Australian Government
Department of Industry, Science and Resources

National Measurement Institute

Certificate of Approval

NMI 5/6B/210

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.

Trimec Model Flomec OM100 Liquid-measuring System

submitted by Trimec Industries Pty Ltd
Trading as Great Plains Industries Australia
Unit 12, 7-11 Parraweena Road
CARINGBAH, NSW 2229, 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 R 117 Measuring Systems for Liquids Other than Water, dated June 2011.

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 – interim certificate issued	11/07/07
1	Pattern & variants 1 to 3 approved – certificate issued	5/03/08
2	Variant 4 approved – certificate issued	18/11/08
3	Variant 5 approved – interim certificate issued	10/08/09
4	Variant 5 approved – certificate issued	3/09/09
5	Variant 6 approved – interim certificate issued	16/02/10

Document History (cont…)

Rev	Reason/Details	Date
6	Variant 6 approved – certificate issued	15/03/10
7	Pattern & variants 1 to 6 reviewed, consolidated into variants 1 to 5, & updated – variant 6 approved – certificate issued	17/08/12
8	Table 1 amended – NMI compliant marking description – Pattern & variants 1 to 6 reviewed – certificate issued	26/06/17
9	Amended Address, Variant 7 approved, Table 1 amended – certificate issued	04/05/26

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with approval number 'NMI 5/6B/210' 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 Phillip Mitchell
A/g Manager
Policy and Regulatory
Services

TECHNICAL SCHEDULE No 5/6B/210

1. Description of Pattern approved on 11/07/07

A bulk flowmetering system (Figure 1 and Table 1) incorporating a Trimec Industries model Flomec model OM100 (*) 100 mm positive displacement flowmeter for bulk metering of approved petroleum products other than LPG including various grades of liquid hydrocarbons.

(*) The full model number of the meter is in the form 'OM100A441-241QP' – refer to Table 1.

1.1 Field of Operation

- Minimum measured quantity, V_{min} 500 L (#1)
- Maximum flow rate, Q_{max} 1500 L/min
- Minimum flow rate, Q_{min} 150 L/min
- Maximum pressure of the liquid, P_{min} 1050 kPa
- Minimum pressure of the liquid, P_{min} 140 kPa (#2)
- Dynamic viscosity 0.4 to 20 mPa.s (at 20 °C) (#3)
- Liquid temperature range −10 °C to +50 °C
- Ambient temperature range −25 °C to +55 °C
- Accuracy class 0.5

(#1) The calculator/indicator indicates the volume at least in 1 L increments.

(#2) As specified for the gas elimination device for effective operation.

(#3) The flowmeter is adjusted to be correct for the liquid for which it is to be verified as marked on the data plate.

1.2 Components of the Flowmetering System (Figure 1)

(i) Tank

A supply tank, which may incorporate a detector for low liquid-level. The detector is used to prevent further deliveries when the low liquid-level is reached and prevents air from entering the pipework.

(ii) Pump

A positive displacement, centrifugal or submersible turbine type pump may be used to provide flow through one or more flowmeters.

A submersible turbine type pump may be used either alone or supplying a centrifugal type pump positioned above or below the liquid level of the supply tank.

The pump(s) is/are positioned either in a flooded suction configuration, i.e. below the liquid level in the supply tank or in a manner such that the inlet pressure is always greater than the atmospheric pressure and saturated vapour pressure of the liquid.

In any case, for all combinations of usage, the pump(s) shall be of sufficient capacity to ensure that each flowmeter can operate over its approved flow rate range.

(iii) Non-return Valve

A non-return valve is fitted between the pump and the flowmeter to prevent reverse flow and always keep the pipework full of liquid.

(iv) Gas Elimination Device (Figure 2)

The gas elimination device is a TCS model 740 strainer/air eliminator (or any other equivalent approved gas elimination device) fitted upstream of the flowmeter to prevent vapour entering the flowmeter.

For applications where the duration of the shut down period does not cause thermal contraction of the liquid and formation of pockets of gas upstream of the flowmeter, the gas elimination device may be modified for use as a strainer only, provided the supply tank incorporates a detector for low liquid-level.

(v) Measurement Transducer

The measurement transducer is a Trimec Industries Flomec model OM100 A441-241QP 100 mm positive displacement flowmeter (Figure 2) incorporating oval gear rotors with two magnets per rotor that pass across a pulser circuit board with dual Hall Effect sensors to produce a dual output signal proportional to the volume throughput. The measuring transducer has the following characteristics:

Input supply voltage	5 to 24 DC
Pulse output	Square wave output proportional to supply voltage
Nominal k-factor	2.2 pulses/litre per channel
Maximum pulse output	55 Hz per channel
Cyclic Volume	1800 mL

The flowmeter may be mounted in horizontal or vertical pipelines provided the rotor shafts are in the horizontal plane.

(vi) Calibration Adjustment

The flowmeter calibration adjustment is achieved using the k-factor and/or meter factor facility provided by the compatible (#) approved controller/indicator.

