS | Billing | Email/SMS Gateway | Payment acknowledgement |
| 19. | **Consumer Service Request** | | | |
| 19.1 | Consumer logs in to Portal/ App | Portal/ App | CIS/CRM | |
| 19.2 | Consumer requests for service | UI | CIS/CRM | Service request |
| 19.3 | System assigns SRN & sends acknowledgement | CIS/CRM | Portal/ App→UI, Email/SMS Gateway | |
| 19.4 | System resolves request & updates consumer records | CIS/CRM | Portal/ App→UI, CIS/CRM | |
| 19.5 | System closes SRN | CIS/CRM | Email/SMS Gateway | |
| 20. | **Consumer Complaints** | | | |
| 20.1 | Consumer logs into Portal/ App | Portal/ App | CIS/CRM | |
| 20.2 | Consumer registers complaint | UI | CIS/CRM | Specific complaint |

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 20.3 | System assigns CRN & sends acknowledgement | CIS/CRM | Portal/ App→UI, Email/SMS Gateway | |
| 20.4 | System assigns resolution based on nature of complaint | CIS/CRM | CIS / OMS / WFM | |
| 20.5 | Target system reports completion of complaint | OMS / WFM | CIS/CRM | |
| 20.6 | System updates records and closes CRN | CIS/CRM | CIS, Email/SMS Gateway | |
| 21. | **Demand read of meters from consumer premises** | | | |
| 21.1 | Requesting instantaneous, interval, load profile & events data from meters | MDM | HES→Meter | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 21.2 | Acquire instant, interval, load profile & events data from meters by HES which then reaches MDM system. | Meter→ HES | MDM | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 22. | **Staff User Access to Utility Portal** | | | |
| 22.1 | User logs in to Portal | Portal | MDM | Login with appropriate credentials |
| 22.2 | User selects available functions | MDM | Portal → UI | |
| 22.3 | User logs out | Portal → UI | MDM | |