



Australian Government
**Department of Industry, Science,
Energy and Resources**

**National
Measurement
Institute**

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval
NMI 14/3/62

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

Rubicon Slipmeter SM model water meter

submitted by Rubicon Systems Australia Pty Ltd
1 Cato Street
Hawthorn East 3123 Victoria
Australia

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI M 11-1 *Meters Intended for the Metering of Water in Open Channels and Partially Filled Pipes, Part 1: Metrological and Technical Requirements*, dated August 2009.

This approval is subject to review at the decision of the Chief Metrologist in accordance with the conditions specified in the document NMI P 106.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern and Variant 1 approved – certificate issued	22/04/22

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/3/62' and only by persons authorised by the submitter.

It is the submitter's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.



Darryl Hines
Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No 14/3/62

1. Description of Pattern

approved on 22/04/22

A Rubicon SlipMeter SM model water meter used to measure water supplies for trade.

1.1 Field of Operation

The field of operation of the measuring system using the Rubicon SlipMeter SM model water meter is determined by the following characteristics:

Minimum flow rate, Q_1 :	1.0 ML/day
Maximum continuous flow rate, Q_3 :	31.5 ML/day
Overload flow rate, Q_4 :	39.0 ML/day
Flow rate ratio, Q_3/Q_1 :	31.5
Maximum admissible temperature:	30 °C
Maximum admissible pressure:	15 kPa
Head loss:	1.0 kPa (0.10 m)
Minimum water level:	180 mm
Accuracy class:	2.5
Electromagnetic class:	E2 (industrial)
Environmental class:	

Control pedestal and indicating device: B (enclosed)

Meter box and ultrasonic transducers: B or C (open)

Note: See clause 5.2 and Annex A of NMI M 11-1 for more information regarding environmental classes and their intended applications.

Orientation:	Horizontal only
Flow Direction:	Forward only
Power supply:	12 V DC self-contained battery charged from solar panel

1.2 Features/Functions

The pattern consists of a flow tube incorporating a series of 16 pairs of Sonaray ultrasonic flow transducers that are mounted into a cuboid meter box (conduit), an upstream entry flare, a downstream undershot control gate (Figure 1), an Ultrasonic or a MicronLevel water level sensor (with MODBUS interface) (Figure 2) and a control pedestal which incorporates an indicating flow computer (calculator/indicator) (Figure 3). The meter box and control gate are connected to the control pedestal via a cable.

The pattern is identified by the model designation 79200 SM.600.XXXX. Where XXXX specifies the maximum measurement of water level in millimetres (mm).

The meter box has the internal dimensions of 600 mm (height) x 600 mm (width) x 829 mm (length), with the ultrasonic flow transducer pairs to be aligned at an angle of 45°.

The pattern has features/functions as listed below:

Display: A digital, electronic, liquid crystal display capable of displaying totalised volume in units of cubic metres (m³) and megalitres (ML) allowing for an indication range of either:
000,000.0 ML to 999,999.9 ML with 0.1 ML increments; or
0,000,000,000 m³ to 2,147,483,647 m³ with 1 m³ increments

Communications: MODBUS output

Materials:

Component	Materials
Meter box	Marine grade aluminium alloys and composite material
Meter body, control gate, and other structural elements	Marine grade aluminium alloys and composite materials
Transducer housing	Injection moulded polycarbonate and polybutyleneterephthalate blend
MicronLevel sensor	Extruded marine grade aluminium, 316 graded stainless-steel, copper and gold connections.
Control pedestal	Marine grade aluminium alloys and composite materials

1.3 Conditions

1.3.1 Installation Conditions:

The Rubicon SlipMeter SM model water meter is designed to be installed into a reinforced concrete structure (Figure 4) that allows for the metering of water through the meter box (conduit) from either:

- open channel to closed conduit; or
- open channel to open channel applications.

The meter shall be installed and mounted into a structure such that no water leaks or bypasses the meter box.

The meter is approved to operate in submerged flow conditions with the meter box completely full of water. This is the recommended operating flow condition.

The meter is approved to operate in partially submerged flow conditions with the meter box partially full of water, with a minimum water level of 180 mm.