Provision is made in the pipework for measuring the liquid temperature and pressure at the flowmeter during verification/certification of the system.

The calibration adjustment is carried out using the liquid which the flowmeter is intended to measure.

(vii) Controller/Indicator

An Enraf Contrec model Trac-40 controller/indicator or any other compatible (#) approved controller/indicator. The Trac-40 is described in the documentation of approval NMI S367A**.**

For applications where volume at 15 °C is required, the approved controller/indicator incorporates volume conversion for temperature facility and is connected to a temperature probe fitted as close as practical to the flowmeter.

(#) 'Compatible' is defined to mean that no additions/changes to hardware/software are required for satisfactory operation of the complete system.

(viii) Power Supply

The power supply to the measurement transducer may be provided either by:

(a) Connecting to the auxiliary power supply provided by the controller/indicator, such as the Enraf Trac-40, which also incorporates a control relay to stop the pump in the event of a power failure; or

(b) Connecting to a common power source defined by wiring, such that in the event of the power supply failure to the measurement transducer, the delivery pump is simultaneously affected and the flow stops.

(ix) Transfer Device

The transfer device is located downstream of the flowmeter and clearly defines the start and stop of the measured quantity. The transfer device may be in the form of a breakaway coupling, a nozzle or a positive shut-off component, such as a manually or automatically operated flow control valve. Whatever the transfer device used, the pipework upstream of the transfer device shall be maintained full of liquid.

The system may have more than one transfer point however the pipework design is such that once the measurement starts the flow continues through the intended transfer point until delivery is finalised; there is no possibility for diverting the measured quantity other than through the intended transfer point.

If a nozzle is used, the nozzle has an anti-drain valve installed either in the nozzle or immediately before it, and having a retaining pressure valve of not less than 55 kPa: the nozzle is the transfer device.

The pipework between the gas eliminator device and the transfer point shall be kept full of liquid during the measurement and shutdown periods.

1.3 Descriptive Markings

Each measuring system shall bear the following information, placed together either on the indicating device or on a data plate:

Pattern approval mark	NMI 5/6B/210
Manufacturer's identification mark or trade mark	…..
Meter model	…..
Serial number of the instrument	…..
Year of manufacture	…..
Maximum flow rate, Q_{max}	….. L/min
Minimum flow rate, Q_{min}	….. L/min
Maximum pressure of the liquid, P_{max}	….. kPa
Minimum pressure of the liquid, P_{min}	….. kPa
Type of the liquid for which the system is verified	..... (#)
Environmental class	class C

(#) This may be located separately, e.g. on a metal tag sealed to the instrument.

The minimum measured quantity *(V_{min})* is clearly visible on the indicating device, e.g. "Minimum Delivery 200 L".

1.4 Verification Provision

Provision is made for the application of a verification mark.

1.5 Sealing Provision

Refer to approval for the controller/indicator for sealing requirements.

Provision is made for the pulse generator to be sealed to prevent access to its electronics.

2. Description of Variant 1 approved on 4/03/08

The dual Hall Effect sensors replaced by dual Reed switches having a contact rating of 6 VA and a maximum voltage rating of 30 V DC.

3. Description of Variant 2 approved on 4/03/08

The dual Hall Effect sensors replaced by a single Reed switch and a single channel Hall Effect sensor output.

4. Description of Variant 3 re-approved on 17/08/12

Using certain other Trimec Industries Flomec OM series flowmeters as listed in Table 1. Meters may also be known as MG series of the same models. Figure 3 shows a model MG100 (E) flowmeter.

The meter inlet and outlet ports may be either threaded or flanged (Figure 6).

5. Description of Variant 4 re-approved on 17/08/12

A bulk flowmetering system incorporating any model flowmeter and constructed of flowmeter materials described elsewhere in this approval but specifically approved for use with AdBlue fluid AUS32 (aqueous urea solution 32.5%).

6. Description of Variant 5 re-approved on 17/08/12

With the output shaft of the flowmeter connected via a 90° bevel gear to a micrometer-type calibration adjustment mechanism and to an approved Veeder-Root mechanical calculator/indicator (as described in the documentation of approval NMI S184B)

The calculator/indicator may be fitted with a pre-set device and a pre-set counter (Figure 4) fitted between the calibration device and indicator. The pre-set device is mechanically linked to a Total Control Systems model TCS 750 mechanical pre-set control valve. The required quantity is displayed on the pre-set counter and is set by using five push-buttons.

The maximum pre-set volume is 999999 units of measurement. During the metering operation, the display of the pre-set counter progressively returns to zero. A mechanical linkage within the pre-set device closes the pre-set valve in two stages to complete the delivery. The pre-set control valve, which may also be manually operated, is installed downstream of the meter.

