Australian Government
Department of Industry, Innovation and Science

National Measurement Institute

Certificate of Approval
NMI 14/3/28

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.

Sensus Model iPERL DN20 Water Meter

submitted by Sensus GmbH Ludwigshafen
Industriestr 16
67063 Ludwigshafen
Rhineland-Palatinate GERMANY

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 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 becomes subject to review on 1/05/20, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 to 3 approved – interim certificate issued	2/04/15
1	Pattern & variants 1 to 3 approved – certificate issued	4/06/15
2	Pattern & variant 1 amended – variant 4 approved – certificate issued	24/11/16

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/3/28' 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*.

Dr A Rawlinson

TECHNICAL SCHEDULE No 14/3/28

1. Description of Pattern **approved on 2/04/15**

A Sensus model iPERL DN20 water meter (Figures 1 to 3) intended for the metering of cold potable water supplies for trade.

1.1 Field of Operation

The field of operation of the measuring system using the Sensus model iPERL DN20 meter, is determined by the following characteristics:

- Minimum flow rate, Q_1 0.005 m^3/h
- Transitional flow rate, Q_2 0.008 m^3/h
- Maximum continuous flow rate, Q_3 4 m^3/h
- Overload flow rate, Q_4 5 m^3/h
- Flow rate ratio, Q_3/Q_1 800
- Maximum admissible temperature 50°C
- Maximum admissible pressure 1600 kPa
- Accuracy class 2
- Electromagnetic class: E1 & E2 (industrial)
- Environmental class: B & O (indoor & outdoor)
- Flow profile sensitivity class: U0/D0
- Pressure loss class: Δp 40 (0.04 MPa)
- Orientation: All positions
- Flow Direction: Forward/reverse

1.2 Features/Functions

The pattern consists of an electromagnetic class 2 water meter of a size which is approved for metering potable domestic water supplies.

Connection type: Threaded end connections type standard G1B.

Display: The meter incorporates a digital electronic indicating device giving a maximum display of 999 999.999 m^3 in 0.001 m^3 increments.

Communications: The meter is equipped with a low power 868 MHz or 433 Mhz integrated radio module with consumption and diagnostic outputs

Body: Composite material

Meter length: 105 mm

Power Supply: Lithium battery

Software version: iPERL firmware version 5

An optional strainer may be fitted. An optional non-return device may also be fitted.

1.3 Conditions

1.3.1 Installation Conditions:

No flow straightener or flow conditioner is required.

The flow profile sensitivity 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 Software Version

The meter is approved with iPERL firmware version 5.

1.5 Verification Provision

Provision is made for the application of a verification mark.

1.6 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 4):

Manufacturer's name or mark	...
Serial number	...
Pattern approval number	NMI 14/3/28
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	Δp40 or 40 kPa
Orientation (1)	…
Flow profile sensitive class (2)	U0/D0
Direction of flow	→ or similar
Accuracy class (3)	…

(1) Optional for meters approved for all orientations

(2) Optional for 0U/0D meters

(3) 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 and/or E2
Environmental class	B and/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

1.7 Sealing Provision

The meter is electronically sealed following calibration via a defined bit pattern, preventing changes to calibration values.

The meter is mechanically sealed via the snap-fitting of the two housing shells (Figure 5), such that attempts to mechanically access the meter will result in evidence of tampering.

2. Description of Variant 1 approved on 2/04/15

A DN20 Sensus model iPERL water meter, except with the alternative flowrates and specifications as listed in Table 1 below. The pattern is repeated in **bold** for completeness.

Table 1. Meter sizes, flowrates and related information

Meter size	DN20						
Minimum flowrate Q_1 (m^3/h)	0.02	0.016	0.013	0.01	0.008	0.006	**0.005**
Transitional flowrate Q2 (m^3/h)	0.032	0.026	0.02	0.016	0.013	0.01	**0.008**
Maximum continuous flowrate Q_3 (m^3/h)	4						**4**
Overload flowrate Q_4 (m^3/h)	5						**5**
Ratio Q_3/Q_1	200	250	315	400	500	630	**800**
Verification scale interval (m^3)	0.001						

3. Description of Variant 2 approved on 2/04/15

A DN20 Sensus model iPERL water meter, approved with the following meter lengths:

115 mm, 154 mm, 165 mm and 190 mm

4. Description of Variant 3 approved on 2/04/15

A DN20 Sensus model iPERL water meter, approved with end connections normally used in QLD, NSW, ACT, VIC, TAS, WA, SA and NT.

5. Description of Variant 4 approved on 24/11/16

A Sensus model iPERL water meter, except with the alternative nominal diameters, flowrates and specifications as listed in Tables 2 (a) to 2 (d) below. Typical meters are shown in Figures 6 to 9.

