



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

**National
Measurement
Institute**

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval
NMI 14/3/57

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.

Bermad Turbo-IR-M model water meter

submitted by Bermad Australia Pty Ltd
 26 Brand Drive
 Thomastown VIC 3074
 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 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 & variant 1 approved – certificate issued	18/05/2022

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/3/57' 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 14/3/57

1. Description of Pattern

approved on 18/05/2022

A DN50 sized Bermad TURBO-IR-M model water meter used to measure water supplies for trade.

1.1 Field of Operation

The field of operation of the measuring system using the DN50 sized Bermad TURBO-IR-M model water meter is determined by the following characteristics:

Minimum flow rate, Q_1 :	5.56 m ³ /h
Maximum continuous flow rate, Q_3 :	35.00 m ³ /h
Overload flow rate, Q_4 :	43.75 m ³ /h
Flow rate ratio, Q_3/Q_1 :	6.3
Maximum admissible temperature:	30 °C
Maximum admissible pressure:	1600 kPa
Pressure loss:	35 kPa
Accuracy class:	2.5
Installation conditions:	See clause 1.3 below
Electromagnetic class:	Not applicable
Environmental class:	Not applicable
Orientation:	Horizontal only
Flow Direction:	Forward only
Power supply:	Not applicable

1.2 Features/Functions

The pattern (Figure 1) consists of mechanical paddle wheel flow sensor and an indicating flow converter (calculator/indicator) (Figure 2) and has features/functions as listed below:

Connection type:	Flanged
Display:	A mechanical display allowing for a maximum indication range of 999,999 m ³ in 0.01 m ³ increments.
Communications:	Reed switch
Materials:	Meter body: Cast iron Flow sensor: Polymer material Flow converter: Polymer material
Meter length:	200 mm

1.3 Conditions

1.3.1 Installation conditions

No flow straightener or flow conditioner is required.

The meter is approved for use in either:

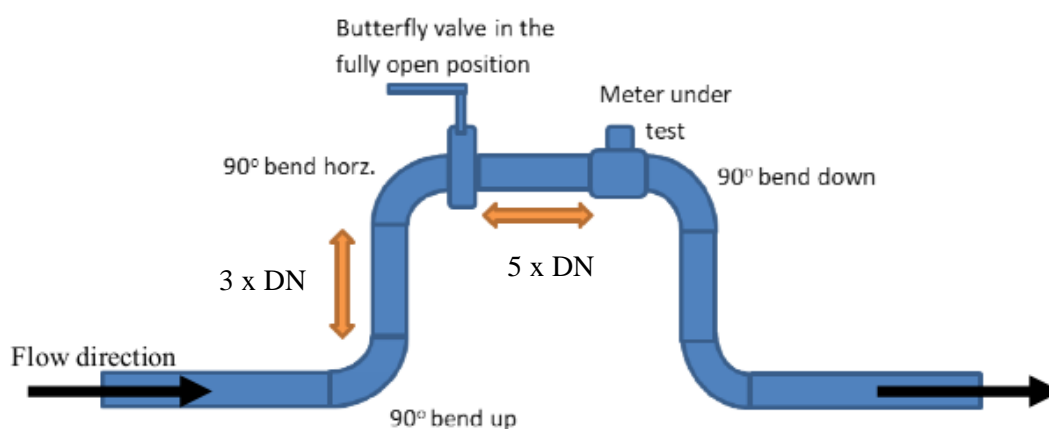
- The Specified Installation described in **Figure 3**;
- The Specified Installation described in **Figure 4**; or
- The installation conditions specified in **Table 1**.

The meter shall be completely full of water when in operation.