If the water level drops below 180 mm, an alarm is raised and displayed by the meter. The meter may be configured to remotely communicate the alarm. The displayed volume will not accumulate when the water level is below the minimum level, however the flow will still be measured, volume calculated and these values recorded in the memory and accessible via the MODBUS interface, allowing for subsequent estimations of volume. Such volume estimations are not covered under this approval.

Where the meter is connected to a downstream closed conduit pipe, the nominal diameter of the pipe shall be equal to the internal width of the meter box. (Figure 5)

The meter shall be installed such that all upstream flow disturbances are minimised or eliminated. This includes entry vortices generated by low submergence levels and high velocity cross flows in the upstream channel.

The meter shall be installed with minimum lengths of unobstructed channel and/or straight pipe as specified in Table 1. The upstream length measurement is taken from the entry flare, and the downstream length measurement is taken from the control gate.

Table 1 - Minimum upstream and downstream installation conditions

	Minimum unobstructed length of channel (mm)
Upstream	1100
Downstream	1100
	Minimum straight length of pipe (mm)
Upstream	Not applicable
Downstream	2000

1.3.2 Specified Installations

The meter (pattern and variants) has not been tested or evaluated for metrological performance in specified installations as part of this approval.

More information regarding specified installation testing may be found in NMI M 11-1 and NMI M 11-2.

1.3.3 Water Quality

The meter is approved for use in the metering of potable water supplies.

The meter is approved for use in the metering of non-potable water supplies of an unspecified quality.

1.4 Software Version

The pattern is approved for use with software/firmware versions:

- Flow sensor: V8.03
- Indicating flow computer: V6.11

1.5 Verification Provision

Provision is made for the application of a verification mark.

1.6 Sealing Provision

The pedestal and controller housing is sealed via a mechanical lock (Figure 6) preventing unauthorised access to the pedestal and indicating device. Unauthorised electronic access to the flow computer is prevented via the use of passwords. The flow computer is also mechanically sealed (Figure 7) using crimp seals providing evidence of unauthorised access and tampering.

1.7 Descriptive Markings and Notices

Instruments are marked with the following data, either grouped or distributed on the casing, the indicating device dial or an identification plate (Figure 8):

Manufacturer's name or mark	...
Serial number	...
Pattern approval number	NMI 14/3/62
Numerical value of maximum continuous flow rate, Q_3	...
Flow rate ratio, Q_3/Q_1	...
Unit of measurement	ML or m^3
Maximum admissible pressure	15 kPa
Head loss	1.0 kPa (0.10 m)
Minimum water level	180 mm
Orientation	H
Direction of flow	→ or similar
Accuracy class	2.5

For instruments that incorporate electronic devices, the following information can either be physically marked on the instrument or provided electronically via the indicating device or similar means:

Electromagnetic class	E2 (industrial)
Environmental class	
Control pedestal and indicating device:	B
Meter box and ultrasonic transducers:	B or C
For meters with an external power supply	the voltage and frequency
For battery powered meters	a replacement date or similar indication of expected battery life

2. Description of Variant 1

approved on 22/04/22

The pattern is approved with an alternative model designation Rubicon SlipMeter type model 73802 SMA-600-1500-L (Figure 9 and Figure 10).

The meter has the same features and functions as the pattern except the length of the flow tube is increased to 848 mm.

TEST PROCEDURE No 14/3/62

This Approval and Certificate is issued only with respect to the design (the pattern and variants) of the water meter described herein. The calibration and measurement accuracy of individual water meters manufactured and marked in accordance with the approved pattern and variants should be verified in accordance with the test procedures specified below, or as required by relevant legislation.

Water meters tested for initial verification shall comply with the Certificate of Approval, Technical Schedule, and the maximum permissible errors for initial and subsequent verifications at the operating conditions in effect at the time of verification. Maximum permissible errors for the initial and subsequent verification of water meters are given in the *National Trade Measurement Regulations 2009* (Cth).

Water meters shall be verified in accordance with NITP 14 *National Instrument Test Procedures for Utility Meters*.

