



Australian Government
Department of Industry,
Science and Resources

**National
Measurement
Institute**

36 Bradfield Road, West Lindfield NSW 2070

**Interim Provisional
Certificate of Approval**

NMI P14/3/68

VALID FOR VERIFICATION PURPOSES UNTIL 1 NOVEMBER 2024

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.

Flowmetrics F-NMIR-1049 Water Meter

submitted by Flowmetrics Pty Ltd
 50 Clyde Ave
 Moorebank NSW 2170
 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 R 49-1 Water Meters Intended for the Metering of Cold Potable Water and Hot Water, *Part 1 Metrological and Technical Requirements*, dated May 2022 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 and variants 1 & 2 provisionally approved – certificate issued	16/01/24
1	Validity date extended – certificate issued	24/07/24

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI P14/3/68' 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.

Special Conditions of Provisional Approval

The approval will remain provisional pending completion of required testing and evaluation. In the event of unsatisfactory performance of the meter or non-compliance with the special conditions, the provisional approval may be varied, cancelled or withdrawn.

The submittor shall implement such modifications as required by the Chief Metrologist (or their Delegate). In the event that such modifications (if any are required) are not made to the satisfaction of the Chief Metrologist, the provisional approval may be varied, cancelled or withdrawn.

The submittor shall provide the Chief Metrologist with copies of all required test results and additional information within 3 (three) months of the issue date of the first revision of this Certificate.

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 P14/3/68

1. Description of Pattern **provisionally approved on 16/01/24**

A DN50 sized Flowmetrics F-NMIR-1049 model water meter used to measure cold water supplies for trade.

1.1 Field of Operation

The field of operation of the measuring system using the DN50 Flowmetrics F-NMIR-1049 model 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
Temperature class:	T30
Maximum admissible temperature:	30 °C
Limiting condition (water temperature):	50 °C
Maximum admissible pressure:	1600 kPa
Pressure loss class:	Δp 10
Accuracy class:	2
Flow profile sensitivity class:	U10/D0
Electromagnetic class:	E1 (residential)
Environmental class:	O (outdoor)
Orientation:	All positions
Flow Direction:	Forward and reverse
Power supply:	3.6 V battery

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 end connections.

Display: A digital, electronic, liquid crystal display (Figure 2) allowing for a maximum indication range of 99,999,999 m³ in 0.0001 m³ increments. Providing for a verification scale interval of 0.0001 m³.

Communications⁽¹⁾: RS485 (ModBus-RTU), RS485+Pulse, OCT pulse, and two wire 4-20mA

Materials: Stainless steel and polymer material

Meter length: 200 mm

⁽¹⁾ The pattern and variants may be fitted and/or configured with the communication options listed in this Certificate. However, the primary indication of volume displayed by the indicating device of the meter is the approved indication of volume.

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 U10/D0.

For Accuracy Class 2.5 (NMI M 10-1) see variant 2 below.

1.3.2 Grounding requirements

The meter shall be installed with a copper grounding cable connected to the grounding ear on meter as indicated in Figure 3.

The grounding cable shall comply with AS/NZS 5000.1, AS/NZS 1125 and/or AS/NZS 3808. The grounding cable shall have a voltage rating of 0.6-1 kV and a minimum size of 16 mm².

The screw connecting the grounding cable shall be sealed using a tamper-evident compound.

1.3.3 Specified Installations and Open Channel Emplacements

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.

1.3.4 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 Firmware Version

The pattern is approved for use with firmware version 2.1.

1.5 Verification Provision

Provision is made for the application of a verification mark.

1.6 Sealing Provision

The meter is mechanically sealed such that any attempt to access metrologically significant components is made evident. The PCBs are potted with resin. The connection between the flow sensor and flow converter is sealed by individually numbered tamper evident seals (Figure 4).

The meter is electronically sealed via a combination of special tools, authorised passwords and audit logs.

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 5):

Manufacturer's name or mark	...
Serial number	...
Pattern approval number	NMI P14/3/68
Numerical value of maximum continuous flow rate, Q_3	...
Flow rate ratio, Q_3/Q_1	...
Unit of measurement	m^3
Temperature class ⁽¹⁾	T30
Maximum admissible pressure ⁽²⁾	1600 kPa
Pressure loss class ⁽³⁾	10 kPa or $\Delta p 10$
Orientation ⁽⁴⁾	...
Flow profile sensitive class ⁽⁵⁾	U10/D0
Direction of flow	→ or similar
Accuracy class ⁽⁶⁾	2

⁽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 $\Delta p 63$

⁽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	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
IP rating	IP68

2. Description of Variant 1 provisionally approved on 16/01/24

The Flowmetrics F-NMIR-1049 model water meter is approved with an accuracy class 2 (NMI R 49-1) with a range of alternative meters sizes (Figure 6), flowrates and associated characteristics as specified in Tables 1 to 3 below. The Pattern is shown in **Bold** for completeness.

