Australian Government
Department of Industry, Science and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 14/3/24

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.

Siemens Model SITRANS F M MAG5100W with SITRANS F M MAG8000 series water meter

submitted by Siemens AG
76187 Karlsruhe
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 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 & variants 1 to 9 approved – interim certificate issued	25/07/14
1	Pattern & variants 1 to 9 amended (validity date) – interim certificate issued	17/10/14
2	Pattern amended (validity date) – interim certificate issued	16/01/15
3	Pattern amended (validity date) – interim certificate issued	22/04/15
4	Pattern & variants 1 to 9 approved – certificate issued	7/05/15
5	Pattern updated (Table A) & variant 5 amended (meter range) – variants 10 & 11 approved – certificate issued	24/09/15
6	Submittor details changed & variant 3 amended – certificate issued	30/10/18
7	Pattern & variants reviewed and updated (flow rate ranges and software versions) – certificate issued	15/01/20
8	Pattern & Variant 6 amended (software versions), Variant 5 amended (orientation) – certificate issued	17/09/21
9	Pattern & Variant 6 amended (communication options, software versions) – certificate issued	16/09/22
10	Variant 5 & Tables 2 to 4, Tables 6 to 9, Table 11, Table 12, Table 14 and Table 15 amended (orientations), certificate updated (NMI R 49:2022) – certificate issued	19/09/24

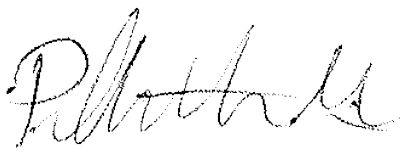
CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number ‘NMI 14/3/24’ 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*.



Phillip Mitchell
Acting Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No 14/3/24

1. Description of Pattern

approved on 25/07/14
amended on 17/09/21
amended on 16/09/22

Siemens Model SITRANS F M MAG5100W with SITRANS F M MAG8000 series water meter used to measure water supplies for trade.

1.1 Field of Operation

The field of operation of the measuring system using the Siemens SITRANS F M MAG5100W DN50 sized electromagnetic flow sensor and SITRANS FM MAG8000 signal transmitter is determined by the following characteristics:

Minimum flow rate, Q_1:	0.16 m^3/h
Transition flow rate, Q_2:	0.25 m^3/h
Maximum continuous flow rate, Q_3:	63.00 m^3/h
Overload flow rate, Q_4:	78.75 m^3/h
Flow rate ratio, Q_3/Q_1:	400
Maximum admissible temperature:	50 °C
Temperature class:	T50
Maximum admissible pressure:	1600 kPa
Pressure loss class:	Δp 25
Accuracy class:	2
Flow profile sensitivity class:	U0/D0
Electromagnetic class:	E2 (industrial)
Environmental class:	O (outdoors)
Orientation:	All positions – see Variant 6 for other sizes
Flow Direction:	Forward and reverse
Power supply:	3.6 V lithium battery

1.2 Features/Functions

The pattern (Figure 1) consists of an electromagnetic flow sensor, SITRANS F M MAG5100W, and a signal transmitter, SITRANS F M MAG8000, incorporating an electronic indicating device with the features and functions as listed below:

Connection type: Flanged end connections.

Display: A digital, electronic, liquid crystal display allowing for a maximum indication range of 9 999 999.9 m^3 in 0.00001 m^3 increments

Communications(1): The meter includes provision for a configurable pulse output, wireless communication module or Modbus.

Materials: Flow sensor: Carbon steel, with corrosion resistant two-component epoxy coating

Liner: EPDM, NBR hard rubber or Ebonite hard rubber

Flow converter: Composite material

Meter length: 200 mm (for DN50)

(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, the flow profile sensitivity class is U0/D0.

For accuracy class 2.5, the installation conditions are specified in Table 1.

Table 1 Minimum pipe lengths required by flow disturbance type

Disturbance Type (*)	Minimum upstream pipe length (mm)	Minimum downstream pipe length (mm)
1	0	0
2	0	0
3	0	0

(*) For information on the different types of flow disturbances which are examined as part of pattern approval, refer to NMI M 10-2.

1.3.2 Water Quality

The meter is approved for use in the metering of potable water supplies (EPDM or Ebonite liners only).

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

1.4 Software Version

The SITRANS F M MAG8000 signal transmitter is approved with firmware versions 3.03, 3.04, 3.07, 3.08, 3.09, 3.11, 3.12 and 3.13.