The following exceptions apply for accuracy class 2.5 meters:

- The maximum permissible errors shall be:
 $\pm 2.5\%$ within the flowrate range Q_1 to Q_4 .
- The flow rates specified for initial verification in NMI M 11-2 shall replace the flow rates specified in NITP 14.

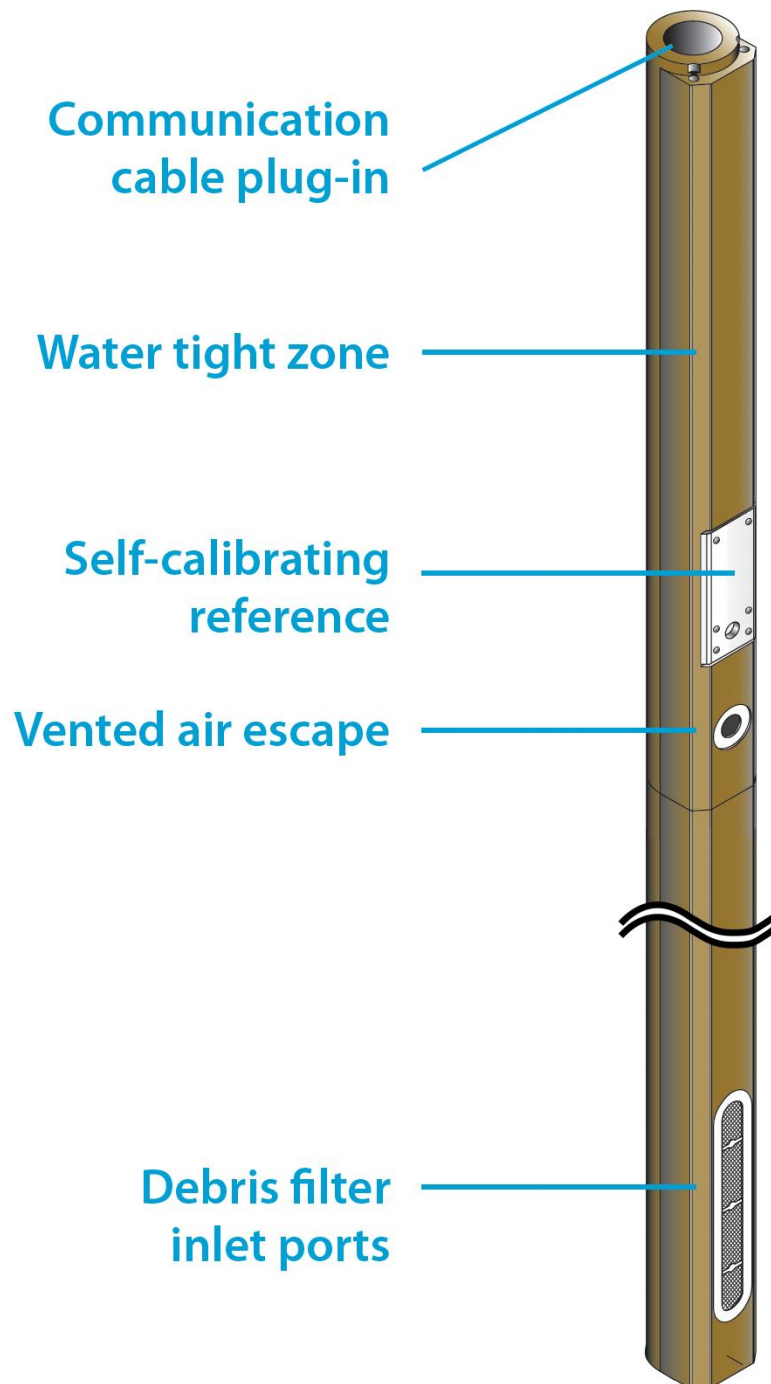
NOTE: NMI reserves the right to vary this procedure. Any such variation shall be notified in writing by NMI.

