Australian Government
Department of Industry, Science, Energy and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

# Certificate of Approval

# NMI 14/3/31

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 PD15 Water Meter

submitted by Arad Ltd
Kibutz Dalia 19239
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.

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 to 3 approved – certificate issued | 16/12/15 |
| 1 | Pattern & variants 1 to 3 amended – certificate issued | 3/02/16 |
| 2 | Variants 4, 5 & 6 approved – certificate issued | 20/05/16 |
| 3 | Variants 7, 8 & 9 approved – certificate issued | 5/12/17 |
| 4 | Variant 10 approved – certificate issued | 18/11/20 |

# CONDITIONS OF APPROVAL

## General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/3/31' 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 14/3/31

## 1. Description of Pattern approved on 16/12/15

An Arad model PD15 water meter (Figure 1) intended for the metering of cold potable water.

### 1.1 Field of Operation

The field of operation of the pattern is determined by the following characteristics:

- Minimum flow rate $Q_1$ 0.00625 $m^3/h$
- Transitional flow rate $Q_2$ 0.1 $m^3/h$
- Maximum continuous flow rate, $Q_3$ 2.5 $m^3/h$
- Overload flow rate $Q_4$ 3.125 $m^3/h$
- Flow rate ratio, $Q_3/Q_1$ 400
- Maximum admissible temperature 50°C
- Maximum admissible pressure 1600 kPa
- Pressure loss class ΔP63
- Accuracy class 2
- Flow profile sensitivity class: U0/D0
- Orientation: All positions
- Flow Direction: Forward only

### 1.2 Features/Functions

A positive displacement piston-type Class 2 water meter of a size (DN15) which is normally connected to a 15 mm pipe and is approved for metering domestic supplies and has features/functions as listed below:

- Connection type: Threaded end connections
- A mechanical digital indicator having a series of six aligned digits and three dials giving a maximum display of 99999.99995 $m^3$ in 0.05 L increments.
- Communications: the meter may be fitted with an AMR or optical output
- Meter body: composite material
- Meter length: 122 mm
- A dual check valve

### 1.3 Conditions

#### 1.3.1 Installation conditions:

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

#### 1.3.2 Water Quality:

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

### 1.4 Verification Provision

Provision is made for the application of a verification mark.

### 1.5 Sealing Provision

The meter is secured by the connection of a snap-fit cover to the meter body. The indicator (register) is positioned between the plastic cover and the meter body. The plastic cover and meter body have integrally moulded clips and once fitted, unauthorised access and dismantling is not possible without leaving evidence of tampering.

### 1.6 Descriptive Markings and Notices

Instruments shall be marked 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 14/3/31 |
| Numerical value of maximum continuous flow rate, $Q_3$ | ... |
| Flow rate ratio, $Q_3/Q_1$ | ... |
| Unit of measurement | $m^3$ |
| Maximum admissible pressure | ... kPa |
| Pressure loss class (1) | ΔP... |
| Direction of flow | → or similar |
| Accuracy class (2) | ... |

(1) Optional for pressure loss class ΔP63 meters

(2) Optional for accuracy class 2 meters

## 2. Description of Variant 1 approved on 16/12/15

Similar to the pattern but with specifications as listed in Table 1 below.

TABLE 1 (Variant 1)

| **Meter size** | **DN15** |
|---|---|
| Minimum flow rate $Q_1$ ($m^3/h$) | 0.00508 |
| Transitional flow rate $Q_2$ ($m^3/h$) | 0.008 |
| Maximum continuous flow rate $Q_3$ ($m^3/h$) | 1.6 |
| Overload flow rate $Q_4$ ($m^3/h$) | 2.0 |
| Ratio $Q_3/Q_1$ | 315 |
| Pressure loss class | ΔP63, ΔP40 or ΔP25 |

NOTE: Where the pressure loss class differs from ΔP63, the meter shall be appropriately marked with the pressure loss class.

## 3. Description of Variant 2 approved on 16/12/15

The Arad model PD15 meter may be supplied with the following alternative lengths:

110, 115, 130, 134, 152 (#), 154 (#), 165, 170, or 190 mm.

(#) These length meters have a dual check valve (as described for the pattern). Other lengths listed are not fitted with a check valve.

## 4. Description of Variant 3 approved on 16/12/15

The Arad model PD15 meter may be supplied with an alternative indicating device providing a minimum resolution of 0.02 L, thereby providing a maximum display of 99999.99998 $m^3$ in 0.02 L increments.

