Australian Government
Department of Industry, Science and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 14/3/59

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.

Badger Meter E-Series G2 Model Water Meter

submitted by Badger Meter, Inc
4545 West Brown Deer Road
Milwaukee, Wisconsin

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.

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 & variant 1 approved – certificate issued	12/08/22

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/3/59' 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 14/3/59

1. Description of Pattern approved on 12/08/22

A Badger Meter DN15 sized E-Series G2 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 Badger Meter E-Series G2 DN15 sized water meter is determined by the following characteristics:

Minimum flow rate, Q_1:	0.003 m^3/h
Transition flow rate, Q_2:	0.005 m^3/h
Maximum continuous flow rate, Q_3:	2.5 m^3/h
Overload flow rate, Q_4:	3.125 m^3/h
Flow rate ratio, Q_3/Q_1:	800
Temperature class:	T50
Maximum admissible temperature:	50 °C
Maximum admissible pressure:	1600 kPa
Pressure loss class:	Δp 25
Accuracy class:	2
Flow profile sensitivity class:	U0/D0
Electromagnetic class:	E1
Environmental class:	O
Orientation:	All positions
Flow Direction:	Forward only
Power supply:	Non-replaceable battery (3.6 V)

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:	Threaded end connections
Display:	A digital, electronic, liquid crystal display allowing for a maximum indication range of 9999.99999 m^3 in 0.00001 m^3 increments
Communications[(1)]:	IR communication port, 3-wire (4-20mA) with ASCII protocol
	Wired M-Bus (optional)
	Wireless M-Bus communications (434 or 868 MHz) (optional)
Materials:	Meter body: Low lead copper alloy
	Indicating device housing: Polymer
	Meter insert: Polymer and stainless steel
Meter length:	110, 114 or 165 mm
Non-return device(s):	None

(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

For Accuracy Class 2, the flow profile sensitivity class is U0/D0.

1.3.2 Water Quality

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

1.4 Software Version

The meter is approved with the software versions specified in Table 1 below:

Table 1 - Software Version

Firmware Platform	Firmware Version	Checksum
ARM – Standard Output	F 1.0.4414	68EB
ARM – Wired M-Bus	F 1.0.548	E86F
ARM – Wireless M-Bus	F 1.0.548	268F
ASIC – Ultrasonic transit time data	A 1.04414	8580 or 2BC7

1.5 Verification Provision

Provision is made for the application of a verification mark.

1.6 Sealing Provision

The meter and its electronics are sealed via colour matched anit-tamper plugs (Figure 3). The anti-tamper plugs prevent access to the screws required to open the water meter top cover/face plate.

The meter is also electronically sealed by effectively disabling IR write access with the final IR write commands. The meter may be 'sealed for life', in which case it is not possible to program the water meter once the seal is applied. Alternatively, the meter may be 'sealed for recovery' in which case write access is only disabled for pertinent data. An integrity alarm will trigger if a legally relevant parameter has been changed. The alarm can only be cleared when re-sealed.

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 2):

Manufacturer's name or mark	...
Serial number	...
Pattern approval number	NMI 14/3/59
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)	25 kPa or Δp 25
Orientation (4)	…
Flow profile sensitive class (5)	U0/D0
Direction of flow	→ or similar
Accuracy class (6)	2

(1) Optional for temperature class T30 meters

(2) Optional for meters with MAP = 1400 kPa

(3) Optional for pressure loss class Δp 63

(4) Optional for meters approved for all orientations

(5) Optional for U0/D0 class 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

2. Description of Variant 1 approved on 12/08/22

The Badger E-Series G2 water meter 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.

Table 2 – Meter sizes, flowrates and related information

Meter size	**DN15**	**DN20**
Minimum flowrate Q^1 (m^3/h)	**0.003**	0.005
Transitional flowrate Q^2 (m^3/h)	**0.005**	0.008
Maximum continuous flowrate Q^3 (m^3/h)	**2.5**	4
Overload flowrate Q^4 (m^3/h)	**3.125**	5
Ratio Q^3/Q^1	**800**	
Meter length (meter only) (mm)	**110, 114 or 165**	190
Verification scale interval (m^3)	**0.00001**	

TEST PROCEDURE No 14/3/59

Water meters tested for 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 meters:

- The working water temperature range for verification is dependent on the temperature class of the meter as follows:

  T30, T50: 20 °C ± 10 °C;

  T70 to T180: 20 °C ± 10 °C and 50 °C ± 10 °C;

  T30/70 to T30/180: 50 °C ± 10 °C.

- Where a meter is tested with a working water temperature greater than 30 °C, the maximum permissible errors shall be:

  ±5% within the flowrate range $Q_1 \leq Q < Q_2$; and

  ±3% within the flowrate range $Q_2 \leq Q \leq Q_4$.

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

FIGURE 14/3/59 – 1

Badger E-Series G2 Water Meter (the pattern)

FIGURE 14/3/59 – 2

Example of required markings (for the pattern)

FIGURE 14/3/59 – 3

Sealing (anti-tamper plugs to prevent access to the screws required to open the water meter top cover/face plate)

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