



**Australian Government**  
**National Measurement  
Institute**

Bradfield Road, West Lindfield NSW 2070

## **Certificate of Approval**

### **No 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

Trimec Model Flomec OM100 Liquid-measuring System

submitted by Trimec Industries Pty Ltd  
1-19 Northumberland Road  
Caringbah NSW 2229.

**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 117-1, *Measuring Systems for Liquids Other than Water*, dated July 2004.

#### **CONDITIONS OF APPROVAL**

This approval becomes subject to review on 1 August 2012, and then every 5 years thereafter.

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.

The National Measurement Institute reserves the right to examine any instrument or component of an instrument purporting to comply with this approval.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0/A.

#### DESCRIPTIVE ADVICE

**Pattern:** approved 11 July 2007

- A Trimec model Flomec OM100 bulk flowmetering system for bulk metering of petroleum products other than LPG.

**Variants:** approved 4 March 2008

1. With single or dual Reed switches.
2. With a single Reed switch and a single channel Hall Effect sensor.
3. Using certain Trimec Flomec flowmeters as listed in Table 1.

Technical Schedule No 5/6B/210 describes the pattern and variants 1 to 3.

**Variant:** approved 17 November 2008

4. For use to dispense AdBlue (aqueous urea solution).

Technical Schedule No 5/6B/210 Variation No 1 describes variant 4.

**Variant:** approved 10 August 2009

5. With a Trimec model Flomec OM100E (aka MG100E) flowmeter.

Technical Schedule No 5/6B/210 Variation No 2 describes variant 5.

**Variant:** approved 16 February 2010

6. With a micrometer-type calibration adjustment mechanism.

Technical Schedule No 5/6B/210 Variation No 3 describes variant 6.

#### FILING ADVICE

Certificate of Approval No 5/6B/210 dated 3 September 2009 is superseded by this Certificate, and may be destroyed. The documentation for this approval now comprises:

- Certificate of Approval No 5/6B/210 dated 15 March 2010
- Technical Schedule No 5/6B/210 dated 5 March 2008 (incl. Table 1 and Test Procedure)
- Technical Schedule No 5/6B/210 Variation No 1 dated 18 November 2008
- Technical Schedule No 5/6B/210 Variation No 2 dated 3 September 2009 (incl. Notification of Change)
- Technical Schedule No 5/6B/210 Variation No 3 dated 15 March 2010
- Figures 1 to 3 dated 5 March 2008
- Figure 4 dated 15 March 2010

Signed by a person authorised by the Chief Metrologist to exercise his powers under Regulation 60 of the *National Measurement Regulations 1999*.



## TECHNICAL SCHEDULE No 5/6B/210

**Pattern:** Trimec Model Flomec OM100 Liquid-measuring System

**Submittor:** Trimec Industries Pty Ltd  
1-19 Northumberland Road  
Caringbah NSW 2229

### 1. Description of Pattern

A bulk flowmetering system (Figure 1 and Table 1) incorporating a Trimec Industries model Flowmec model OM100 (\*) 100 mm positive displacement flowmeter for bulk metering of petroleum products other than LPG.

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

#### 1.1 Field of Operation

The field of operation of the measuring system is determined by the following characteristics:

- Minimum measured quantity,  $V_{min}$  200 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/certified 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 combination 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 keep the pipework full of liquid at all times.

**(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 model Flowmec 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.

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

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 including all checking facilities.

**(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 Verification/Certification Provision

Provision is made for the application of a verification/certification mark.

### 1.4 Sealing Provision

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

### 1.5 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".

## 2. Description of Variants

### 1.1 Variant 1

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.

### 1.2 Variant 2

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

### 1.3 Variant 3

Using certain other Trimec Industries Flowmec OM series flowmeters as listed below. Meters may also be known as MG series of the same models. Figure 3 shows a model MG100 flowmeter.

