



Australian Government  
Department of Industry,  
Innovation and Science

## National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

### Certificate of Approval NMI 14/3/42

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.

Sonaray Pipe Meter

submitted by      Rubicon Systems Australia Pty Ltd  
                                 (trading as Rubicon Water)  
                                 1 Cato Street  
                                 Hawthorn East VIC 3123

**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 10-1 *Meters Intended for the Metering of Water in Full Flowing Pipes. Part 1: Metrological and Technical Requirements* dated July 2010.

This approval becomes subject to review on **1/09/23**, and then every 5 years thereafter.

#### DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 & 2 provisionally approved – certificate issued	08/08/18
1	Provisional approval extended – certificate issued	08/03/19
2	Pattern and variants 1 & 2 approved – certificate issued	07/08/19
3	Variant 3 approved – certificate issued	12/06/20

## CONDITIONS OF APPROVAL

### General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/3/42' and only by persons authorised by the submitter.

Instruments purporting to comply with this approval and currently marked 'NMI P14/3/42' may be re-marked 'NMI 14/3/42' but 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 14/3/42

### 1. Description of Pattern

**approved on 08/08/18**

A DN600 sized Sonaray Pipe Meter used to measure non-potable water supplies for trade.

#### 1.1 Field of Operation

The field of operation of the measuring system using the DN600 Sonaray Pipe Meter is determined by the following characteristics:

Minimum flow rate, $Q_1$	1.0 ML/d
Maximum continuous flow rate, $Q_3$ :	31.5 ML/d
Overload flow rate, $Q_4$	40.0 ML/d
Flow rate ratio, $Q_3/Q_1$ :	31.5
Maximum admissible temperature:	50 °C
Maximum admissible pressure:	100 kPa
Pressure loss class:	$\Delta p_0$
Accuracy class:	2.5
Flow profile sensitivity class:	U2/D0 – see table 1
Electromagnetic class:	E1 & E2 (industrial)
Environmental class:	B, O & M (indoor, outdoor & mobile)
Orientation:	Horizontal
Flow Direction:	Forward
Power supply:	12 Volt DC solar powered battery

## 1.2 Features/Functions

The pattern consists of a series of ultrasonic flow sensors and flow computer/transmitter mounted into a flow tube (model: 74222AD) (Figure 1), a pedestal and controller housing (Figure 2) that incorporates the indicating device and indicating computer (model: Rubicon SolarDrive Board 77264), with the features and functions as listed below:

Connection type: Flanged

Display: A digital, electronic, liquid crystal display (Figure 3) capable of displaying totalised volume in units of litres (L), cubic metres (m<sup>3</sup>) 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 m<sup>3</sup> to 2,147,483,647 m<sup>3</sup> with 1 m<sup>3</sup> increments

0,000,000,000 L to 9,999,999,999 L with 1 L increments

Communications: MODBUS output

Materials: Flow sensor: Marine Grade Aluminium Alloys & Composite material

Pedestal and controller housing: Stainless Steel, Marine Grade Aluminium Alloys & Composite material

Meter length: 763 mm

## 1.3 Conditions

### 1.3.1 Installation Conditions:

No flow straightener or flow conditioner is required.

The flow profile sensitivity class is U2/D0 as detailed in Table 1.

**Table 1 minimum pipe lengths required by flow disturbance type**

Disturbance Type (*)	Minimum upstream pipe length	Minimum downstream pipe length
1	2	0
2	2	0
3	2	0

(\*) For information on the different types of flow disturbances which are examined as part of pattern approval, refer to NMI M 10-2.

### **1.3.2 Water Quality**

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

The meter was not tested for the effect of water quality; however some pattern approval testing was performed with a non-potable water of an unspecified nature.

### **1.4 Software Version**

The pattern is approved for use with software versions:

- Flow sensor: V8.51.
- Indicating flow computer: V6.41

### **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 4) preventing unauthorised access to the flow computer. Unauthorised electronic access to the flow computer is prevented via the use of passwords. The flow tube is mechanically sealed (Figure 5) 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 6):

Manufacturer's name or mark	...
Serial number	...
Pattern approval number	NMI 14/3/42
Numerical value of maximum continuous flow rate, $Q_3$	...
Flow rate ratio, $Q_3/Q_1$	...
Unit of measurement	ML or m <sup>3</sup>
Maximum admissible pressure	100 kPa
Maximum pressure loss	0 kPa or $\Delta p_0$
Orientation <sup>(1)</sup>	...
Flow profile sensitive class <sup>(2)</sup>	U2/D0
Direction of flow	→ or similar
Accuracy class	2.5

<sup>(1)</sup> Optional for meters approved for all orientations

<sup>(2)</sup> Optional for Accuracy class 2.5 meters or those approved as U0/D0

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	E1 and/or E2
Environmental class	B, O and/or M
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 08/08/18

The pattern may incorporate the Rubicon BladeMeter connection type model: 74220AD (Figure 7).