1.3.2 Specified Installations and Open Channel Emplacements

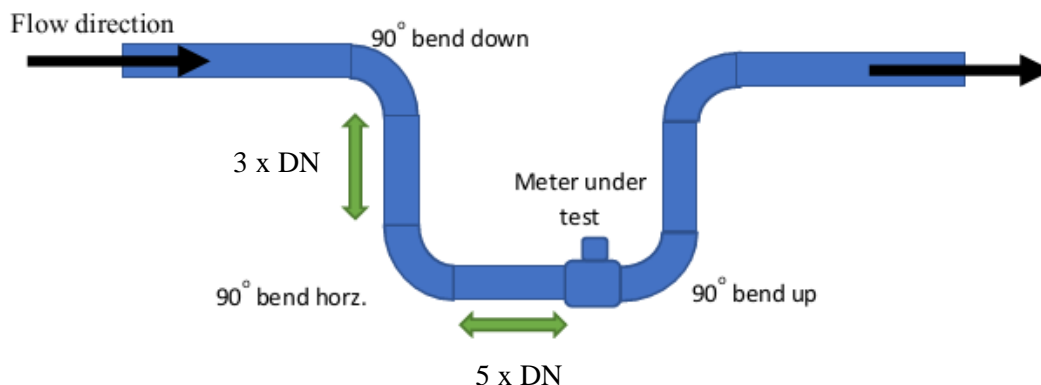
The meter (pattern and variants in all sizes) is approved for use in the specified installation arrangements in Figure 3 and Figure 4.

FIGURE 14/3/57 – 3



Specified Installation 1

FIGURE 14/3/57 – 4



Specified Installation 2

The meter (pattern and variants) has not been tested or evaluated for performance in 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 Minimum upstream and downstream pipe lengths

Table 1 minimum pipe lengths required by flow disturbance type

Disturbance Type ⁽¹⁾	Minimum upstream pipe length (mm)	Minimum downstream pipe length (mm)
1	150 x DN ⁽²⁾	5 x DN
2	150 x DN	5 x DN
3	150 x DN	5 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 the meter. It comprises the letters DN followed by a dimensionless whole number that corresponds to the internal diameter, in millimetres, of the bore of the meter.

1.3.4 Water quality

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

1.4 Software Version

Not applicable.

1.5 Verification Provision

Provision is made for the application of a verification mark.

1.6 Sealing Provision

The meter is mechanically sealed (Figure 5) via the use of tamper-evident wire seals that connect the meter body and the indicating device housing, such that attempts to mechanically access the meter will result in evidence of 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 14/3/57
Numerical value of maximum continuous flow rate, Q_3	...
Flow rate ratio, Q_3/Q_1	...
Unit of measurement	m^3
Maximum admissible pressure	1600 kPa
Maximum pressure loss	35 kPa or Δp_{35}
Orientation	H
Direction of flow	→ or similar
Accuracy class	2.5

2. Description of Variant 1

approved on 18/05/2022

The Pattern and Variants are approved with a range of different sizes (Figure 7), flowrates and associated characteristics as specified in Table 2 to Table 4 below. The Pattern is shown in **Bold** for completeness.

Table 2: Meter sizes, flowrates and related information

Meter size	DN50	DN65	DN80
Minimum flowrate Q_1 (m ³ /h)	5.56	7.94	9.38
Maximum continuous flowrate Q_3 (m ³ /h)	35.00	50.00	75.00
Overload flowrate Q_4 (m ³ /h)	43.75	62.50	93.75
Ratio Q_3/Q_1	6.3	6.3	8
Meter Length	200	200	225
Pressure loss (kPa)	35		
Verification scale interval (m ³)	0.01		
Maximum indication range (m ³)	999,999		

Table 3: Meter sizes, flowrates and related information

Meter size	DN100	DN125	DN150
Minimum flowrate Q_1 (m ³ /h)	15.63	21.88	39.68
Maximum continuous flowrate Q_3 (m ³ /h)	125.00	175.00	250.00
Overload flowrate Q_4 (m ³ /h)	156.25	218.75	312.50
Ratio Q_3/Q_1	8	8	6.3
Meter Length	250	250	300
Pressure loss (kPa)	20		
Verification scale interval (m ³)	0.01		
Maximum indication range (m ³)	999,999		9,999,999