FIGURE 14/3/62 – 1



The Pattern – Rubicon SlipMeter SM model water meter –
Meter box, control gate and entry flare

FIGURE 14/3/62 – 2



Rubicon SlipMeter – MicronLevel water level sensor

FIGURE 14/3/62 – 3



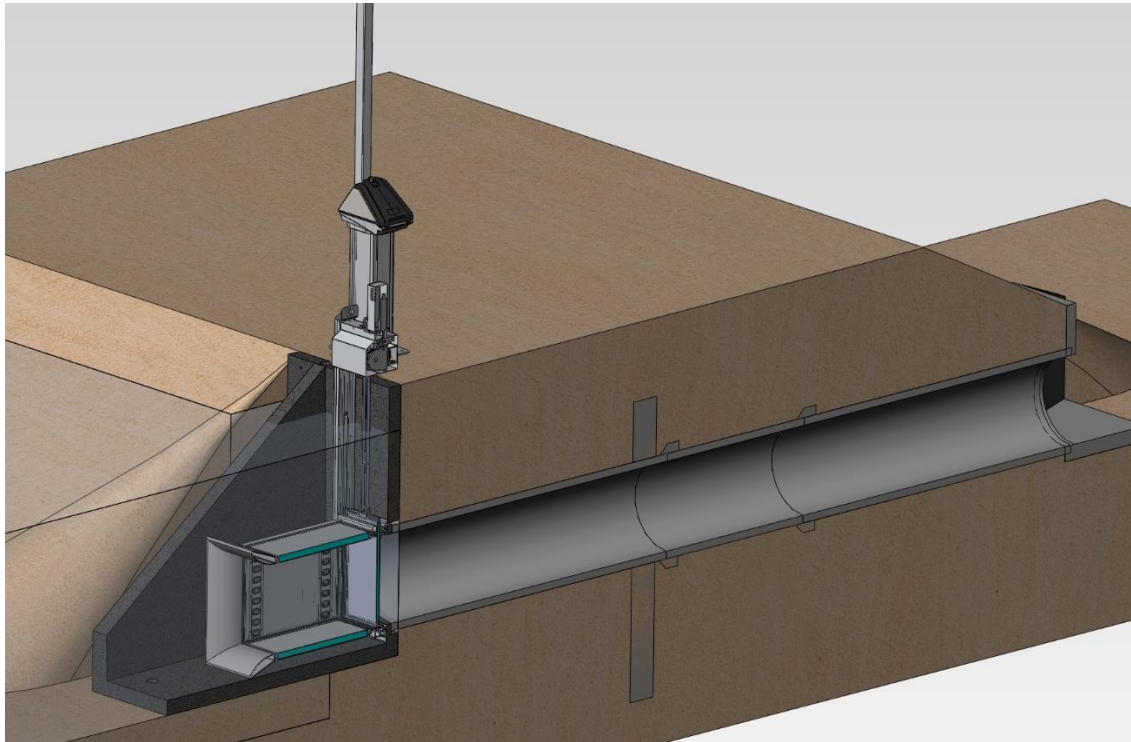
Image of the Control Pedestal and Indicating Device

FIGURE 14/3/62 – 4



Example of Rubicon SlipMeter installed into a headwall

FIGURE 14/3/62 – 5



SlipMeter - Example of downstream pipe connection

FIGURE 14/3/62 – 6




SlipMeter – Control Pedestal and Indicating Device Sealing

FIGURE 14/3/62 – 7




SM SlipMeter - Flow Computer Mechanical Sealing

FIGURE 14/3/62 – 8


RUBICON™

SlipMeter®
Patents applied for



Item No: 79200	Q3: 31.5 ML/d
Model No: SM-600-1500	Q3/Q1: 31.5
Serial No: 123456-012345	Accuracy Class: 2.5
Weight: 195kg, (429 lbs)	NMI 14/3/xx
IP Rating:	IP68 Submerged components
	IP54 Elevated components
Power Supply: 12 VDC	Max Pressure: 15 kPa
Flow / Orientation: Horizontal	Pressure Loss: Δp_0

