

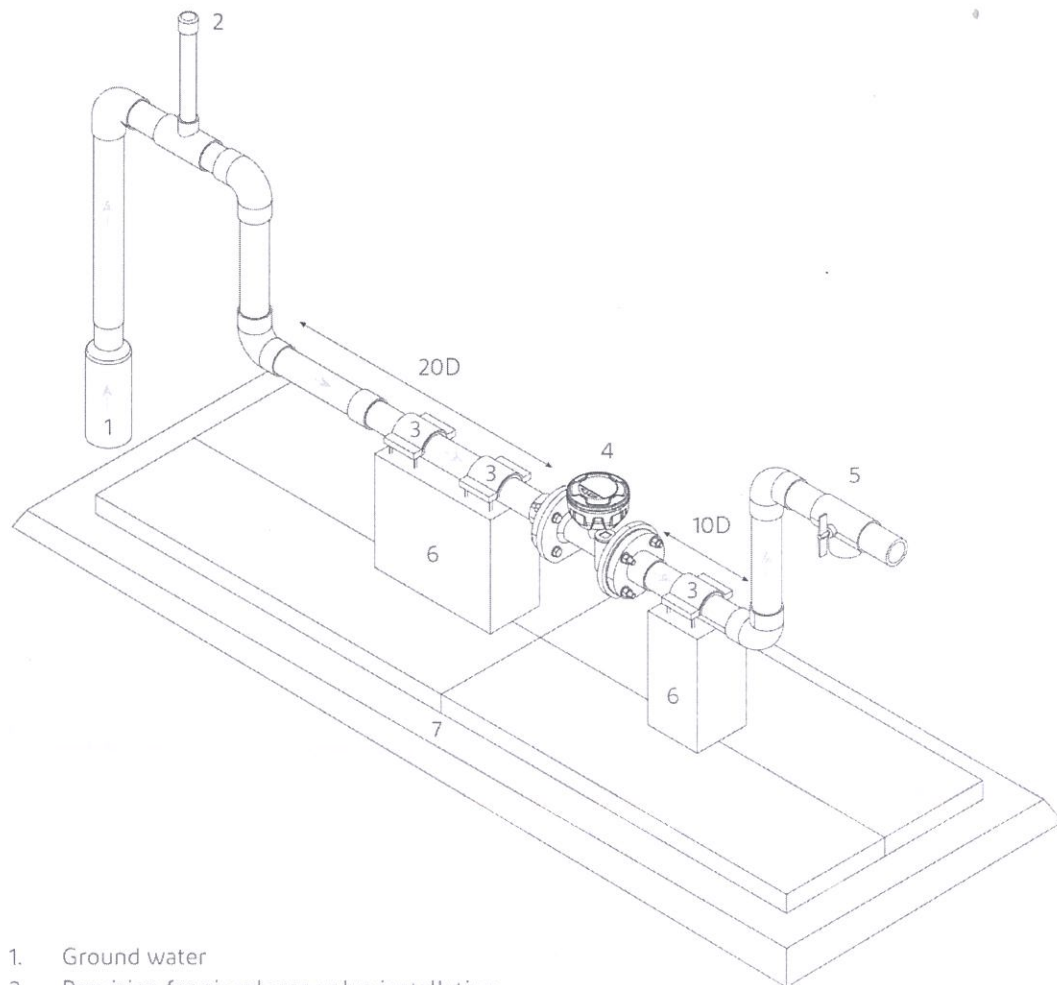
**GOVERNMENT OF TELANGANA  
GROUND WATER DEPARTMENT**

**Specifications of Tamper-proof Digital Water Flow Meters with Telemetry for  
Monitoring Groundwater Abstraction, Recommended by IIT Kanpur.**