Table 1 - Meter sizes, flowrates and related information

Meter size	DN50	DN65	DN80
Minimum flowrate Q ₁ (m ³ /h)	0.080	0.126	0.126
Transitional flowrate Q ₂ (m ³ /h)	0.128	0.20	0.20
Maximum continuous flowrate Q ₃ (m ³ /h)	40	63	63
Overload flowrate Q ₄ (m ³ /h)	50	78.75	78.75
Ratio Q ₃ /Q ₁	500		
Meter Length (mm)	200	200	225

Table 2 - Meter sizes, flowrates and related information

Meter size	DN100	DN125	DN150
Minimum flowrate Q ₁ (m ³ /h)	0.20	0.32	0.50
Transitional flowrate Q ₂ (m ³ /h)	0.32	0.51	0.80
Maximum continuous flowrate Q ₃ (m ³ /h)	100	160	250
Overload flowrate Q ₄ (m ³ /h)	125	200	312.5
Ratio Q ₃ /Q ₁	500		
Meter Length (mm)	250	250	300

Table 3 - Meter sizes, flowrates and related information

Meter size	DN200	DN250	DN300
Minimum flowrate Q ₁ (m ³ /h)	0.80	2.0	2.0
Transitional flowrate Q ₂ (m ³ /h)	1.28	3.2	3.2
Maximum continuous flowrate Q ₃ (m ³ /h)	400	1000	1000
Overload flowrate Q ₄ (m ³ /h)	500	1250	1250
Ratio Q ₃ /Q ₁	500		
Meter Length (mm)	350	450	500

3. Description of Variant 2 **provisionally approved on 16/01/24**

The Flowmetrics F-NMIR-1049 model water meter is approved with an accuracy class 2.5 (NMI M 10-1) with a range of alternative meters sizes, flowrates and associated characteristics as specified in Tables 4 to 6 below.

Table 4 - Meter sizes, flowrates and related information

Meter size	DN50	DN65	DN80
Minimum flowrate Q ₁ (m ³ /h)	0.127	0.20	0.20
Maximum continuous flowrate Q ₃ (m ³ /h)	40	63	63
Overload flowrate Q ₄ (m ³ /h)	50	78.75	78.75
Ratio Q ₃ /Q ₁	315		
Meter Length (mm)	200	200	225

Table 5 - Meter sizes, flowrates and related information

Meter size	DN100	DN125	DN150
Minimum flowrate Q ₁ (m ³ /h)	0.32	0.51	0.79
Maximum continuous flowrate Q ₃ (m ³ /h)	100	160	250
Overload flowrate Q ₄ (m ³ /h)	125	200	312.5
Ratio Q ₃ /Q ₁	315		
Meter Length (mm)	250	250	300

Table 6 - Meter sizes, flowrates and related information

Meter size	DN200	DN250	DN300
Minimum flowrate Q ₁ (m ³ /h)	1.27	3.17	3.17
Maximum continuous flowrate Q ₃ (m ³ /h)	400	1000	1000
Overload flowrate Q ₄ (m ³ /h)	500	1250	1250
Ratio Q ₃ /Q ₁	315		
Meter Length (mm)	350	450	500

For Accuracy Class 2.5 (NMI M 10-1) the installation conditions by flow disturbance type are specified in Tables 7 and 8.

Table 7 - Minimum pipe lengths required by flow disturbance type

Meter sizes DN50, DN65 and DN80		
Disturbance Type ⁽¹⁾	Minimum upstream pipe length (mm)	Minimum downstream pipe length (mm)
1	3 x DN ⁽²⁾	3 x DN
2	30 x DN	10 x DN
3	3 x DN	3 x DN

Table 8 - Minimum pipe lengths required by flow disturbance type

Meter sizes DN100, DN125, DN150, DN200, DN250 and DN300		
Disturbance Type	Minimum upstream pipe length (mm)	Minimum downstream pipe length (mm)
1	10 x DN	0 x DN
2	15 x DN	0 x DN
3	10 x DN	0 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 (mm), of the bore or the diameter of the end connections.

TEST PROCEDURE No P14/3/68

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 verification shall comply with the Certificate of Approval, Technical Schedule, and the maximum permissible errors for verifications at the operating conditions in effect at the time of verification. Maximum permissible errors for the 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.

Evidence of verification shall be confirmed via either:

- the meter serial number and certificate of verification issued by a utility meter verifier in accordance with NITP 14; or
- the verification mark applied to the meter by the utility meter verifier in accordance with NITP 14.

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

FIGURE P14/3/68 – 1



Flowmetrics DN50 F-NMIR-1049 model water meter – the Pattern

FIGURE P14/3/68 – 2



Indicating device

FIGURE P14/3/68 – 3



Grounding cable attached to meter grounding tear

FIGURE P14/3/68 – 4



Mechanical tamper evident seals

FIGURE P14/3/68 – 5



Example of required markings – DN250 sized Class 2 – Variant 1

FIGURE P14/3/68 – 6



Example of DN100 sized meter – Variant 1

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