

**SPECIFICATION FOR ELECTROMAGNETIC TYPE
WASTEWATER FLOW METERS**

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TABLE OF CONTENTS

	Page Number
1. General	8bbm-3
2. Performance Specifications	8bbm-3 8bbm-4
3. Flow converter	8bbm-5
4. Flow Element	8bbm-6
5. Manufacturer	8bbm-6
6. Warranty & Submittals	8bbm-6
7. Spares	8bbm-7

SPECIFICATION FOR ELECTROMAGNETIC TYPE WASTEWATER FLOW METERS

1.0 GENERAL:

Flow meters including their protective coatings and joint materials that will come into contact with wastewater/sewage, which may be of acidic nature and associated with the evolution of hydrogen sulfide. Therefore meters shall not cause sulfuric acid corrosion and shall have high resistance to acids in sewage.

Each Electromagnetic flow meter shall have the following design features and engineering specifications. The manufacturer of equipment shall have obtained ISO 9001:2015 Quality Management System certification for equipment manufacturing factory from an accredited Agent which shall be a member of International Accredited Forum (IAF). Scope of the production shall be clearly specified in the certificates. Manufacturer shall maintain the validity of this certificate during the contract period. When the components are from more than one factory, ISO 9001:2015 certificates shall be submitted for each factory.

The manufacturer shall have certificates for the conformity of goods for ISO 20456:2017 or latest from an accredited agent which shall be a member of International Accredited Forum (IAF). The manufacturer shall maintain the validity of this certificate during the contract period.

The Contractor shall provide all equipment specified under the Contract which shall be furnished by the equipment manufacturer who shall be responsible for the adequacy and compatibility of all unit components. Any component of equipment not provided by the manufacturer shall be designed, fabricated, tested and installed by factory authorized representatives experienced in design and manufacture of such components. This requirement, however, shall not be construed as relieving the Contractor of the overall responsibility for this portion of work.

The specifications indicated in the equipment shall be according to the basic requirement of the Employer and is not intended to describe each and every item particular to any specific equipment. Therefore, it may be anticipated that supporting accessories, connection pipes and valves specified in part or whole, shall be accommodated in the equipment as per the manufactures recommendations.

2.0 PERFORMANCE SPECIFICATIONS

The flow meter shall be of the electromagnetic type including signal converter with an accuracy of $\pm 0.5\%$. The meter shall be able to register the instantaneous and total accumulated flow. Flow meter shall comply with ISO 20456:2017 or latest.

The flow meter including lining shall be rated for waste water purpose. Capsulation shall be minimum IP 68.

The measuring capacity shall be as indicated for the pumping installation to which the meter is furnished. Power supply to the meter shall be 230 V AC, 50 Hz. The following output signals shall be available from the meter:

- Analogue current signal, 4 - 20 mA
- Pulse and status signal

Each meter shall be provided with bracket and cable for remote installation of the signal converter.

Flow converter may not be installed directly on the flow element but may be placed in an appropriate location in the pump room.

Flow meter shall be installed with straight pipe piece minimum size of 5xD at up stream of flow meter as well as straight pipe piece minimum size of 3xD at downstream of flow meter. All pipes & pipe fittings necessary for installation work shall be Ductile Iron or otherwise material relevant to the pumping main.

- Inspection and Test certificates from an accredited inspection agency which shall be a member of International Accredited Forum(IAF) shall be provided for each instrument, and this include testing during manufacturing, after manufacturing and prior to shipping.
- the equipment shall be guaranteed suitable for the ambient and process liquid temperatures,
- Primary units shall be suitable for submergence to a depth of 3 metres.
- the flow meter equipment shall be supplied complete with amplifier (converter), and all cable for connection between the components. The termination box shall be sealed to IP68.
- the amplifier/converter shall be fully screened to prevent interference from adjacent equipment and shall be remote from the primary units,
- The display of the amplifier/converter shall be with indication for actual flow, accumulated flow, fault indication and calibration.
- Accuracy: less than $\pm 0.5\%$ at maximum design flow
- Lining: Polyurethane rubber or chloroplane rubber or equivalent, suitable for sewage application.
- Electrode: Stainless Steel (SUS 316L) or equivalent, suitable for sewage application.
- Output signal 4 ~ 20 mA DC galvanically isolated (For actual flow rate)
- pulse output (For accumulative flow)

- status output (e.g. for alarm, high and high-high , 3 contacts if possible)

The electromagnetic flowmeter shall be of separated type in which detector and converter/transmitter are not combined.

3.0 FLOW CONVERTER

The flow converter shall comply with the following requirements as a minimum:

- Remote panel door mounted display with background illuminated and display shall indicate the actual flow and accumulated flow (resetable). The length of display cable shall be of 15-20 m. (Please insert the actual length as per the site)
- Analogue output (4-20 mA) flow, load min. 600 ohms.
- Digital pulse output freely scaled according to the actual flow range, e.g. 1 pulse per 10m³ or 100m³. It shall be configured to give one pulse approximately once a minute at 100 % nominal flow.
- Pulse width adjustable from 0.05 seconds to 1 sec.

The converter / transmitter including built-in microprocessor shall have the following functions:

- (i) Instantaneous flow rate digital display ;
- (ii) Totalization digital display ;
- (iii) Soft keys for easy calibration ;
- (iv) Self-diagnostic;
Converter failure, flow tube failure, setting error shall be diagnosed and displayed.
- (v) Automatic zero adjustment ;
Zero point shall be able to adjust automatically with front panel key when the flow velocity is zero.
- (vi) Totalization/ presetting ;
Totalized value shall be able to be pre-set with a front panel key,
- (vii) No Flow cut – off,
No Flow cut – off shall be able to cut off by setting a rate limit.

- (viii) Arrester;
Built-in for power source (in case of separate supply) and output signal terminals
- (ix) Cable connection between sensor and transmitter.
- (x) Ground disk and earthing.

4.0 FLOW ELEMENT

The flow element shall comply the following

- Nominal size : as specified in the bill of quantities
- Connection type : flange connection DIN, ANSI, BS
- Protection : IP 68 NEMA 6
- Flow tube Material : Stainless steel
- Maximum Media temperature : 50 °C
- Maximum Pressure : 16 bar
- Each flow meter shall consist with relevant spares such as AD Card, Power supply Card and spares recommended by manufacturer. Itemized price list shall be provided with the offer.

5.0 MANUFACTURER

The manufacturing factory of equipment shall have obtained ISO 9001: 2015 Quality Management Systems certification and shall have an accredited agent in Sri Lanka carrying spare parts and maintenance facility. The local accredited agent for the equipment shall have been in the business in Sri Lanka at least five years and have supplied more than two equipment in similar nature during last three years.

6.0 WARRANTY & SUBMITTALS

Calibration report from an accredited laboratory shall be submitted by the manufacturer for each unit.

Comprehensive warranty from the manufacturer for entire equipment shall be provided for two years from the date of acceptance.

7.0 SPARES

The following spares for each flow meter shall be offered with the bid along with itemized price list ;

- Power card - 01 No
- Control Card(s) - 01 Set

Bidder shall provide manufacturer's details for purchasing spare parts requirement in future directly from manufacturer, spare parts catalogues to be included with the bid. In addition to that, five years manufacturer recommended spare parts shall be included with the bid including price list.