



Australian Government
Department of Industry and Science

**National
Measurement
Institute**

Certificate of Approval

NMI 5/6B/223

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.

ISOIL Model BM 200 Bulk Flowmetering System

submitted by ISOIL IMPIANTI SPA
Via Madonna Delle Rose, 74
Albano S. Alessandro, BG 24061
ITALY

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 becomes subject to review on 1/09/20, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 to 3 approved – certificate issued	5/08/15

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 5/6B/223' and only by persons authorised by the submitter.

It is the submitter'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.

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

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

A handwritten signature in black ink, appearing to read 'A Rawlinson', with a horizontal line underneath.

Dr A Rawlinson

TECHNICAL SCHEDULE No 5/6B/223

1. Description of Pattern

approved on 5/08/15

An ISOIL model BM 200 flowmetering system incorporating an BM 200 positive displacement flowmeter (Figure 1 and Table 1) for bulk metering of petroleum products other than LPG.

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}) 1570 L/min
- Minimum flow rate (Q_{min}) 120 L/min
- Maximum pressure of the liquid (P_{max}) 2000 kPa
- Minimum pressure of the liquid (P_{min}) 30 kPa (nominal) (#2)
- Range of liquids viscosity (at 20°C) 0.1 to 500 mPa.s (#3)
- Liquid temperature range -40°C to 170°C
- Ambient temperature range -25°C to 55°C
- Accuracy classes 0.3, 0.5

(#1) When the calculator/indicator is set to indicate volume in 1 L increments.

(#2) Minimum pressure required for effective operation of the gas elimination device.

(#3) The flowmeter is adjusted for use with one product viscosity for which it is to be verified and as marked on the data plate.

1.2 Components of Measuring System

(i) Supply tank

The supply tank, which may incorporate a detector for low liquid-level. A positive displacement, centrifugal or submersible turbine type pump may be used to provide flow through one or more flowmeters.

(ii) Pump

The pump is required to have sufficient capacity to allow flow rates at least three times the minimum flow rate specified for the flowmeter. If the pump is not for the exclusive use of the flowmeter, the pump shall be of sufficient capacity to ensure that flow rate through each meter is maintained above its respective specified minimum flow rate and the pressure is maintained above the minimum backpressure recommended for each meter for all combinations of alternative uses of the pump.

A positive displacement type, centrifugal type, or submersible turbine type pump may be installed in a flooded suction configuration. Systems with positive displacement pumps are installed so that the pump stops when the liquid level in the supply tank is low. Systems which incorporate submersible turbine type pumps, may in addition include centrifugal type pumps fitted above the liquid level in the supply tank as supplementary pumps.

(iii) Non-return Valve

A non-return valve between the pump and the meter, or an arrangement of the components and piping to keep the system (up to the transfer point) full of liquid at all times.

(iv) Gas Elimination Device

The pattern is fitted with an ISOIL FDA (*) series (Figure 2) or other compatible (#) strainer/air eliminator.

(*) Abbreviated model number – the full model number may include a numeric suffix, e.g. FDA 400.

(v) Measurement Transducer

The measurement transducer is an ISOIL model BM 200 positive displacement meter fitted with an ISOIL ENCODER EM 6422 (**) series pulse generator (Figure 3) or other compatible (#) NMI-approved pulse generator. Liquid enters the meter through the inlet side of the manifold and causes the rotors to rotate within the measuring chamber displacing a fixed volume of liquid for each cycle. The pulse generator provides a pulse output proportional to the volume throughput, and has the following characteristics:

Pulse transmission:

Input supply voltage	5 to 30 VDC
Pulse resolution	64 or 256 pulses/revolution
Maximum speed	1000 rpm

(**) Abbreviated model number – the full model number may include a numeric suffix, e.g. 6422 1111.

(vi) Calculator/Indicator

An ISOIL model VEGA II or model VEGA T calculator/indicator (Figure 4) or other compatible (#) NMI-approved calculator/indicator. The model VEGA units have a graphics display and numerical/function soft/hard keys housed in an aluminium enclosure.

(vii) Transfer Device

A transfer device is located downstream of the meter to define the start and finish of volume measured by the flowmeter and may be in the form of a shut-off valve or a decoupling valve fitted to the end of a loading arm.