1.5 Verification Provision

Provision is made for the application of a verification mark.

1.6 Sealing Provision

Provision is made for the instrument to be sealed by the application of two sealing screws provided on the indicator body (Figure 2), 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 3):

Manufacturer's name or mark	...
Serial number	...
Pattern approval number	NMI 14/3/24
Numerical value of maximum continuous flow rate, Q_3	...
Flow rate ratio, Q_3/Q_1	...
Unit of measurement	m^3
Maximum admissible pressure (1)	1600 kPa
Maximum pressure loss (2)	25 kPa or Δp 25
Maximum admissible temperature (3)	T50
Orientation (4)	…
Flow profile sensitive class (5)	U0/D0
Direction of flow	→ or similar
Accuracy class (6)	2 or 2.5

(1) Optional for meters with MAP = 1400 kPa

(2) Optional for class Δp63

(3) Optional for T30 meters

(4) Optional for meters approved for all orientations

(5) Optional for U0/D0 class 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	E2
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 25/07/14
amended on 15/01/20
amended on 19/09/24

The Pattern and Variants are approved with **accuracy class 2** (NMI R 49) with the different sensor sizes (Figure 4), flowrates and associated characteristics as specified in Tables 2, 3 & 4. The Pattern is included in **Bold** for completeness.

Table 2 Meter sizes, flowrates and related information

Meter size	**DN50**	**DN65**	**DN80**	**DN100**
Minimum flow rate Q1 (m^3/h)	**0.16**	0.25	0.40	0.63
Transitional flow rate Q2 (m^3/h)	**0.25**	0.40	0.63	1.00
Maximum continuous flow rate Q3 (m^3/h)	**63.00**	100	160	250
Overload flow rate Q4 (m^3/h)	**78.75**	125	200	312.50
Ratio Q3/Q1	**400**	400	400	400
Meter length (mm)	**200**	200	200	250
Orientation/s	**All**			

Table 3 Meter sizes, flowrates and related information

Meter size	**DN125**	**DN150**	**DN200**	**DN250**
Minimum flow rate Q1 (m^3/h)	1.00	1.60	2.50	4.00
Transitional flow rate Q2 (m^3/h)	1.60	2.50	4.00	6.40
Maximum continuous flow rate Q3 (m^3/h)	400	630	1000	1600
Overload flow rate Q4 (m^3/h)	500	787.50	1250	2000
Ratio Q3/Q1	400	400	400	400
Meter length (mm)	250	300	350	450
Orientation/s	All			

Table 4 Meter sizes, flowrates and related information

Meter size	**DN300**	**DN350**	**DN400**
Minimum flow rate Q1 (m^3/h)	8.00	8.00	10.00
Transitional flow rate Q2 (m^3/h)	12.80	12.80	16.00
Maximum continuous flow rate Q3 (m^3/h)	3200	3200	4000
Overload flow rate Q4 (m^3/h)	4000	4000	5000
Ratio Q3/Q1	400	400	400
Meter length (mm)	500	550	600
Orientation/s	All	H or V	

3. Description of Variant 2

approved on 25/07/14
amended on 15/01/20

The Pattern and Variants are approved with **accuracy class 2** (NMI R 49), at the values of Q3 specified in tables 2, 3 & 4, with the following alternative Q3/Q1 ratios for meter sizes specified in Table 5.

Table 5 – Q3/Q1 ratios

Meter Size	**Alternative Q3/Q1 ratios**
DN50 to DN400	40, 50, 63, 80, 100, 125, 160, 200, 250 & 315

4. Description of Variant 3

approved on 25/07/14
amended on 17/10/14
amended on 30/10/18
amended on 15/01/20
amended on 19/09/24

The Pattern and Variants are approved with **accuracy class 2.5** (NMI M 10) with the sensor sizes, flow rates and related information as specified in Tables 6, 7, 8 & 9 below.

