



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

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 14/3/61

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.

Arad Octave High Flow Model Water Meter

submitted by Arad Ltd
 Kibutz Dalia 1923900
 Israel

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 R 49-1 Water Meters Intended for the Metering of Cold Potable Water and Hot Water, *Part 1 Metrological and Technical Requirements*, dated September 2015 and 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 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 & Variants 1 & 2 approved – certificate issued	29/04/22

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/3/61' 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 14/3/61

1. Description of Pattern

approved on 29/04/22

An Arad Octave High Flow model water meter used to measure cold potable water supplies for trade.

1.1 Field of Operation

The field of operation of the measuring system using the DN200 sized water meter is determined by the following characteristics:

Minimum flow rate, Q ₁ :	2 m ³ /h
Transition flow rate, Q ₂ :	3.2 m ³ /h
Maximum continuous flow rate, Q ₃ :	1000 m ³ /h
Overload flow rate, Q ₄ :	1250 m ³ /h
Flow rate ratio, Q ₃ /Q ₁ :	500
Temperature class:	T50
Maximum admissible temperature:	50 °C
Maximum admissible pressure:	1600 kPa
Pressure loss class:	Δp 10
Accuracy class:	2
Flow profile sensitivity class:	U3/D3 (see 1.1.3)
Electromagnetic class:	E1
Environmental class:	B & O
Orientation:	All positions
Flow Direction:	Forward/reverse
Power supply:	2 x D sized lithium batteries (3.65 V DC nominal)

1.2 Features/Functions

The pattern (Figure 1) consists of an ultrasonic flow sensor, a flow computer electronic indicating device and has features/functions as listed below:

- Connection type: Flanged
- Display: A digital, electronic, liquid crystal display (Figure 3) allowing for a maximum indication range of 999,999,999.999 m³ in 0.001 m³ increments
- Communications: Communications modules may be fitted to the meter allowing the following output options:
- Pulse output
 - 4-20 mA output
 - AMR output
 - Encoder protocol output
 - Mbus communications
 - NFC inductive communication
 - MODBUS
- Materials: Body: Stainless steel

1.3 Conditions

1.3.1. Installation Conditions:

No flow straightener or flow conditioner is required.

For Accuracy Class 2 (NMI R 49-1) the flow profile sensitivity class is U3/D3.

For Accuracy Class 2.5 (NMI M 10-1) the installation conditions are specified in Table 1.

Table 1 - Minimum pipe lengths required by flow disturbance type

Disturbance Type ⁽¹⁾	Minimum upstream pipe length (mm)	Minimum downstream pipe length (mm)
1	3 x DN ⁽²⁾	3 x DN
2	3 x DN	3 x DN
3	3 x DN	3 x DN

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

(2) DN (Nominal Diameter) is the alphanumeric designation of size for components of a pipework system, including water meters. It comprises the letters DN followed by a dimensionless whole number that is directly related to the physical size, in millimetres, of the bore or the diameter of the end connections.

1.3.2 Specified Installations and Open Channel Emplacements (Accuracy Class 2.5 only)

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

More information regarding specified installation and open channel emplacement testing may be found in NMI M 10-1 and NMI M 10-2.

1.3.3 Water Quality

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

1.4 Software Version

The pattern and variants are approved with software version – Ver. 4.02.

1.5 Verification Provision

Provision is made for the application of a verification mark.

1.6 Sealing Provision

The meter incorporates five plastic, tamper-evident seals:

- Two on the sensor covers
- Two on the meter face plate
- One on the communications output screw cover

The meter is also provided with software security. Access to the CPU for software revisions can only be done via a specific J-Tag connector on the PCB. In order to reach the PCB, the meter must be disassembled breaking two seals and breaching the vacuumed electronics compartment.

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 4):

Manufacturer's name or mark	...
Serial number	...
Pattern approval number	NMI 14/3/61
Numerical value of maximum continuous flow rate, Q_3	...
Flow rate ratio, Q_3/Q_1	...
Unit of measurement	m^3
Temperature class ⁽¹⁾	T50
Maximum admissible pressure ⁽²⁾	1600 kPa
Pressure loss class ⁽³⁾	Δp 10
Orientation ⁽⁴⁾	...
Flow profile sensitive class ⁽⁵⁾	U3/D3
Direction of flow	→ or similar
Accuracy class ⁽⁶⁾	2 or 2.5

⁽¹⁾ Optional for temperature class T30

⁽²⁾ Optional for meters with MAP of 1400 kPa or 600 kPa for $DN \geq 500$

⁽³⁾ Optional for pressure loss class Δp 63

⁽⁴⁾ Optional for meters approved for all orientations

⁽⁵⁾ Optional for U0/D0 meters and accuracy class 2.5 meters

⁽⁶⁾ Optional for accuracy class 2 meters

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
Environmental class	B or O
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 29/04/22

The pattern is approved with a range of different sizes, flowrates and associated characteristics as specified in Table 2 below. The pattern is shown in **bold** for completeness. An example of the DN100 variant is provided in Figure 2.

Table 2 - Meter sizes, flowrates and related information

Meter size	DN80	DN100	DN150	DN200
Minimum flowrate Q ₁ (m ³ /h)	0.32	0.5	1.26	2
Transitional flowrate Q ₂ (m ³ /h)	0.512	0.8	2.016	3.2
Maximum continuous flowrate Q ₃ (m ³ /h)	160	250	630	1000
Overload flowrate Q ₄ (m ³ /h)	200	312.5	787.5	1250
Ratio Q ₃ /Q ₁	500			
Meter Length	225	250	300	350
Maximum admissible pressure (kPa)	1600			
Verification scale interval (m ³)	0.001			

3. Description of Variant 2

approved on 29/04/22

The pattern is approved with a range of different sizes, flowrates and associated characteristics as specified in Table 3 below.

Table 2 - Meter sizes, flowrates and related information

Meter size	DN80	DN100	DN150	DN200
Minimum flowrate Q ₁ (m ³ /h)	0.64	1	2.52	4
Transitional flowrate Q ₂ (m ³ /h)	1.024	1.6	4.032	6.4
Maximum continuous flowrate Q ₃ (m ³ /h)	160	250	630	1000
Overload flowrate Q ₄ (m ³ /h)	200	312.5	787.5	1250
Ratio Q ₃ /Q ₁	250			
Meter Length	225	250	300	350
Maximum admissible pressure (kPa)	1600			
Verification scale interval (m ³)	0.001			

TEST PROCEDURE No 14/3/61

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 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 14/3/61 – 1



Arad Octave High Flow DN200 Water Meter (the pattern)

FIGURE 14/3/61 – 2



Arad Octave High Flow DN100 Water Meter (variant)

FIGURE 14/3/61 – 3



Example of display/indicating device

FIGURE 14/3/61 – 4



Example of required markings for the pattern

~ End of Document ~