## 5. Description of Variant 4 approved on 20/05/16

An Arad model PD20 water meter having the same technical characteristics as the pattern except that the meter is of a size normally connected to 20 mm pipe, with the specifications listed in Table 2 below.

TABLE 2 (Variant 4)

| **Meter size** | **DN20** |
|---|---|
| Minimum flow rate $Q_1$ ($m^3$/h) | 0.016 |
| Transitional flow rate $Q_2$ ($m^3$/h) | 0.026 |
| Maximum continuous flow rate $Q_3$ ($m^3$/h) | 4.00 |
| Overload flow rate $Q_4$ ($m^3$/h) | 5.00 |
| Ratio $Q_3/Q_1$ | 250 |
| Pressure loss class | ΔP63 |

## 6. Description of Variant 5 approved on 20/05/16

An Arad model PD20 water meter may be fitted with brass end-connections.

## 7. Description of Variant 6 approved on 20/05/16

Certain approved model PD15 and PD20 water meters may be fitted with reverse flow restrictors and/or with two (2) single check valves. The approved meters are those of lengths as listed below:

- PD15 of 122 mm (pattern), or 152 or 154 mm (variant 2)
- PD20 of 140, 152 or 154 mm (variant 4)

## 8. Description of Variant 7 approved on 5/12/17

An Arad model PD15 water with the flowrate characteristics specified in Table 3 and Table 4.

TABLE 3 (Variant 7)

| **Meter size** | **DN15** | | | |
|---|---|---|---|---|
| Minimum flow rate $Q_1$ ($m^3/h$) | 0.005 | 0.0064 | 0.008 | 0.01 |
| Transitional flow rate $Q_2$ ($m^3/h$) | 0.008 | 0.01024 | 0.0128 | 0.016 |
| Maximum continuous flow rate $Q_3$ ($m^3/h$) | 1.6 | | | |
| Overload flow rate $Q_4$ ($m^3/h$) | 2.0 | | | |
| Ratio $Q_3/Q_1$ | 315 | 250 | 200 | 160 |
| Pressure loss class | ΔP63, ΔP40 or ΔP25 | | | |

TABLE 4 (Variant 7)

| **Meter size** | **DN15** | | | | |
|---|---|---|---|---|---|
| Minimum flow rate $Q_1$ ($m^3/h$) | 0.00625 | 0.008 | 0.01 | 0.0125 | 0.01563 |
| Transitional flow rate $Q_2$ ($m^3/h$) | 0.01 | 0.0128 | 0.016 | 0.02 | 0.025 |
| Maximum continuous flow rate $Q_3$ ($m^3/h$) | 2.5 | | | | |
| Overload flow rate $Q_4$ ($m^3/h$) | 3.125 | | | | |
| Ratio $Q_3/Q_1$ | 400 | 315 | 250 | 200 | 160 |
| Pressure loss class | ΔP63, ΔP40 or ΔP25 | | | | |

## 9. Description of Variant 8 approved on 5/12/17

An Arad model PD15 water with alternative marking arrangements (Figure 2) whereby some markings are inscribed on the meter casing rather than the indicating device.

## 10. Description of Variant 9 approved on 5/12/17

An Arad model PD15 water meter with the following communication output options:

### a) Mechanical register with electronic 3G unit

The register is similar to the standard mechanical register but contains an electronic 3G communication device for remote reading of the measurement. The transmission of measurement data using this device is not covered by this approval. This device has three variations with regards to power supply;

- Powered by "A" cell batteries;
- Powered by "AA" cell batteries; or
- Powered by Tadiran Lithium Batteries.

An additional capacitor may be added depending on the register configuration.

### b) LoRa, Veolia and Homerider registers

Having the 3G register (as described in a) above) with different communications protocols and operating frequencies: LoRa and Homerider. The registers are identified by LoRa and VE on the dial plate.

## 11. Description of Variant 10 approved on 18/11/20

The Pattern and relevant Variants are approved with a LR (LoRa) type digital register (indicating device) (Figure 3).

### Field of Operation

| | |
|---|---|
| Orientation: | Horizontal with the indication device on top |
| Power supply: | 3.6 V lithium battery |

### Features and Functions

| | |
|---|---|
| Display: | A digital indicating device allowing for a maximum indication range of 999,999.999 $m^3$ in 0.001 $m^3$ increments |
| Communications: | The LR (LoRa) type digital register communicates with the network server via the LoRaWAN interpreter (frequency 868 MHz / 900 MHz) with geolocation, consumption and diagnostic outputs. |
| Software version: | 1D.1C.X |

The software version is divided into a measurement relevant part (1D.1C.) and a measurement irrelevant part (X).