The transfer device may also be designed to control the flow rate, or a separate flow control valve may be fitted between the meter and the transfer device, provided that the flow control system maintains the operation of the meter within the approved field of operation.

1.3 Sealing Provision

Provision is made for pulse generator to be sealed by the application of one or more mechanical seals (Figure 3).

Provision is made for the calculator/indicator to be sealed as shown in Figure 5.

(#) ‘Compatible’ is defined to mean that no additions/changes to the hardware/software specified in this approval are required for satisfactory operation of the system.

1.4 Verification Provision

Provision is made for the application of a verification mark.

1.5 Descriptive Markings and Notices

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

Pattern approval number	NMI No 5/6B/223
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 (#1)
Minimum pressure of the liquid, P_{min}	..... kPa
Liquid temperature range	... to ... °C (#2)
Nominal k-factor	..... L/pulse
Type of liquid for which the system is verified	..... (#3)
Environmental classes	class C or I
Accuracy class	.....

(#1) Required for systems with flexible outlet pipework.

(#2) Required if temperature converted volume to 15°C is reported.

(#3) 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', or the pre-set of the controller is limited to deliveries equal to or greater than the minimum delivery specified for the flowmeter.

2. Description of Variant 1

approved on 5/08/15

With certain model ISOIL flowmeters as listed below in Table 1. (The pattern, model BM 200, is shown in **bold**.)

TABLE 1

Flowmeter Model	Size (mm)	Minimum Flow Rate (Q_{min}) (L/min)	Maximum Flow Rate (Q_{max}) (L/min)	Minimum Delivery (V_{min}) (L)
SBM 32	40	30	350	50
SBM 75	50	50	500	50
SBM 150	80	100	1300	100
BM 200	80	120	1570	200
BM 400	100	200	2600	200
BM 600	150	300	4000	500
P4000	100	300	3000	200

3. Description of Variant 2 **approved on 5/08/15**

With certain other model ISOIL flowmeters as listed below in Table 2.

TABLE 2

Flowmeter Model	Size (mm)	Minimum Flow Rate (Q_{min}) (L/min)	Maximum Flow Rate (Q_{max}) (L/min)	Minimum Delivery (V_{min}) (L)
LBM1000	200	700	7850	1000
LBM3000	250	1400	15 700	1000

4. Description of Variant 3 **approved on 5/08/15**

The ISOIL model S9000 measuring system (Figure 6) is used for gravity unloading of road tankers.

4.1 Field of Operation

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

- Minimum measured quantity (V_{min}) 200 L (#1)
- Maximum flow rate (Q_{max}) 1000 L/min
- Minimum flow rate (Q_{min}) 200 L/min
- Maximum pressure of the liquid (P_{max}) 1000 kPa
- Range of liquids viscosity 0.3 to 20 mPa.s (at 20°C) (#2)
- Liquid temperature range -10°C to 50°C
- Ambient temperature range -25°C to 55°C
- Accuracy class 0.5

(#1) When the calculator/indicator is set to indicate volume in 1 L increments.

(#2) The flowmeter is adjusted for use with one product viscosity for which it is to be verified and as marked on the data plate.

5. Description of Variant 4 **approved on 5/08/15**

With a Veeder-Root model 789000-074 mechanical calculator/indicator (as described in approval NMI S681) or any other compatible (#) NMI-approved mechanical calculator/indicator.