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

TABLE 1

Flowmeter Model (*)	Minimum Flow Rate ( <i>Q<sub>min</sub></i> ) (L/min)	Maximum Flow Rate ( <i>Q<sub>max</sub></i> ) (L/min)	Minimum Delivery ( <i>V<sub>max</sub></i> ) (L)	Pulses per Litre per channel (optional)	Hz per channel (optional)	Cyclic Volume mL
OM025	15	150	5	54 (107)	135 (270)	75
OM040	25	250	10	36 (53)	110 (220)	152
OM050	45	450	20	13 (26)	100 (200)	307
OM080	75	750	50	4.7 (9.3)	60 (120)	860
OM080H	100	1000	100	3.1 (6.2)	55 (110)	1290
OM100	150	1500	200	2.2 (4.4)	55 (110)	1800

The full model number of the meter is in the form 'OM100 A441-241QP' (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.

'4' designates rotor material, namely

- 4 = aluminium or
- 5 = stainless steel.

'4' designates bearing type, namely

- 1 = ceramic or
- 4 = hardened steel roller bearings.

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

'-1' designates ambient temperature range limits, e.g. -1 = 80°C.

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

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

'QP' designates pulse output type, namely

- 00 = standard output board (variant 2) plus E1- Ex option
- QP = Quadrature pulse output. (Q1- Ex option )

## TEST PROCEDURE

Instruments should be tested in accordance any relevant tests specified in the Uniform Test Procedures. Tests should be conducted in conjunction with any tests specified in the approval documentation for any controller/indicator and/or any conversion device, etc. used.

### **Maximum Permissible Errors**

#### **For accuracy class 0.5**

The maximum permissible errors are:

- ±0.3% for calibration adjustment of the meter; and
- ±0.5% for in service tolerance of the measuring system.

It is forbidden to adjust the calibration of the meter to an error other than as close as practical to zero error.

The meter is required to be verified/certified with the liquid that the meter is metering.

#### **Elimination of Air or Gas**

The maximum permissible errors applicable for the elimination of air or gas are:

- ±0.5% for liquids having a dynamic viscosity not exceeding 1 mPa.s (e.g. petrol); and
- ±1.0% for liquids having a dynamic viscosity exceeding 1 mPa.s (e.g. kerosene).

#### **Hose Dilation Test**

The maximum permissible errors applicable for hose dilation are:

- ±(0.01 × Minimum Measured Quantity) litres for systems without a hose reel;
- and
- ±(0.02 × Minimum Measured Quantity) litres for systems with a hose reel.

TECHNICAL SCHEDULE No 5/6B/210

VARIATION No 1

**Pattern:** Trimec Model Flomec OM100 Liquid-measuring System

**Submittor:** Trimec Industries Pty Ltd  
1-19 Northumberland Road  
Caringbah NSW 2229

**1. Description of Variant 4**

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%).

TECHNICAL SCHEDULE No 5/6B/210

VARIATION No 2

**Pattern:** Trimec Model Flomec OM100 Liquid-measuring System

**Submittor:** Trimec Industries Pty Ltd  
1-19 Northumberland Road  
Caringbah NSW 2229

**1. Description of Variant 5**

A bulk flowmetering system as described for the pattern and variants, using a Trimec model Flomec OM100E flowmeter, also known as a model MG100E.

The field of operation of the measuring system is as described for the pattern, except for the following characteristics:

- Maximum flow rate,  $Q_{max}$  2500 L/min
- Minimum flow rate,  $Q_{min}$  250 L/min

NOTIFICATION OF CHANGE

In Table 1 in Technical Schedule No 5/6B/210 dated 5 March 2008, the reference to the model 'OM080H' should be amended to now read:

'OM080E'.