Rubicon Water™

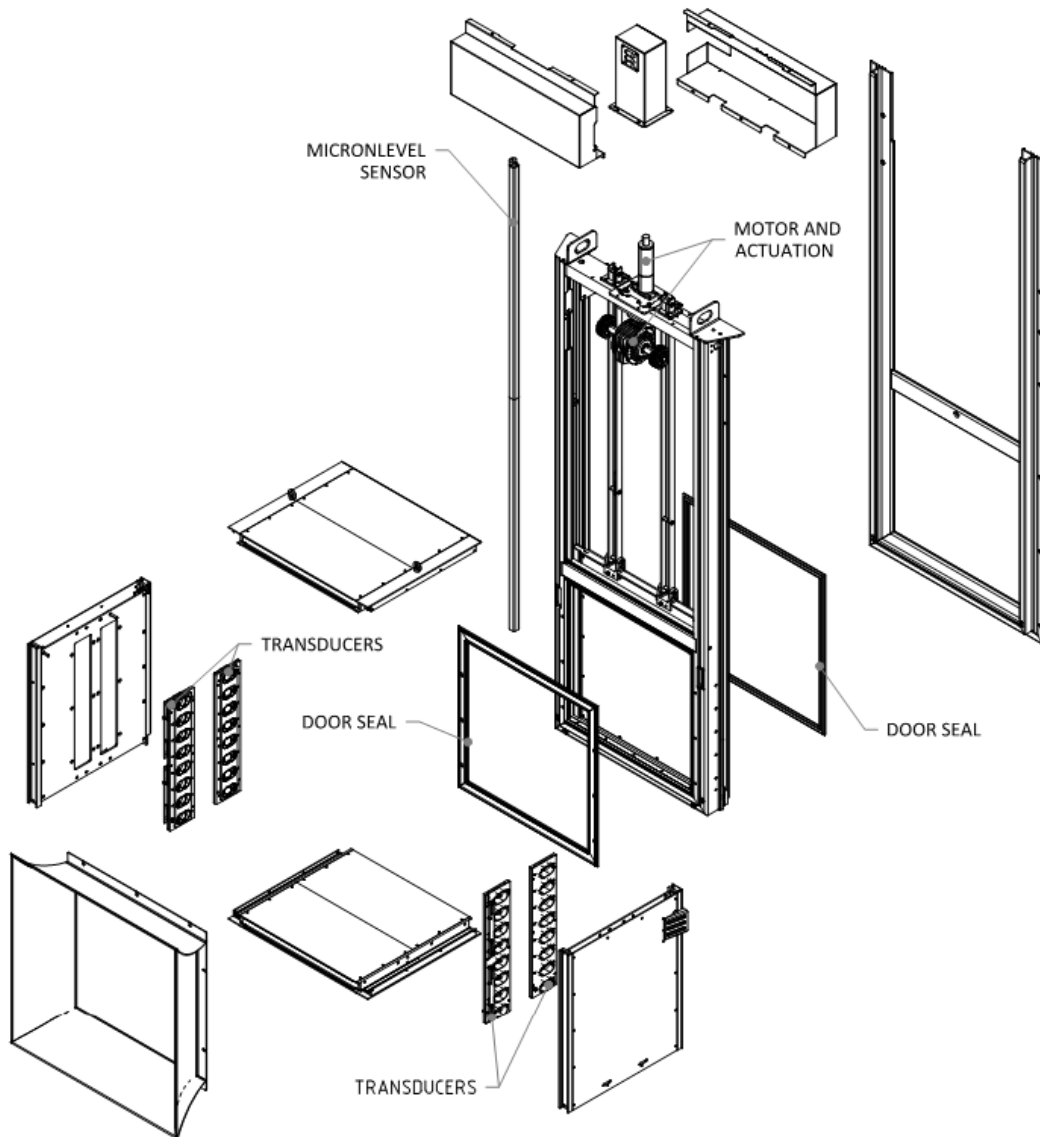
SlipMeter – Example Markings

FIGURE 14/3/62 – 9



Rubicon SlipMeter SMA model water meter –
Meter box, control gate and entry flare

FIGURE 14/3/62 – 10



Rubicon SlipMeter SMA model water meter –
Meter box, control gate and entry flare (exploded view)

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