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

TEST PROCEDURE

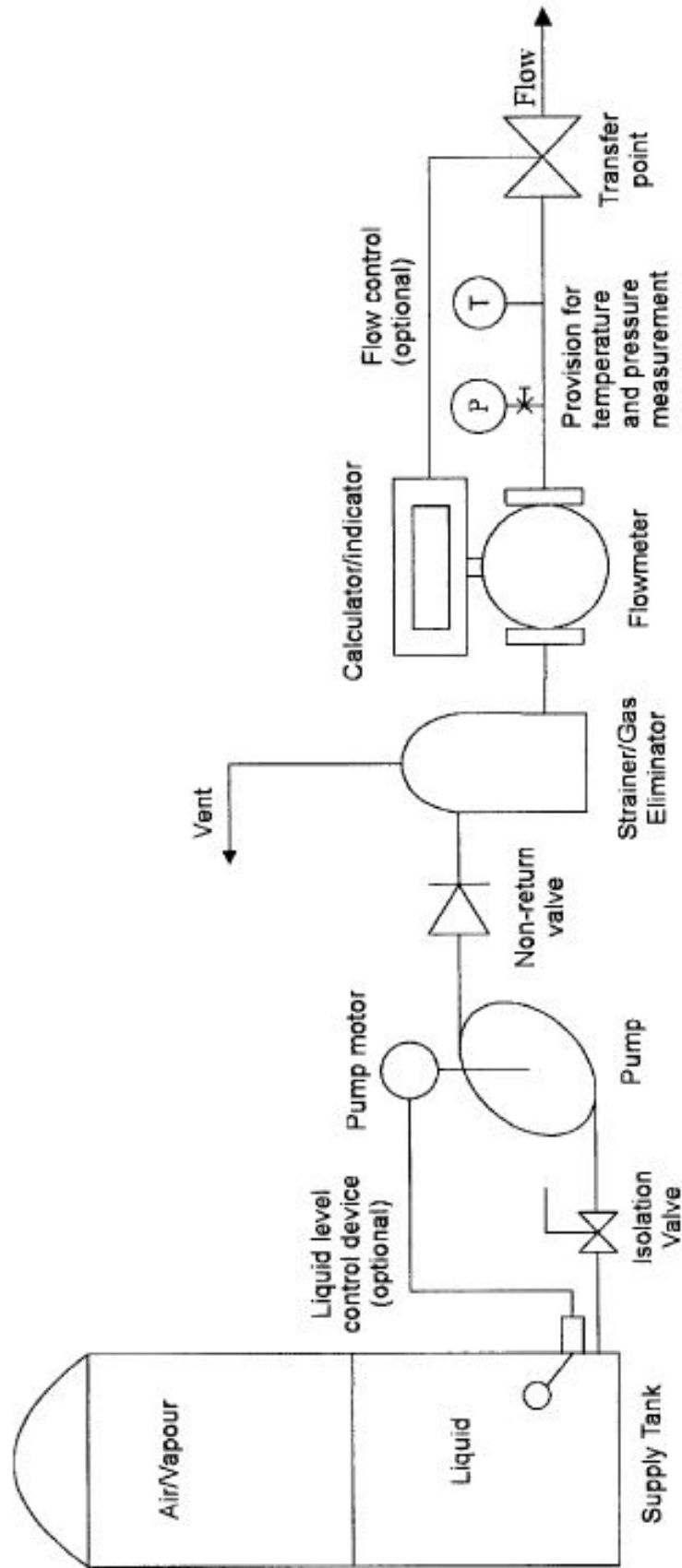
Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

Maximum Permissible Errors

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

FIGURE 5/6B/223 – 1



ISOIL Model BM 200 Bulk Flowmetering System (The Pattern)

