



Australian Government
Department of Industry,
Innovation and Science

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval NMI 14/3/29

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 Model Octave DN50 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 for cold potable water and hot water, Part 1 Metrological and technical requirements*, dated September 2015.

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 1/09/21, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 & 2 approved – interim certificate issued	13/08/15
1	Pattern & variants 1 to 6 approved – certificate issued	11/08/16
2	Pattern and variants 1 & 5 amended, variant 7 approved – certificate issued	14/02/19
3	Variant 6 amended, variant 8 approved – certificate issued	17/03/20

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/3/29' and only by persons authorised by the submittor.

It is the submittor'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 14/3/29

1. Description of Pattern

**approved on 13/08/15
amended on 14/02/19**

An Arad model Octave DN50 water meter (Figure 1) intended for the metering of cold potable water.

1.1 Field of Operation

The field of operation of the measuring system using the Octave DN50 water meter is determined by the following characteristics:

Minimum flow rate, Q_1	0.080 m ³ /h
Transition flow rate, Q_2	0.128 m ³ /h
Maximum continuous flow rate, Q_3 :	40 m ³ /h
Overload flow rate, Q_4	50 m ³ /h
Flow rate ratio, Q_3/Q_1 :	500
Maximum admissible temperature:	50 °C
Maximum admissible pressure:	1600 kPa
Pressure loss class:	Δp 16
Accuracy class:	2
Flow profile sensitivity class:	U0/D0
Electromagnetic class:	E1 (commercial and light industrial)
Environmental class:	B & O (indoor & outdoor)
Orientation:	All positions
Flow Direction:	Forward/reverse
Power supply:	2 × D sized lithium batteries (3.65 V DC nominal)

1.2 Features/Functions

The pattern consists of an ultrasonic flow sensor, an indicating device and a flow computer with the features/functions as listed below:

Connection type:	Flanged end connections.
Display:	A digital electronic indicating device giving a maximum display of 999 999 999.999 m ³ in 0.001 m ³ increments.
Communications:	communications modules may be fitted to the meter allowing the following output options: <ul style="list-style-type: none"> • Pulse output; • 4-20 mA output; • AMR output; • Encoder protocol output; and • Mbus communications.
Body:	Cast iron
Meter length:	200 mm

1.3 Conditions

1.3.1 Installation conditions:

- No flow straightener or flow conditioner is required.
- Accuracy Class 2 flow profile class: U0/D0

1.3.2 Water Quality:

The meter is approved for use in the metering of potable and 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 Versions

The pattern may incorporate the following software versions:

- Ver. 4.00;
- Ver. 4.01; or
- Ver. 4.02.

1.5 Sealing Provision

The meter incorporates five plastic, tamper-evident seals:

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

The meter is also provided with software security. Access to 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 (2) seals
- breaching the vacuumed electronics compartment

1.6 Verification Provision

Provision is made for the application of a verification mark.

1.7 Descriptive Markings and Notices

Instruments shall be marked (Figure 1 and Figure 4) with the following data, either grouped or distributed on the casing, the indicating device dial or an identification plate:

Manufacturer's name or mark	...
Serial number	...
Pattern approval number	NMI 14/3/29
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
Maximum pressure loss ⁽³⁾	16 kPa or Δp 16
Orientation ⁽⁴⁾	...
Flow profile sensitive class ⁽⁵⁾	U0/D0
Direction of flow	→ or similar
Accuracy class ⁽⁶⁾	2 or 2.5

⁽¹⁾ Optional for Class T30

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

⁽³⁾ Optional for Class Δp 63

⁽⁴⁾ Optional for meters approved for all orientations

⁽⁵⁾ Optional for U0/D0 meters

⁽⁶⁾ Optional for 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 11/08/16
amended on 14/02/19

The models Octave 2 and Octave 2 Hardware version 2.4 meters which are similar to the pattern but having alternative internal electronics. The only visible difference to the meter is the software version number change as shown on the label (Figure 4).