Table 6 Meter sizes, flowrates and related information

Meter size	**DN50**	**DN65**	**DN80**	**DN100**
Minimum flow rate Q1 (m^3/h)	0.79	1.25	2.00	3.13
Maximum continuous flow rate Q3 (m^3/h)	63	100	160	250
Overload flow rate Q4 (m^3/h)	78.75	125	200	312.5
Ratio Q3/Q1	80	80	80	80
Meter length (mm)	200	200	200	250
Orientation/s	All			

Table 7 Meter sizes, flowrates and related information

Meter size	**DN125**	**DN150**	**DN200**	**DN250**
Minimum flow rate Q1 (m^3/h)	5	7.88	12.50	20
Maximum continuous flow rate Q3 (m^3/h)	400	630	1000	1600
Overload flow rate Q4 (m^3/h)	500	787.50	1250	2000
Ratio Q3/Q1	80	80	80	80
Meter length (mm)	250	300	350	450
Orientation/s	All			

Table 8 Meter sizes, flowrates and related information

Meter size	**DN300**	**DN350**	**DN400**	**DN450**
Minimum flow rate Q1 (m^3/h)	25	31.25	31.25	50
Maximum continuous flow rate Q3 (m^3/h)	2000	2500	2500	4000
Overload flow rate Q4 (m^3/h)	2500	3125	3125	5000
Ratio Q3/Q1	80	80	80	80
Meter length (mm)	500	550	600	600
Orientation/s	All	H or V		

Table 9 Meter sizes, flowrates and related information

Meter size	**DN500**	**DN600**
Minimum flow rate Q1 (m^3/h)	80	100
Maximum continuous flow rate Q3 (m^3/h)	6400	8000
Overload flow rate Q4 (m^3/h)	8000	10000
Ratio Q3/Q1	80	80
Meter length (mm)	600	600
Orientation/s	H or V	

5. Description of Variant 4 approved on 25/07/14

The Pattern and Variants are approved with **accuracy class 2.5** (NMI M 10) with maximum admissible pressures of 600 kPa, 1000 kPa or 1600 kPa; the value is to be marked on the meter.

6. Description of Variant 5

approved on 25/07/14
amended on 24/09/15
amended on 17/09/21
amended on 19/09/24

The Pattern and Variants are approved with orientations as follows:

a) DN50 – DN300: The meter is approved for all orientations

b) DN350 – DN1200: The meter is approved for horizontal and vertical use only

Note: Orientations are reflected in Tables 2 to 4, Tables 6 to 9, Table 11, Table 12, Table 14 and Table 15.

7. Description of Variant 6

approved on 25/07/14
amended on 15/01/20
amended on 17/09/21
amended on 16/09/22

The Pattern and Variants are approved with communications modules and software versions specified in Tables 10 & 11.

The designations of the products with the communication modules are specified in Table 10 below.

Table 10 Product designations

Product designation	Sensor	Transmitter
MAG8000 (7ME681)	MAG5100W	MAG8000 including the wireless communication module or Modbus
MAG8000CT (7ME682)	MAG5100W	MAG8000CT including the wireless communication module or Modbus
MAG8000 Irrigation (7ME688)	MAG5100W	MAG8000 including the wireless communication module or Modbus

The above signal transmitters are approved with the firmware versions specified in Table 11 below.

Table 11 Software versions

Signal Transmitter	Firmware versions
SITRANS F M MAG8000	3.03, 3.04, 3.07, 3.08, 3.09, 3.11, 3.12 and 3.13
SITRANS F M MAG8000CT	3.03, 3.04, 3.07, 3.08, 3.09, 3.11, 3.12 and 3.13
SITRANS F M MAG8000 Irrigation	3.03, 3.04, 3.07, 3.08 and 3.09

9. Description of Variant 8 **approved on 25/07/14**

The Pattern and Variants are approved in both compact and remote arrangements (Figure 4). In the compact arrangement, the sensor and signal transmitter are connected as part of an integral unit. In the remote arrangement, the sensor and signal transmitter are housed separately and connected via a cable with a maximum length of 30 metres.

10. Description of Variant 9 **approved on 25/07/14**

The Pattern and Variants are approved with the following power supplies:

a) 3.6 V lithium battery
b) 12 – 24 V AC/DC
c) 115 – 230 V AC

11. Description of Variant 10 **approved on 25/07/14**
amended on 15/01/20
amended on 19/09/24

The Pattern and Variants are approved with accuracy class 2 (NMI R 49) with the following sensor sizes, flow rates and related information as specified in Table 12 below.