## 3. Description of Variant 2 approved on 08/08/18

The pattern may incorporate the Mann Pit connection type model: 74221AD (Figure 8).

#### **4. Description of Variant 3**

**approved on 12/06/20**

The pattern may incorporate the following flanged connection types:

- Sonaray PipeMeter BladeMeter Table D: 82175 (Figure 9)
- Sonaray PipeMeter BladeMeter PN16: 82176 (Figure 10)
- Sonaray PipeMeter BladeMeter B16.5 24": 82177 (Figure 11)
- Sonaray PipeMeter PN16: 82188 (Figure 12)
- Sonaray PipeMeter B16.5 24": 82189 (Figure 13)

## TEST PROCEDURE No 14/3/42

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*.

For accuracy class 2.5 meters:

- The maximum permissible errors for initial verification shall be  $\pm 2.5\%$  from  $Q_1$  to  $Q_4$ .
- The flow rates specified for initial verification in NMI M 10-2 may 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 14/3/42 – 1



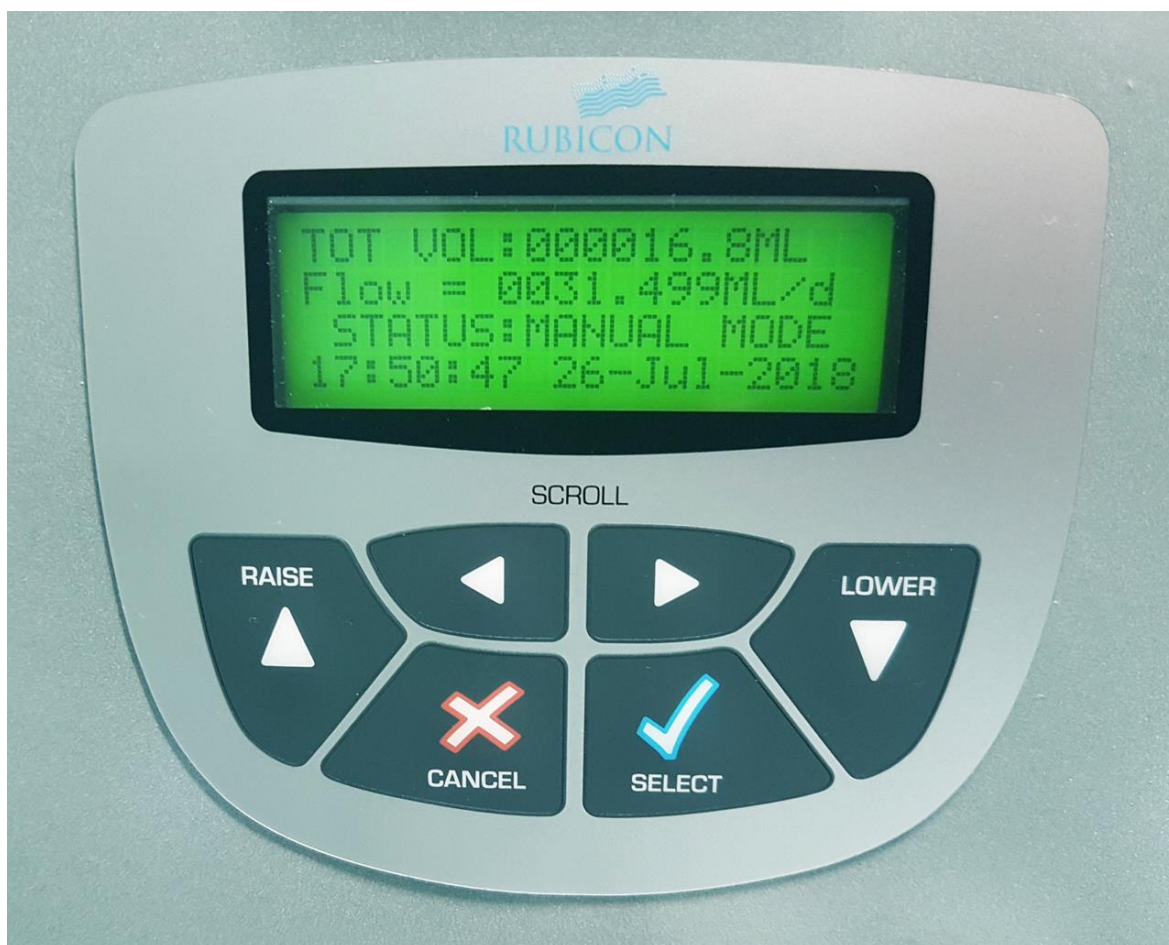
Sonaray Pipe Meter – Flow tube

FIGURE 14/3/42 – 2



Sonaray Pipe Meter – Pedestal

FIGURE 14/3/42 – 3



Sonarar Pipe Meter – Indicating device

FIGURE 14/3/42 – 4



Sonaray Pipe Meter – Pedestal sealing

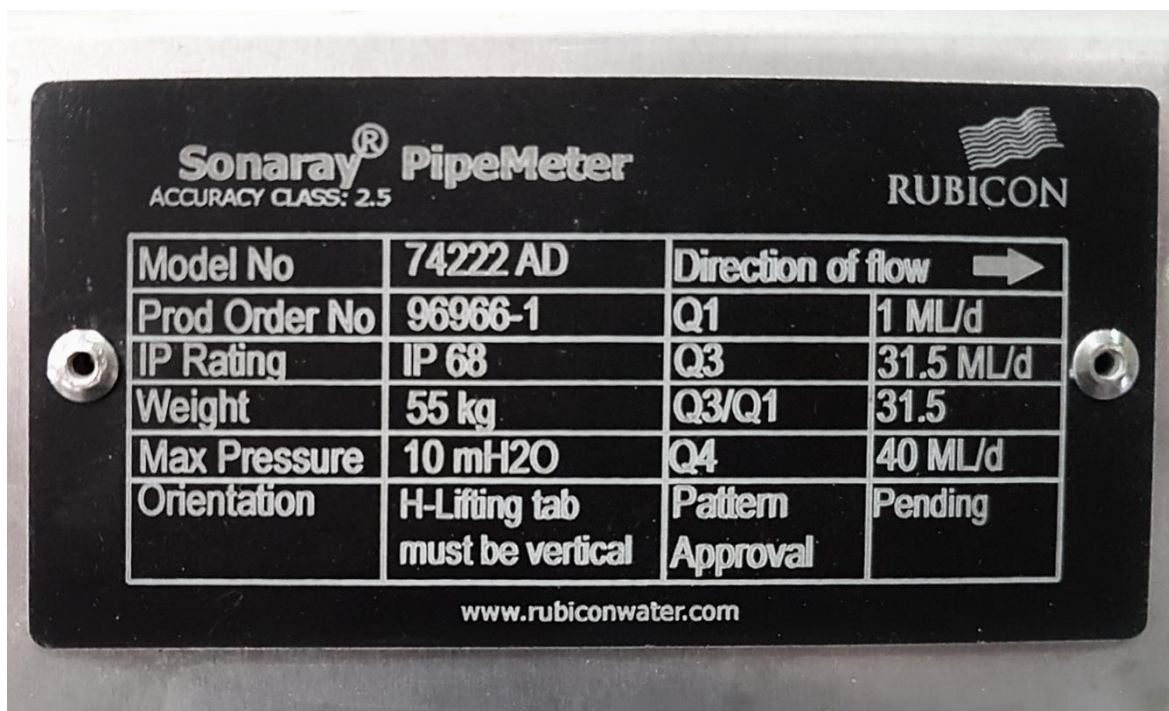
FIGURE 14/3/42 – 5



Sonaray Pipe Meter – Flow tube sealing



FIGURE 14/3/42 – 6



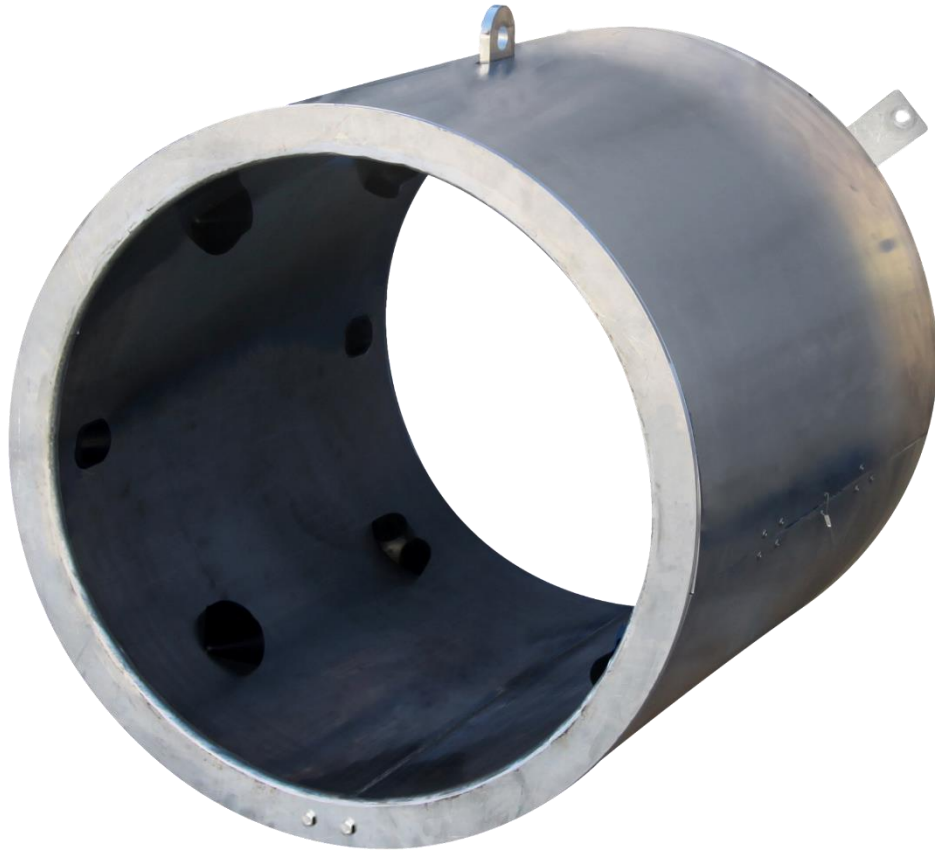
Sonaray Pipe Meter – Example markings

FIGURE 14/3/42 – 7