<b>Tamper-proof digital water flow meter with telemetry specifications</b>	
Metering Technology	Ultrasonic or Electromagnetic
Communication type	Wireless Cellular - GPRS/3G/4G/5G/NB IoT
<b>Tamper proof</b>	
a) Power source	<p><b>Both the flow meter and telemetry components shall be battery-operated, eliminating the need for any external power sources or renewable energy.</b></p> <p>The entire system, including the battery, must be enclosed in an IP68 rated box for protection against water and dust.</p> <p>Battery should have a minimum lifespan of 3 years. The battery shall be replaceable without any data loss.</p>
b) Sealing	<p>The flow meter and telemetry system shall feature both mechanical and electronic seals to identify any tampering attempts.</p> <p>Any unauthorised attempt to open the meter or system enclosure shall physically damage the mechanical seal and trigger an automatic alert to the online server.</p>
c) Tampering	Tampering with flow meter data is strictly prohibited
Accuracy	The flow meter shall meet the accuracy standards of ISO 4064:2014, class 2.
Ingress Protection	Both the Flow Meter and Telemetry Unit shall comply with IP68 standards for protection against water and dust ingress.
Certifications	ISO 4064: 2014, IP68
Device Approval	The manufacturer shall provide a meter performance certificate from any of the Govt. NABL accredited laboratories (like Fluid Control Research Institute (FCRI) or National Physical Laboratory (NPL) or others)

Parameters to monitor	<p>The flow meter shall transmit the following parameters as per the scheduled frequency</p> <ul style="list-style-type: none"> <li>● Timestamp</li> <li>● Instantaneous flow rate</li> <li>● Cumulative forward flow volume</li> <li>● Cumulative reverse flow volume</li> <li>● Cumulative hours of pump operation</li> <li>● Meter serial number</li> <li>● Device last calibration date</li> <li>● Borewell id (Provided by TSGWD)</li> </ul>
Communication security	The communication between the flow meter and cloud servers shall be secured with a minimum TLS1.2 standard to ensure data integrity and privacy.
Data storage in cloud	The Communication/telemetry data should be directly captured in a secure cloud. The cloud service provider should be empaneled with The Ministry of Electronics and Information Technology (MeitY).
Logging and transmission frequency	<p>Data shall be logged three times a day at 8 AM, 4 PM, and 12 AM.</p> <p>Data transmission to cloud servers shall occur once a day.</p> <p>In case of weak cellular signals, the meter should store data and transmit it to the cloud once communication is restored, with storage capacity for at least 2 years.</p>
Material of construction	Brass/Bronze/MS/CI/SS/Engineering Plastic
Calibration	The flow meters shall be calibrated from a laboratory accredited by NABL as per ISO 17025: 2017 standard.
Data sharing with TSGWD	<p>The un-tampered data shall be sent to the state groundwater department portal through APIs.</p> <p>Direct data transfer from flow meters to the department server may be implemented in the future to enhance security and prevent data tampering at the server level.</p>
<b>Installation of tamper proof flow meter</b>	
Location	Water meters shall be installed within the premises, with

	<p>sturdy support and above the ground level to avoid immersion in water.</p> <p>The meter shall not be embedded in concrete or full metal chambers and must be easily accessible for maintenance and inspection.</p>
Position	The meter shall be installed at the very beginning of the borewell outlet before any offtake.
Bypassing	Bypassing of the pipe at the flow meter is strictly prohibited.
Installation	<p>The installation of the meter shall be in compliance with ISO 4064-5.</p> <p>To ensure a consistent full flow of water without any air bubbles in the installation line, it is mandatory to install the piping in a 'U' shape configuration, accompanied by an appropriate air release valve positioned before the meter.</p> <p>Sufficient upstream and downstream unobstructed straight lengths shall be provided for the meter according to the sensitivity class (ISO 4064-5) as prescribed by the manufacturer.</p> <p>Refer to Figure 1. for installation guidelines.</p>
Yearly Calibration	<p>The flow meters shall undergo yearly calibration from an NABL accredited laboratory, either on-site or in the lab.</p> <p>Issuing a calibration certificate without actual calibration is strictly prohibited.</p>



1. Ground water
  2. Provision for air release valve installation
  3. Clamps
  4. Tamper proof digital water flow meter
  5. Potable opening
  6. Support structure
  7. Ground level
- Flow direction

Figure. 1 Installation position of tamper proof flow meter with telemetry at groundwater abstraction structures