Table 12 Meter sizes, flowrates and related information

Meter size	**DN450**	**DN500**	**DN600**	**DN700**
Minimum flow rate Q1 (m^3/h)	25	39.38	62.50	62.50
Transitional flow rate Q2 (m^3/h)	40	63	100	100
Maximum continuous flow rate Q3 (m^3/h)	4000	6300	10 000	10 000
Overload flow rate Q4 (m^3/h)	5000	7875	12 500	12 500
Ratio Q3/Q1	160	160	160	160
Meter length (mm)	600	600	600	700 or 850
Orientation/s	H & V			

The Pattern and Variants are approved with **accuracy class 2** (NMI R 49), at the values of Q_3 specified in Table 12, with the following alternative Q3/Q1 ratios for meter sizes specified in Table 13.

Table 13 – Q3/Q1 ratios

Meter Size	Alternative Q3/Q1 ratios
DN450 to DN700	40, 50, 63, 80, 100 & 125

12. Description of Variant 11 **approved on 25/07/14**
amended on 15/01/20
amended on 19/09/24

The Pattern and Variants are approved with **accuracy class 2.5** (NMI M 10) the following sensor sizes, flow rates and related information as specified in Tables 14 & 15 below.

Table 14 Meter sizes, flowrates and related information

Meter size	DN700	DN750	DN800	DN900
Minimum flow rate Q1 (m^3/h)	78.75	78.75	125	125
Maximum continuous flow rate Q3 (m^3/h)	6300	6300	10000	10000
Overload flow rate Q4 (m^3/h)	7875	7875	12500	12500
Ratio Q3/Q1	80	80	80	80
Meter length (mm)	700	700 or 875	800	900
Orientation/s	H & V			

Table 15 Meter sizes, flowrates and related information

Meter size	**DN1000**	**DN1050**	**DN1100**	**DN1200**
Minimum flow rate Q1 (m^3/h)	156.25	156.25	200	200
Maximum continuous flow rate Q3 (m^3/h)	12500	12500	16000	16000
Overload flow rate Q4 (m^3/h)	15625	15625	20000	20000
Ratio Q3/Q1	80	80	80	80
Meter length (mm)	1000	1000 or 1250		1200
Orientation/s	H & V			

The Pattern and Variants are approved with **accuracy class 2.5** (NMI M 10), at the values of Q_3 specified in Tables 14 & 15, with the following alternative Q3/Q1 ratios for meter sizes specified in Table 16.

Table 16 – Q3/Q1 ratios

Meter Size	**Alternative Q3/Q1 ratios**
DN700 to DN1200	10, 12.5, 16, 20, 25, 31.5, 40, 50 & 63

TEST PROCEDURE No 14/3/24

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). The following exception applies to accuracy class 2.5 meters:

- The maximum permissible errors shall be:
  ±2.5% within the flowrate range Q_1 to Q_4.

Water meters shall be verified in accordance with the following test procedures:

- NITP 14.0 – Utility meters – general requirements
- NITP 14.3 – Utility meters – water meters

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

FIGURE 14/3/24 – 1

(a) Siemens Model MAG 8000 DN50 Water Meter (Pattern)

(b) Showing Indicator MAG8000

FIGURE 14/3/24 – 2

Typical Mechanical Sealing of MAG8000

FIGURE 14/3/24 – 3

SIEMENS

SITRANS F M MAG 8000 CT

Order No.:	7ME68203TN431AA4	MAWP (PS) at 0.1°C/32°F:	16 bar/232psi
		MAWP (PS) at 50°C/122°F:	16 bar/232psi
Serial No.:	123456H123	Tmedia min.:	0.1°C/32°F
Size DN: 100 (4 inch.)	U0D0	Tmedia max.:	50°C/122°F
Sensor material:	Ebonite	Process connection:	EN 1092-1 PN16
Meter orientation:	All orientations	Year of Manuf.:	2022
Environmental Class:	O, E2, IP68/NEMA 6P	Software V.:	3.13
Supply:	115-230V AC 50-60Hz	Q3:250m3/h	Q3/Q1:80
Certification No.:	NMI 14/3/24	Pressure loss class	Δp25
Accuracy Class 2.5		Max admissible Temp.:	T50

Siemens AG, DE-76181 Karlsruhe

Made in China*

**: Made in France or Made in China*

Typical Markings - MAG8000

FIGURE 14/3/24 – 4

Showing Two Different Size Meters MAG8000 (Various Variants)
And in ‘Compact’ and ‘Remote’ Arrangements (Variant 8)

~ End of Document ~