Table 2 (a). Meter sizes, flowrates and related information

Nominal Diameter	**DN15**						
Minimum flowrate Q_1 (m^3/h)	0.013	0.01	0.008	0.006	0.005	0.004	0.003
Transitional flowrate Q2 (m^3/h)	0.02	0.016	0.013	0.01	0.008	0.006	0.005
Maximum continuous flowrate Q_3 (m^3/h)	2.5						
Overload flowrate Q_4 (m^3/h)	3.125						
Ratio Q_3/Q_1	200	250	315	400	500	630	800
Meter Length	134 mm						
Verification scale interval (m^3)	0.001						

Table 2 (b). Meter sizes, flowrates and related information

Nominal Diameter	**DN25**						
Minimum flowrate Q_1 (m^3/h)	0.032	0.025	0.02	0.016	0.013	0.01	0.008
Transitional flowrate Q2 (m^3/h)	0.051	0.04	0.032	0.026	0.02	0.016	0.013
Maximum continuous flowrate Q_3 (m^3/h)	6.3						
Overload flowrate Q_4 (m^3/h)	7.875						
Ratio Q_3/Q_1	200	250	315	400	500	630	800
Meter Length	178 mm						
Verification scale interval (m^3)	0.001						

Table 2 (c). Meter sizes, flowrates and related information

Nominal Diameter	**DN32**						
Minimum flowrate Q_1 (m^3/h)	0.05	0.04	0.032	0.025	0.02	0.016	0.013
Transitional flowrate Q2 (m^3/h)	0.08	0.064	0.05	0.04	0.032	0.025	0.02
Maximum continuous flowrate Q_3 (m^3/h)	10						
Overload flowrate Q_4 (m^3/h)	12.5						
Ratio Q_3/Q_1	200	250	315	400	500	630	800
Meter Length	190 mm						
Verification scale interval (m^3)	0.001						

Table 2 (d). Meter sizes, flowrates and related information

Nominal Diameter	**DN40**						
Minimum flowrate Q_1 (m^3/h)	0.08	0.064	0.05	0.04	0.032	0.025	0.02
Transitional flowrate Q2 (m^3/h)	0.128	0.102	0.08	0.064	0.05	0.04	0.032
Maximum continuous flowrate Q_3 (m^3/h)	16						
Overload flowrate Q_4 (m^3/h)	20						
Ratio Q_3/Q_1	200	250	315	400	500	630	800
Meter Length	232 mm						
Verification scale interval (m^3)	0.001						

TEST PROCEDURE No 14/3/28

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*.

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

FIGURE 14/3/28 – 1

Sensus Model iPERL DN20 Water Meter (The Pattern)

FIGURE 14/3/28 – 2

Sensus Model iPERL DN20 Water Meter (The Pattern – End View)

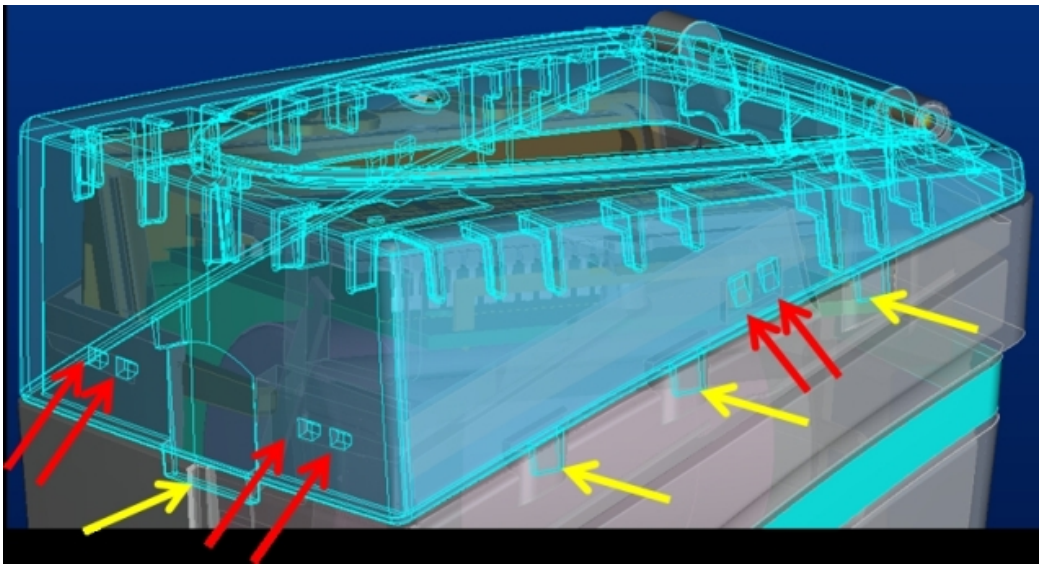
FIGURE 14/3/28 – 3

Sensus Model iPERL DN20 Water Meter (The Pattern – Side View)

FIGURE 14/3/28 – 5

Indicating Device and Markings

FIGURE 14/3/28 – 4



Typical Sealing Arrangement (During Manufacture)

FIGURE 14/3/28 – 6

Sensus Model iPERL DN15 Water Meter

FIGURE 14/3/28 – 7

Sensus Model iPERL DN25 Water Meter

FIGURE 14/3/28 – 8

Sensus Model iPERL DN32 Water Meter

FIGURE 14/3/28 – 9

Sensus Model iPERL DN40 Water Meter

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