**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:

| | |
|---|---|
| For battery powered meters | A replacement date or similar indication of expected battery life |

# TEST PROCEDURE No 14/3/31

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 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.

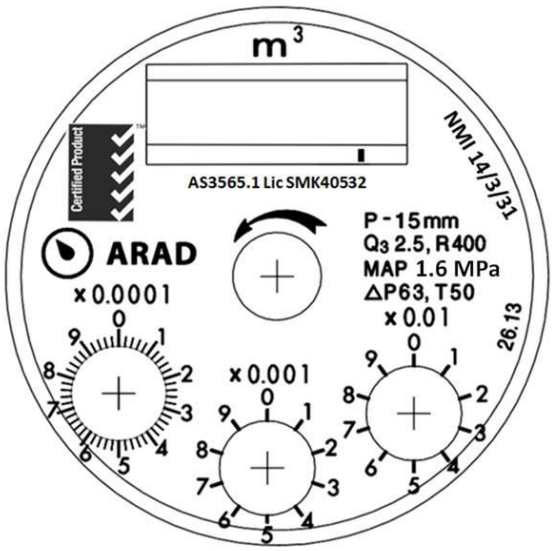
- Where a meter is tested with a working water temperature greater than 30 °C, the maximum permissible errors shall be:

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

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

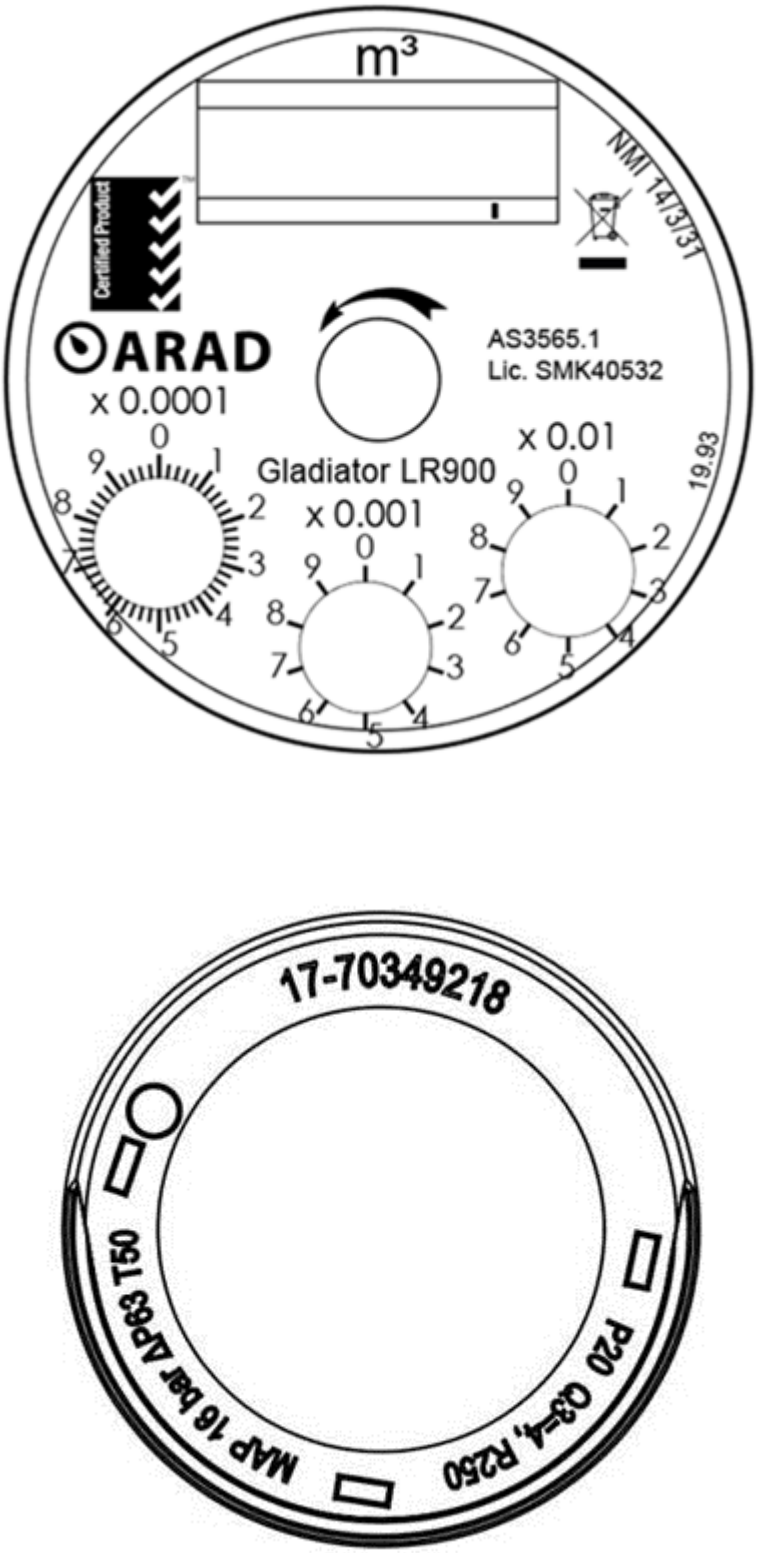
NOTE: NMI reserves the right to vary this procedure. Any such variation shall be notified in writing by NMI.