Table 4: Meter sizes, flowrates and related information

Meter size	DN200	DN250	DN300
Minimum flowrate Q_1 (m ³ /h)	56.25	95.24	126.98
Maximum continuous flowrate Q_3 (m ³ /h)	450.00	600.00	800.00
Overload flowrate Q_4 (m ³ /h)	562.50	750.00	1000.00
Ratio Q_3/Q_1	8	6.3	6.3
Meter Length	350	450	500
Pressure loss (kPa)	20		
Verification scale interval (m ³)	0.1	1.0	1.0
Maximum indication range (m ³)	9,999,999		

TEST PROCEDURE No 14/3/57

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.

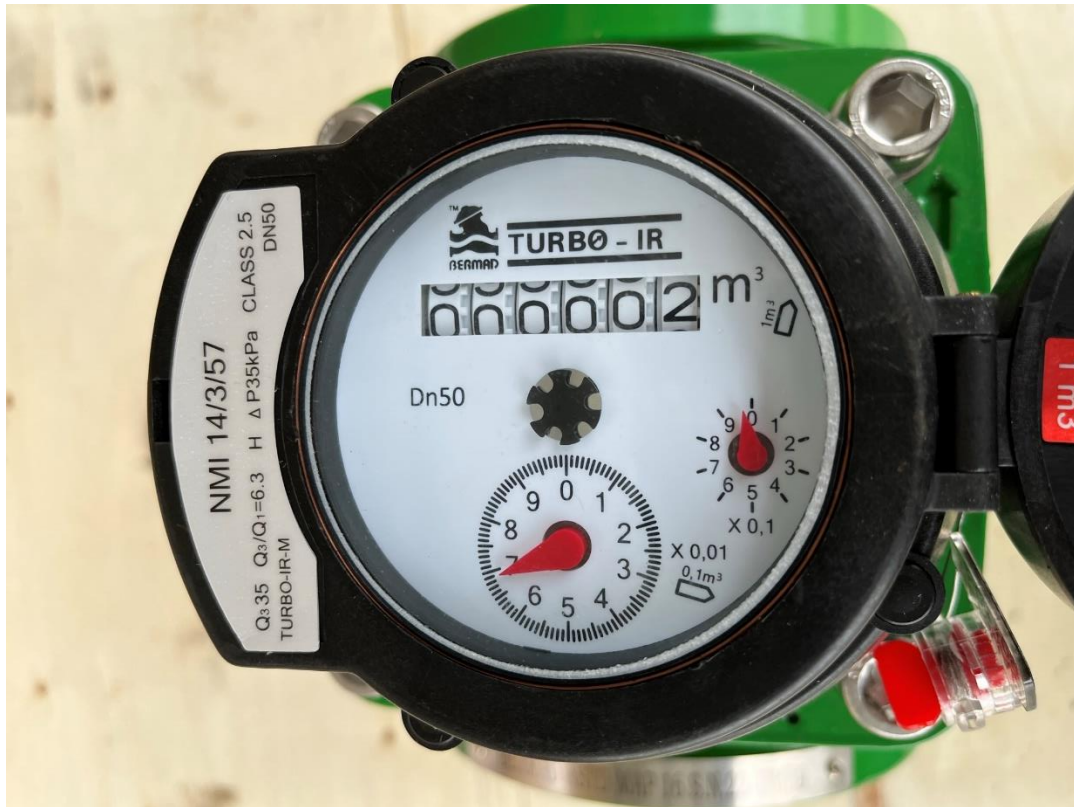
NOTE: NMI reserves the right to vary this procedure. Any such variation shall be notified in writing by NMI.

FIGURE 14/3/57 – 1



Bermad DN50 Turbo-IR-M model water meter – The Pattern

FIGURE 14/3/57 – 2



The indicating device

FIGURE 14/3/57 – 5



Sealing provisions

FIGURE 14/3/57 – 6



Example of required markings

FIGURE 14/3/57 – 7



DN200 sized Bermad TURBO-IR-M model water meter – Variant 1

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