Rubicon BladeMeter connection type – model: 74220AD

FIGURE 14/3/42 – 8



Mann Pit connection type – model: 74221AD



FIGURE 14/3/42 – 9



Sonaray PipeMeter BladeMeter Table D: 82175 flange connection – Variant 3

FIGURE 14/3/42 – 10



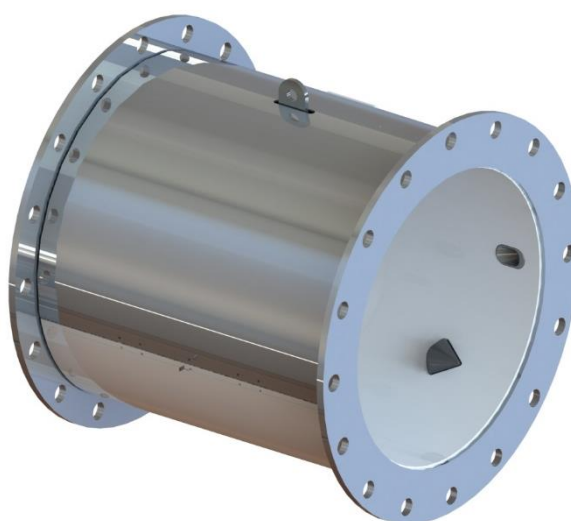
Sonaray PipeMeter BladeMeter PN16: 82176 flange connection – Variant 3

FIGURE 14/3/42 – 11



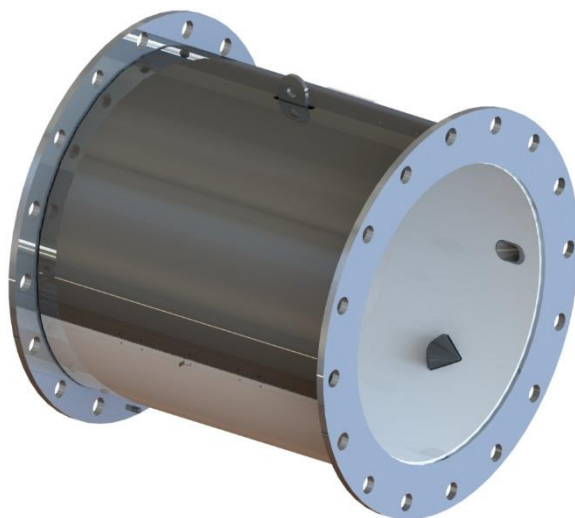
Sonarar PipeMeter BladeMeter B16.5 24": 82177 flange connection – Variant 3

FIGURE 14/3/42 – 12



Sonarar PipeMeter PN16: 82188 flange connection – Variant 3

FIGURE 14/3/42 – 13



Sonaray PipeMeter B16.5 24": 82189 flange connection – Variant 3

~ End of Document ~