FIGURE 14/3/31 – 1



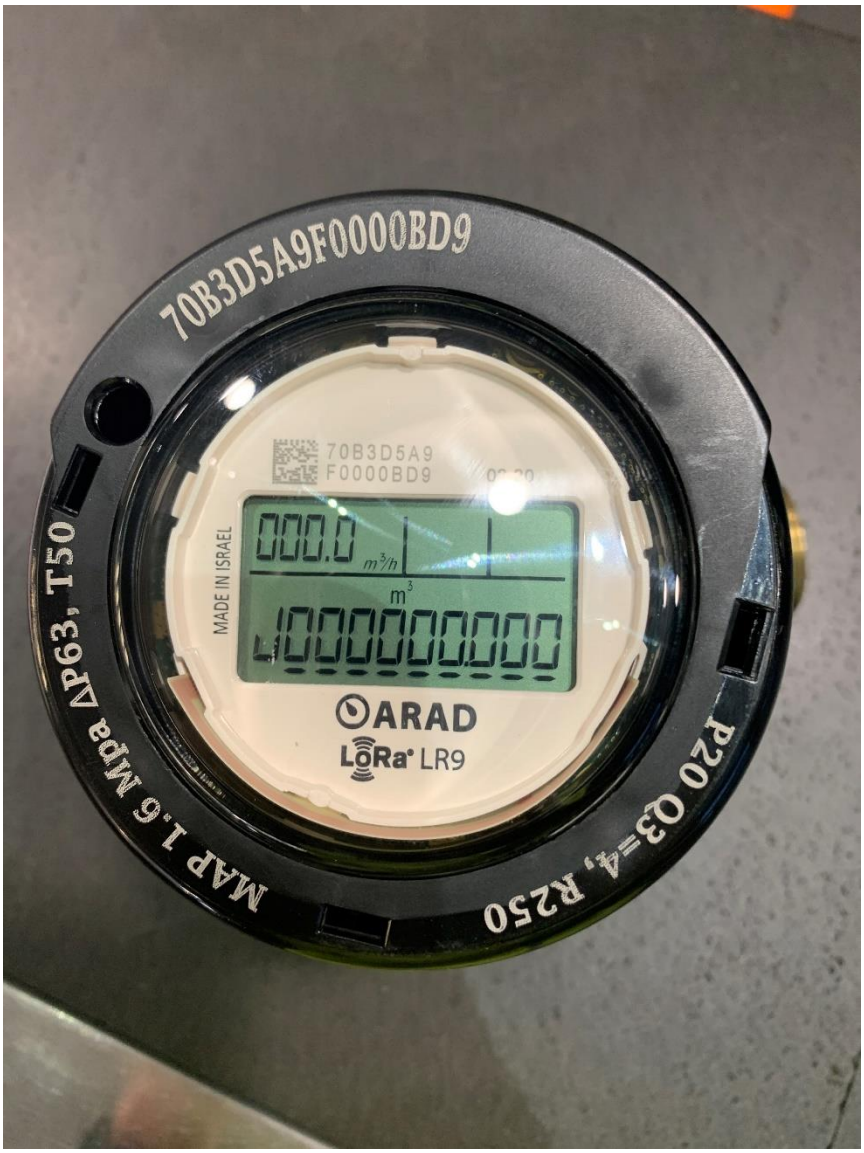

Arad Model PD15 Water Meter (Pattern)

FIGURE 14/3/31 – 2




Alternative marking arrangements – dial plate and meter casing

FIGURE 14/3/31 – 3




LR (LoRa) Type Digital Register

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