FIGURE 5/6B/223 – 2



ISOIL FDA Series Strainer/Air Eliminator

FIGURE 5/6B/223 – 3



ISOIL Model BM 200 Flowmeter

FIGURE 5/6B/223 – 4



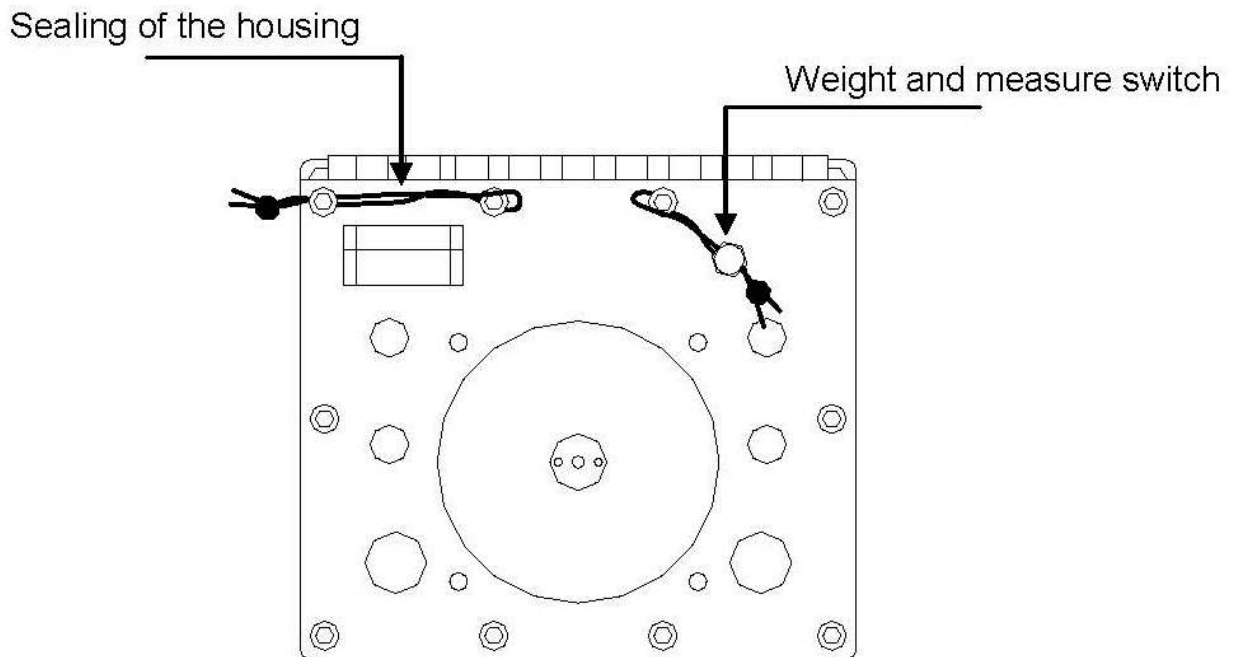
(a) ISOIL Model VEGA II Calculator/Indicator



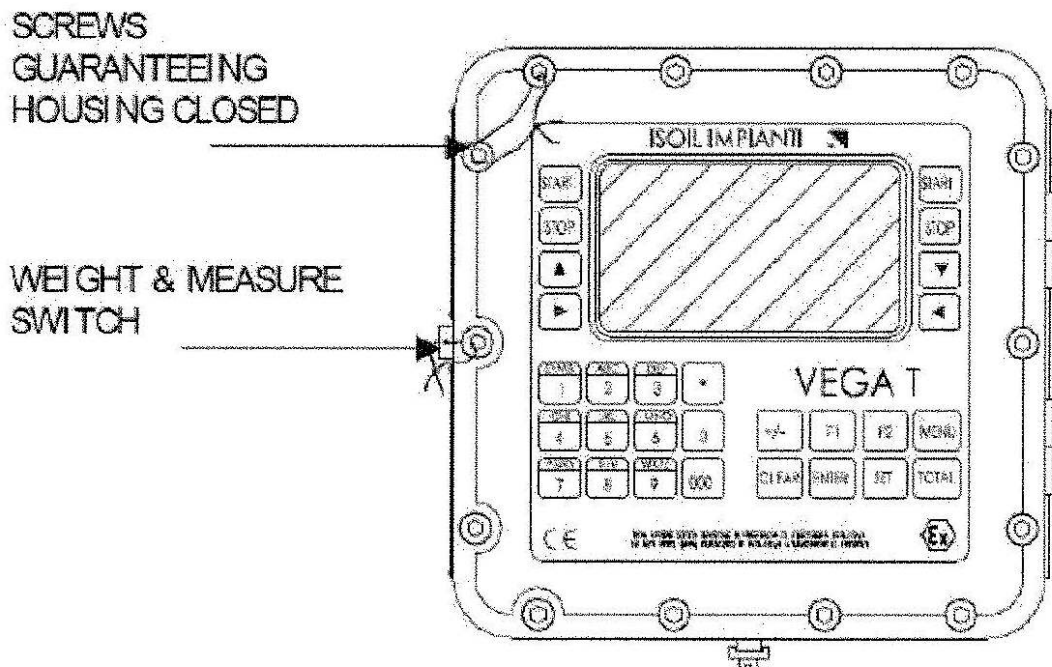
(b) ISOIL Model VEGA T Calculator/Indicator

FIGURE 5/6B/223 – 5

Bottom view of the VEGA II



(a) ISOIL Model VEGA II Calculator/Indicator



(b) ISOIL Model VEGA T Calculator/Indicator

Typical Sealing Methods

FIGURE 5/6B/223 – 6



ISOIL Model S9000 Measuring System (Variant 3)

~ End of Document ~