This variant may incorporate the following software versions:

- Ver. 3.16, Ver. 3.17, Ver. 4.00, Ver. 4.01, or Ver. 4.02

The model Octave 2 Hardware version 2.4 also has the following additional functionality:

NFC inductive communication	Add the ability to communicate (set/get parameters of the meter) through inductive communication
LCD	Add new icons functionality
Data logger + Real time clock	Add ability to save flow and volume records/alarms/histograms
Tamper	Add vandal detection option
ModBus, Mbus and SSR	Add the ability to communicate (set/get parameters of the meter) through ModBus, Mbus and SSR communication

3. Description of Variant 2 approved on 11/08/16

Certain other Octave meters similar to the pattern but with specifications as listed in Table 1 below (pattern shown in **bold**).

TABLE 1 – Pattern and variants 2 & 6 specifications

Meter size	DN50	DN65	DN80	DN100	DN150	DN200
Minimum flow rate Q_1 (m ³ /h)	0.08	0.08	0.126	0.20	0.50	0.80
Transitional flow rate Q_2 (m ³ /h) (#)	0.128	0.128	0.20	0.32	0.80	1.28
Maximum continuous flow rate Q_3 (m ³ /h)	40	40	63	100	250	400
Overload flow rate Q_4 (m ³ /h)	50	50	80	125	313	500
Ratio Q_3/Q_1	500	500	500	500	500	500
Meter length (mm)	200	200	225	250	300	350
Minimum verification scale interval (m ³)	0.001	0.001	0.001	0.001	0.001	0.001

(#) Transitional flow rate Q_2 , for class 2 meters only

4. Description of Variant 3 approved on 11/08/16

Certain other Octave meters as listed below and having a plastic body with specifications as listed in Table 2 below.

TABLE 2 – Variants 3 & 6 specifications

Meter size	DN40	DN50
Minimum flow rate Q_1 (m ³ /h)	0.16	0.08
Transitional flow rate Q_2 (m ³ /h) (#)	0.256	0.128
Maximum continuous flowrate Q_3 (m ³ /h)	40	40
Overload flow rate Q_4 (m ³ /h)	50	50
Ratio Q_3/Q_1	250	500
Meter length (mm)	300	300
Minimum verification scale interval (m ³)	0.001	0.001

(#) Transitional flow rate Q_2 , for class 2 meters only

5. Description of Variant 4 **approved on 11/08/16**

The DN40 and DN50 sized meters of any approved body material may be fitted with threaded end connections instead of flanged end connections.

6. Description of Variant 5 **approved on 11/08/16**
amended on 14/02/19

An Octave meter as described for the pattern and variant 2 but with the body made of stainless steel and some versions having iron flanges, with the length specifications as listed in Table 4 below.

TABLE 3 – Variant 5 length specifications

Meter size	DN50	DN80	DN100	DN150	DN200
Meter length (mm)	254	305	356	457	508
	310	413	483	500	520
Meter length (mm) With Iron Flanges	200	225	250	300	n/a

7. Description of Variant 6 **approved on 11/08/16**
amended on dd/m/yy

Octave meters approved as Accuracy Class 2.5 water meters, with specifications as listed in Tables 1 and 2 and manufactured before 11/08/16 may be marked with the minimum upstream and downstream lengths specified in Table 4 below.

TABLE 4 – Minimum pipe lengths required by flow disturbance type

Disturbance Type	Minimum upstream pipe length	Minimum downstream pipe length
1	10	5
2	10	5
3	10	5

Octave meters approved as Accuracy Class 2.5 water meters, with specifications as listed in Tables 1 and 2 and manufactured on or after 11/08/16 may be marked with the minimum upstream and downstream lengths of U0/D0.

8. Description of Variant 7 **approved on 14/02/19**

The pattern and variants are approved with a meter body made of Stainless Steel (Figures 2 and 3).

9. Description of Variant 8

approved on 17/03/20

The Octave meter is approved with the alternative sizes and specifications listed in Table 5.