TECHNICAL SCHEDULE No 5/6B/210

VARIATION No 3

**Pattern:** Trimec Model Flomec OM100 Liquid-measuring System

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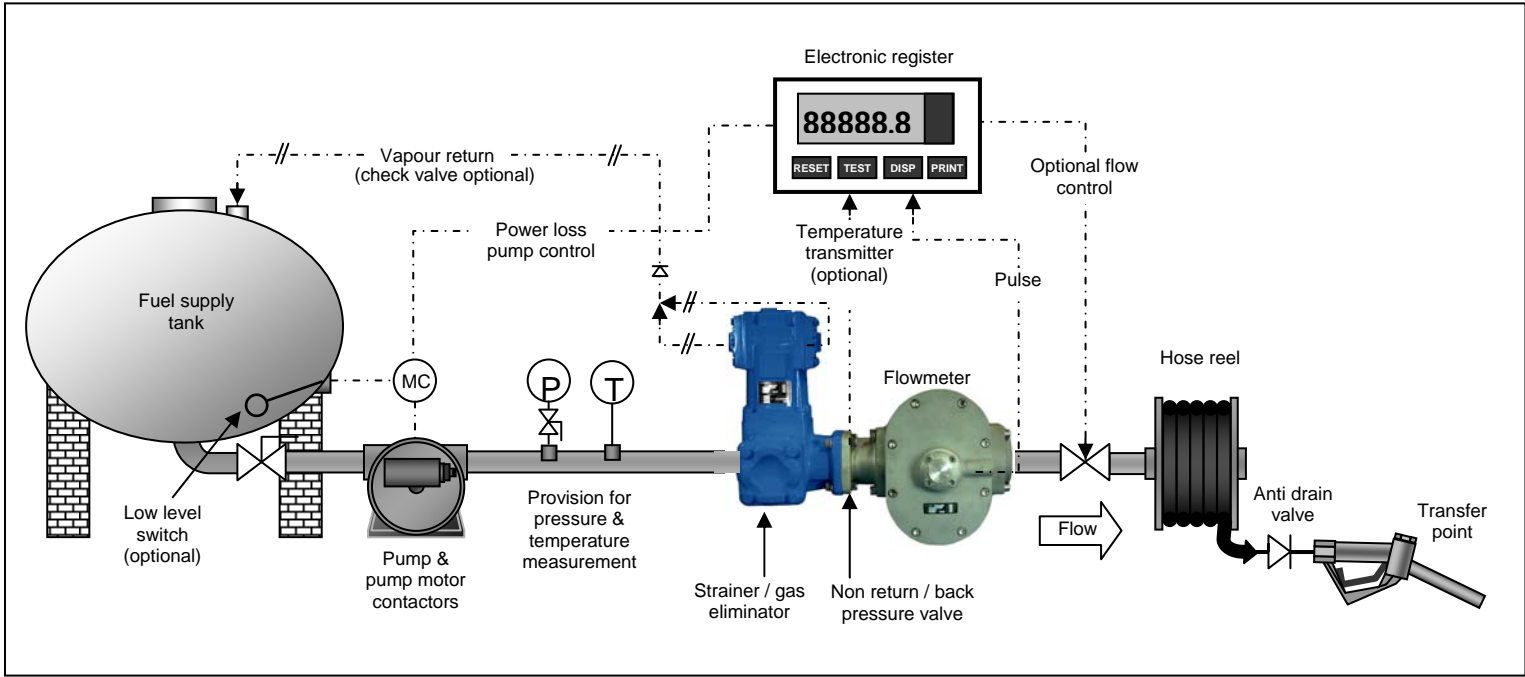
**1. Description of Variant 6**

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.

