

Australian Government

Department of Industry, Science, Energy and Resources

# National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

# Certificate of Approval NMI 5/6B/71B

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 SBM75 Bulk Flowmetering System

submitted by Liquip International Pty Limited 148B Newton Road Wetherill Park NSW 2164

**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.

#### DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 & 2 approved – interim certificate issued	17/02/03
1	Pattern & variants 1 & 2 approved – certificate issued	5/05/03
2	Pattern amended (submittor name) – notification of change	10/02/05
	issued	
3	Variants 3 & 4 approved – certificate issued	30/08/07

Document	History	(Cont)	)
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Rev	Reason/Details	Date
4	Pattern & variants 1 to 4 reviewed – notification of change	4/06/08
	issued	
5	Variants 5 to 7 approved – certificate issued	22/10/10
6	Pattern & variants 1 to 7 updated & reviewed – certificate	9/06/16
	change issued	
7	Amend address – certificate issued	25/11/20

# CONDITIONS OF APPROVAL

#### General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 5/6B/71B' 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.

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

**Darryl Hines** Manager Policy and Regulatory Services

## TECHNICAL SCHEDULE No 5/6B/71B

#### 1. Description of Pattern

#### approved on 17/02/03

The ISOIL model SBM 75 positive displacement flowmeter (Figure 1 and Table 1) approved for bulk metering of liquid petroleum products within the stated field of operation. The flowmetering system may be mounted on a vehicle or installed in a fixed location for metering the volume dispensed. The flowmeter is adjusted to be correct for the liquid for which it is to be verified as marked on the data plate.

## 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
•	Maximum flow rate, Qmax	500 L/min
•	Minimum flow rate, Qmin	50 L/min
•	Maximum pressure of the liquid, $P_{max}$	1050 kPa
•	Dynamic viscosity range at 20°C	0.4 to 20 mPa.s
•	Maximum temperature of the liquid, $T_{max}$	50°C
•	Minimum temperature of the liquid, $T_{min}$	-10°C
•	Accuracy class	0.5

# 1.2 Components of the Flowmetering System

## (i) Tank

The supply tank may incorporate a device for detecting when the liquid level in the supply tank is low.

## (ii) Pump

The pump is fitted in a positive suction head (flooded suction) installation, i.e. below the liquid level in the supply tank (Figure 2).

A positive displacement type or centrifugal type pump may be used.

#### (iii) Non-return Valve

A non-return value is fitted between the pump and the flowmeter to prevent reverse flow of the liquid.

#### (iv) Gas Elimination Device

The gas elimination device consists of an Isoil model FDV 75 gas eliminator (Figure 1) with integral strainer. The gas elimination device is approved on the condition that the pump is operated under a positive suction head.

The gas elimination device prevents flow through the meter when significant air or gas is detected.

# (v) Measurement Transducer

A measurement transducer is an Isoil SBM 75 positive displacement meter (Figure 1). 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 rotors drive a shaft that connects via gearing to a calibrating mechanism; one complete turn of the calibrating screw varies the volume indicated on the meter by approximately 0.16%.

A thermowell is provided downstream of the meter, and provision is made for measuring the pressure at the meter.

## (vi) Calculator/Indicator

The measurement transducer is fitted with a Veeder-Root 7889 series pre-set counter mechanically linked to an Oilmeter model 705 outlet-control control valve with integral anti-drain valve fitted immediately downstream of the meter.

The pre-set counter is only approved for facilitating the delivery and is marked 'PRESET INDICATION NOT IN USE FOR TRADE'.

The calculator/indicator may be replaced with any other NMI-approved compatible calculator/indicator that can be fitted to the meter output shaft without modifying meter components or increasing the torque on the meter output shaft.

## (vii) Transfer Device

The transfer device is either in the form of a shut-off valve, a nozzle or a dry-break coupling at the end of a rigid pipe or flexible hose. The shut-off valve may be operated either manually or automatically. An optional flow control valve may be fitted between the transfer point and the meter.

If a hose and nozzle is used, an anti-drain valve installed either in the nozzle or immediately before it, and is designed to retain a pressure of not less than 55 kPa; the nozzle is the transfer device.

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

## 1.3 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 or NSC No 5/6	B/71B
Manufacturer's identification mark or trade mark		
Meter model		
Serial number of the instrument		
Year of manufacture		
Maximum flow rate, <i>Q<sub>max</sub></i>	L/min	
Minimum flow rate, Q <sub>min</sub>	L/min	
Maximum pressure, <i>P</i> <sub>max</sub>	kPa	
Environmental class	class I	
Cyclic Volume	L/rev	
Type of liquid for which the system is verified (*)	(	*)

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

Provision is made for sealing the following components:

- (a) The covers of the meter housing;
- (b) The calibrating mechanism; and
- (c) The indicating mechanism and pre-set mechanism (if fitted).

# 2. Description of Variant 1

#### approved on 17/02/03

Using certain other Isoil meters as listed in Table 1.

Meter Model	Flow Rate (L/min)		Minimum Measured Quantity (L)	Cyclic Volume (L/rev)	
(*)	<b>Q</b> min	<b>Q</b> <sub>max</sub>	Vmin		
SBM 75	50	500	200	0.625	
SBM 150	100	1000	500	2.299	
BM 200	120	1200	500	2.275	
BM 400	240	2400	1000	4.550	
BM 600	360	3600	2000	6.825	

TABLE 1

(\*) Prefix S means a steel casing

# 3. Description of Variant 2

## approved on 17/02/03

With the model SBM75 flowmeter for use with lubricating oils having a dynamic viscosity in range 20 and 1000 mPa.s. In these applications the gas elimination device may be dispensed with, however provision is made to prevent air entering the pipework, for example by incorporating a device that stops measurements when low liquid level in the supply tank is detected.

## 4. Description of Variant 3

## approved on 30/08/07

approved on 30/08/07

approved on 22/10/10

The pattern and variants for use to dispense various grades of petrol which may include up to 10% ethanol ('E10').

## 5. Description of Variant 4

The pattern and variants constructed for use to dispense various grades of pure biodiesel and biodiesel/distillate blends (to Australian government standard).

# 6. Description of Variant 5

The pattern and variants for use to dispense various grades of petrol which may include up to 99% ethanol ('E99').

## 7. Description of Variant 6

#### approved on 22/10/10

The pattern and variants constructed for use to dispense various liquids having a dynamic viscosity at 20°C from 0.4 to 1000 mPa.s.

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

#### 8. Description of Variant 7

#### approved on 22/10/10

As a mobile liquid-measuring system for aircraft refuelling similar to system described for variant 2 but as shown in Figures 3 to 5.

## 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/71B - 1



ISOIL Model SBM 75 Flowmeter With an Isoil Model FDV 75 Gas Eliminator



FIGURE 5/6B/71B - 2

ISOIL Model SBM75 Vehicle-mounted Bulk Flowmetering System





Typical ISOIL Avgas Aviation Tanker Refueller Liquid-measuring System

FIGURE 5/6B/71B - 4



FIGURE 5/6B/71B - 5



Typical ISOIL Hydrant Dispenser Liquid-measuring System

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