TABLE 5 – Meter sizes and flowrates

Meter size	DN250	DN300
Minimum flow rate Q_1 (m ³ /h)	2.0	2.0
Transitional flow rate Q_2 (m ³ /h) (#)	3.2	3.2
Maximum continuous flow rate Q_3 (m ³ /h)	1000	1000
Overload flow rate Q_4 (m ³ /h)	1250	1250
Ratio Q_3/Q_1	500	500
Meter length (mm)	449	499
Minimum verification scale interval (m ³)	0.001	0.001

(#) Transitional flow rate Q_2 , for class 2 meters only

Octave meters of a size specified in Table 5 are approved with the following installation conditions:

- Accuracy Class 2: flow profile sensitivity class U0/D0
- Accuracy Class 2.5: see Table 6

TABLE 6 – Minimum pipe lengths required by flow disturbance type

Disturbance Type	Minimum upstream pipe length	Minimum downstream pipe length
1	10	0
2	10	0
3	10	0

TEST PROCEDURE

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.

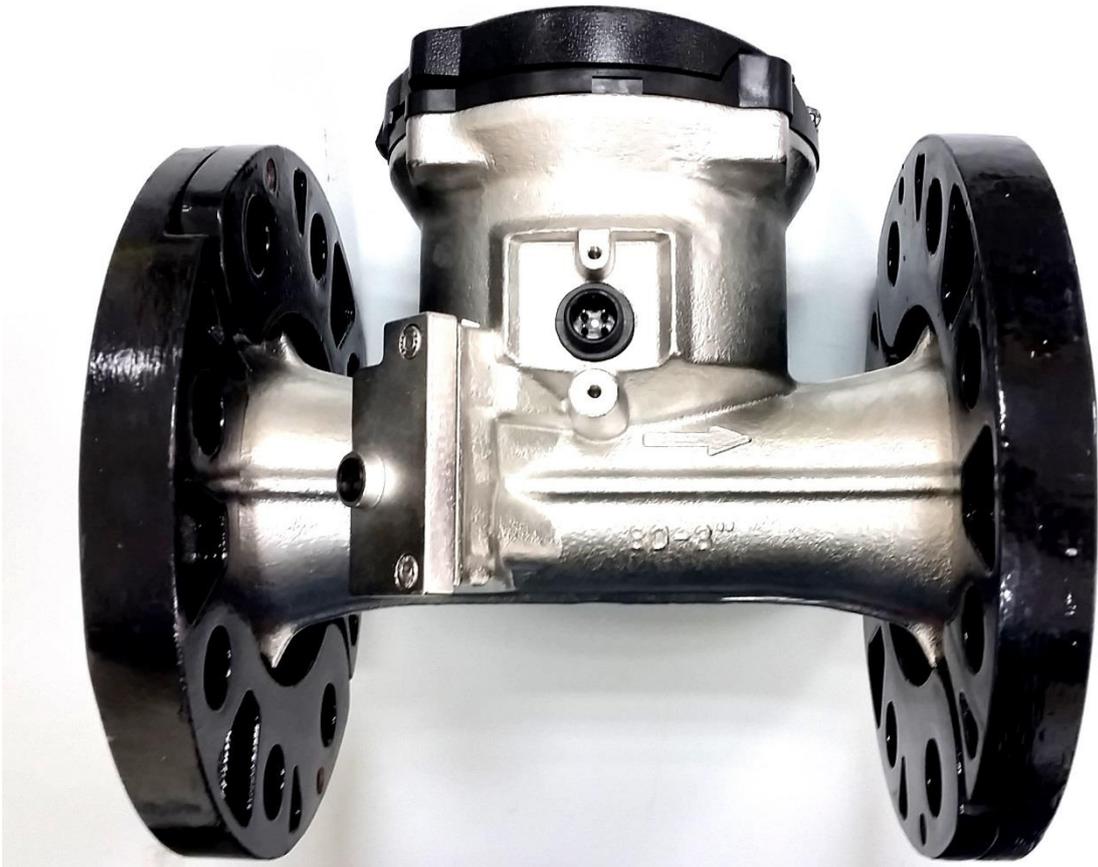
NOTE: NMI reserves the right to vary this procedure. Any such variation shall be notified in writing by NMI.

FIGURE 14/3/29 – 1



Arad Model Octave DN50 Water Meter (Pattern) and Markings

FIGURE 14/3/29 – 2



Arad Model Octave DN50 Water Meter (steel body – side view)

FIGURE 14/3/29 – 3



Arad Model Octave DN50 Water Meter (steel body – top view)

FIGURE 14/3/29 – 4



Arad Model Octave DN50 Water Meter alternative markings

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