7. Description of Variant 6 approved on 17/08/12

Approved for use with petrol/ethanol blends and pure ethanol (‘E100’) and various grades of pure biodiesel and biodiesel/distillate blends (to Australian government standard). Polyphenylene sulphide (PPS) is used as the body/rotor/bearing material. (refer to Table 1)

8. Description of Variant 7 approved on 04/05/26

Additional Flomec model OM015 — refer to Table 1 for specifications

TEST PROCEDURE No 5/6B/210

Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

Maximum Permissible Errors

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

TABLE 1

Flowmeter Model (*)	Minimum Flow Rate (*Qmin*) (L/min)	Maximum Flow Rate *(Qmax*) (L/min)	Minimum Delivery ***(Vmin*)** (L)	Pulses per Litre per channel (optional)	Hz per channel (optional)	Cyclic Volume mL
OM015	4	40	**10**	169(169)	113(113)	24
OM025	15	150	**20**	54 (107)	135 (270)	75
OM040	25	250	**50**	36 (53)	110 (220)	152
OM050	45	450	**100**	13 (26)	100 (200)	307
OM050E	**58**	**580**	**100**	**9.6(19.2)**	**100(200)**	**420**
OM080	75	750	**200**	4.7 (9.3)	60 (120)	860
OM080**E**	100	1000	**500**	3.1 (6.2)	55 (110)	1290
OM100	150	1500	**500**	2.2 (4.4)	55 (110)	1800
OM100E	**250**	**2500**	**1000**	**1.1(2.2)**	**45(90)**	**3490**

The full model number of the meter is in the form 'OM100 A441-241QP**N**' (or MG100 A441-241QP), as set out below:

'OM' (or 'MG') designates meter series.

'100' designates meter size in mm.

'A' designates meter body material, namely
A = aluminium; or
D = ductile iron; or
S = stainless steel, or
P = polyphenylene sulphide (PPS)

'4' designates rotor material, namely
4= aluminium or
5= stainless steel
0= polyphenylene sulphide (PPS)

'4' designates bearing type, namely
1= ceramic; or
4= hardened steel roller bearings; or
0= polyphenylene sulphide (PPS)

'1' designates O-ring material, e.g. 1 = Viton

'-1' designates ambient temperature range limits, e.g. -2 = 120°C

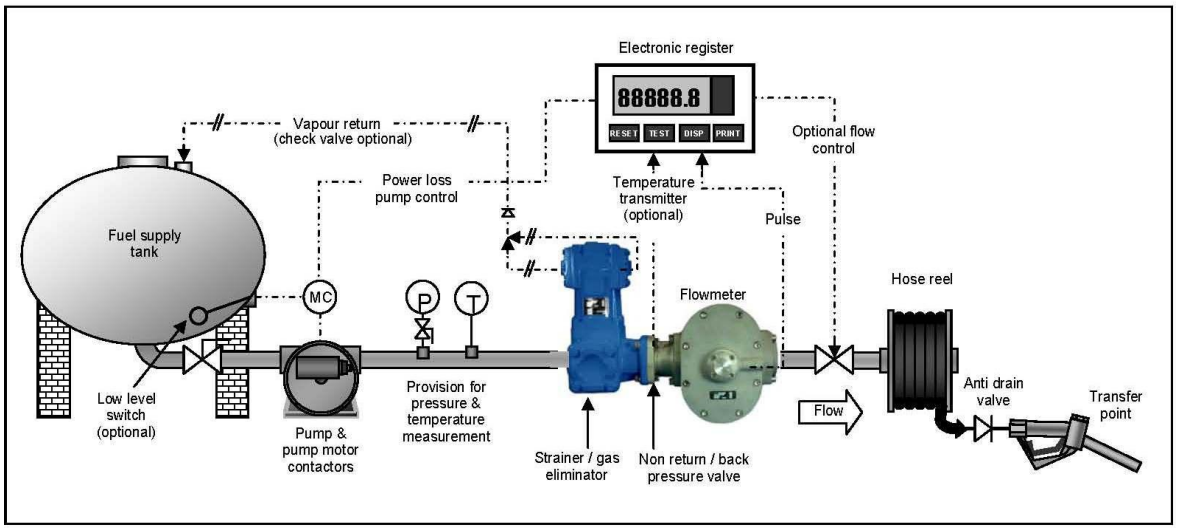
'4' designates process connections, e.g. 4 = ANSI-150 flanges

'1' designates cable entries, e.g. M20 × 1.5 mm

'QP' designates pulse output type, namely
00 = standard output board (variant 2)
E1 = standard output pulse with EXD approval
QP = quadrature pulse output board
Q1 = quadrature pulse output with EXD approval

'**N**' designates meter is NMI compliant.

FIGURE 5/6B/210 – 1



Trimec Model Flomec OM100 Flowmetering System

FIGURE 5/6B/210 – 2

Trimec Model Flomec OM100 Flowmeter With Gas Elimination Device

FIGURE 5/6B/210 – 3

Trimec Model Flomec MG100 Series Flowmeter

FIGURE 5/6B/210 – 4

Typical Pre-set Device and Pre-set Counter Arrangement

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