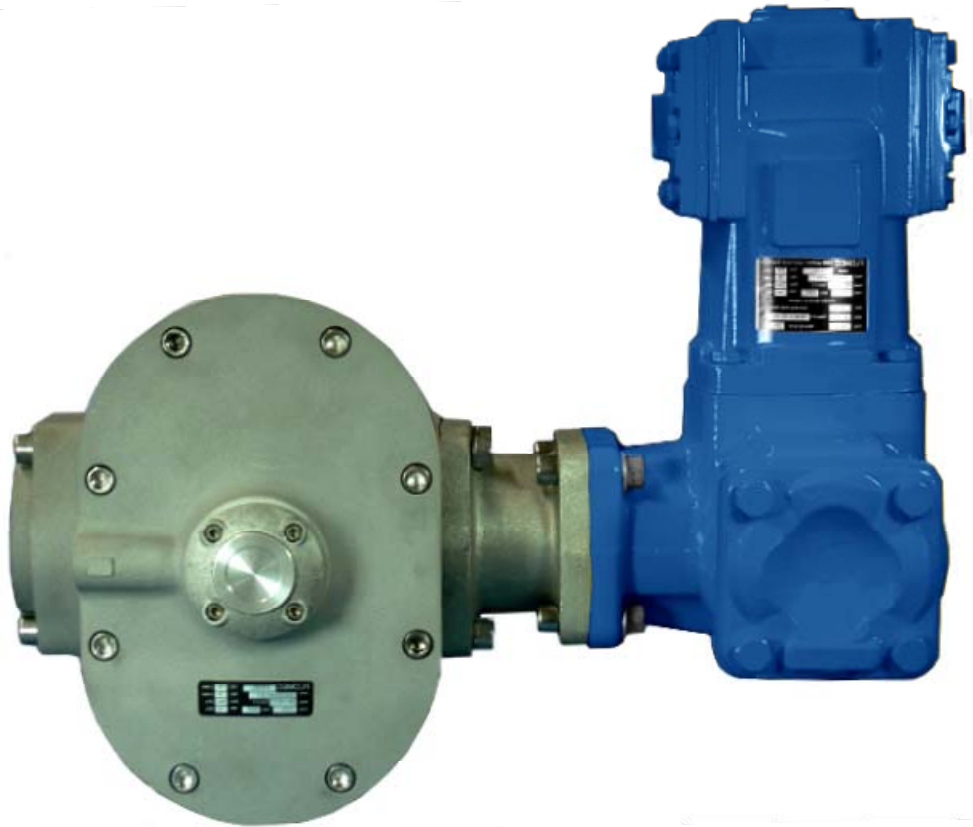
FIGURE 5/6B/210 – 1



Trimec Model Flomec OM100 Flowmetering System

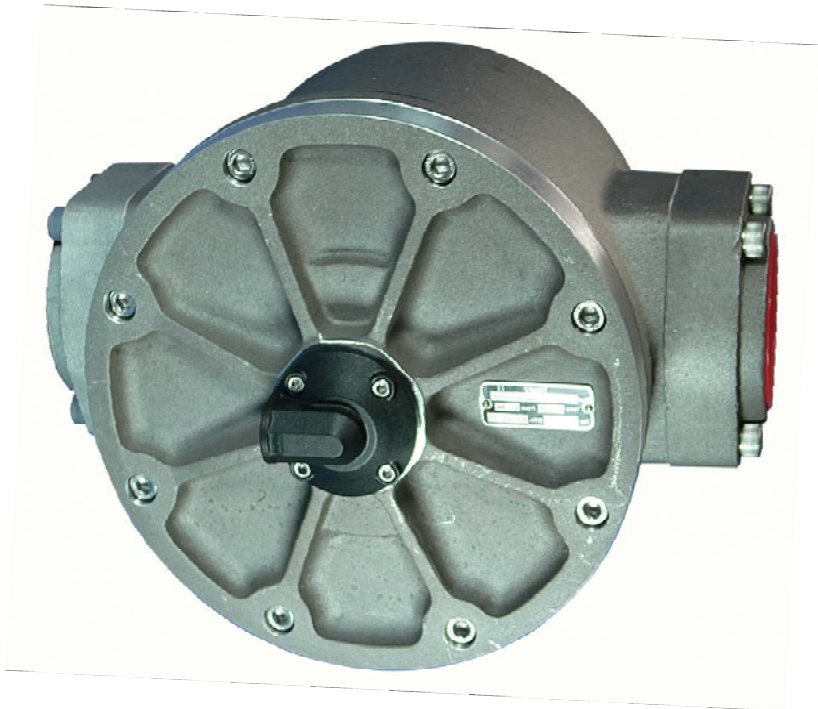
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FIGURE 5/6B/210 – 2



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