Australian Government
Department of Industry and Science

National Measurement Institute

Certificate of Approval

NMI 5/6B/220

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.

F. A. Sening Model GMVT 805 Bulk Flowmetering System

submitted by John Bean Technologies
61D Marple Avenue
Villawood NSW 2163

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 1/09/19, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – interim certificate issued	12/08/14
1	Pattern amended (validity) – interim certificate issued	29/01/15
2	Pattern & variant 1 approved – certificate issued	26/08/15

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number ‘NMI 5/6B/220’ 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 A Rawlinson

TECHNICAL SCHEDULE No 5/6B/220

1. Description of Pattern approved on 12/08/14

A bulk flowmetering system incorporating an F.A. Sening model GMVT 805 positive displacement flowmeter with an integral special gas separator for bulk metering of petroleum products other than LPG (Figure 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}	800 L/min	
• Minimum flow rate, Q_{min}	40 L/min	
• Maximum pressure of the liquid, P_{min}	1050 kPa	
• Minimum pressure of the liquid, P_{min}	20 kPa/gravity discharge	(#2)
• Dynamic viscosity	0.4 to 20 mPa.s (at 20°C)	(#3)
• Liquid temperature range	-10°C to 50°C	
• Ambient temperature range	-10°C to 55°C	
• Accuracy	Class 0.5	
• Application	Static, mobile	

(#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)

The system includes:

(i) Tank

A supply tank with an anti-swirl bottom valve for gravity discharge.

(ii) Pump

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

A centrifugal type pump may only be installed below the liquid level of the supply tank and 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.

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) Measurement Transducer

The measurement transducer is an F.A. Sening model GMVT 805 curved-path-controlled vane operated positive displacement flowmeter (Figure 2) with an integral special filter/float-operated gas separator. A non-return valve (to prevent reverse flow), two operating valves (controlled by the calculator/indicator) and a 2-stage valve are all fitted downstream of the flowmeter.

(iv) Pulse Generators

The model GMVT 805 flowmeter is fitted two integral F.A. Sening pulse transmitters, either model THS-J (two-wire) or model THS-O (three-wire) with a pulse rate of 19 pulses/rev which results in 8.415 pulses/litre.

(v) Calculator/Indicator

An FMC F.A. Sening model MultiFlow calculator/indicator (Figure 3), as described in approval NMI S671, is used. Figure 3 shows a MultiFlow calculator/ indicator with an optional chip card reader.

(vi) 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 an 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.

(vii) Product Drain and Return System

This optional float operated control device reduces the retained liquid volume when changing the product (e.g. from diesel to petrol). Prior to changing product, the integral special gas extractor, flowmeter and the discharge valve are drained by using an air driven pump and the product is returned into the truck's compartment, or slop tank.

During the draining process and while the measuring system is empty, the discharge valve cannot be opened and the electronic register (calculator/indicator) is deactivated. Prior to the next discharge process, the integral special gas extractor, flowmeter and discharge valve are refilled with the new product.

1.3 Volume Conversion for Temperature Facility

An optional electronic volume conversion for temperature facility may be used to convert the measured volume to volume at 15ºC. Activation of the volume conversion feature is indicated by 'compensated to 15ºC appearing on the display and is activated via the parameter 3.5.n.n.7 mode for the approved products. The conversion is based on ASTM-IP-API Petroleum Measurement Table 54B for Generalised Petroleum Products.

The density is either fixed via the calibration mode or is available for adjustment using the parameter 3.1.5.2.1. The density has to be entered prior to measurements taking place. In such applications, temperature measurement is required which can be displayed by the MultiFlow calculator/indicator.

For temperature measurement, the model Pt100SG4, Pt100 4-wire RTD probe, which has a resistance of 100 ohms at 0ºC, or any other compatible (#) temperature probe with similar characteristics, can be used.

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

1.4 Printer

The model MultiFlow calculator/indicator may be connected to an Epson model TM-295 printer (Figure 4) or to any other equivalent (*) printer (##). Note that the printer is mandatory when the optional electronic volume conversion for temperature facility is used.

If the nature of the measured volume is entered into the calculator/indicator at the beginning of the measurement operation, then a printer is mandatory for printing the delivery details and the manually-entered density for which the volume conversion is set.

(*) 'Equivalent' is defined to mean other proprietary equipment of the same or better specifications requiring no changes to the software specified in this approval for satisfactory operation of the complete system.

(##) The printer must be situated in a location that will satisfy the temperature requirements of -10ºC to 40ºC.

Note: Where the vehicle battery supply is 12 V, a voltage doubler is required.

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 mark	NMI 5/6B/220	
Manufacturer's identification mark or trade mark	F.A. Sening	
Meter model	GMVT 805	
Serial number of the instrument	…..	
Year of manufacture	…..	
Maximum flow rate, Q_{max}	800 L/min	
Minimum flow rate, Q_{min}	40 L/min	
Maximum pressure of the liquid, P_{max}	1000 kPa	
Minimum pressure of the liquid, P_{min}	20 kPa	
Type of the liquid for which the system is verified	…..	(#1)
Environmental class	class C, I	

(#1) 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'.

Environmental class	M3/E3	(#2)
Liquid temperature range	-10ºC to 50ºC	(#3)

(#2) Environmental class for printers is Class B

(#3) Required when the volume conversion for temperature facility is activated

For applications other than LPG, when the volume conversion facility is activated, the indicator reading face shall be marked 'Litres at 15ºC' or 'Volume at 15ºC'.

1.6 Sealing Provision

Provision is made for sealing access as shown in Figure 5 (not all sealing methods shown are required for all systems). Refer also to the approval for calculator/indicator for any additional sealing requirements

1.7 Verification Provision

Provision is made for the application of a verification mark.

2. Description of Variant 1 approved on draft/15

For use with a Smith model T-20 flowmeter **(Figure 6)** with the following field of operation:

• Minimum measured quantity, V_{min}	100 L	(#1)
• Maximum flow rate, Q_{max}	1000 L/min	
• Minimum flow rate, Q_{min}	100 L/min	
• Dynamic viscosity	0.4 to 50 mPa.s (at 20°C)	(#2)

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

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

TEST PROCEDURE

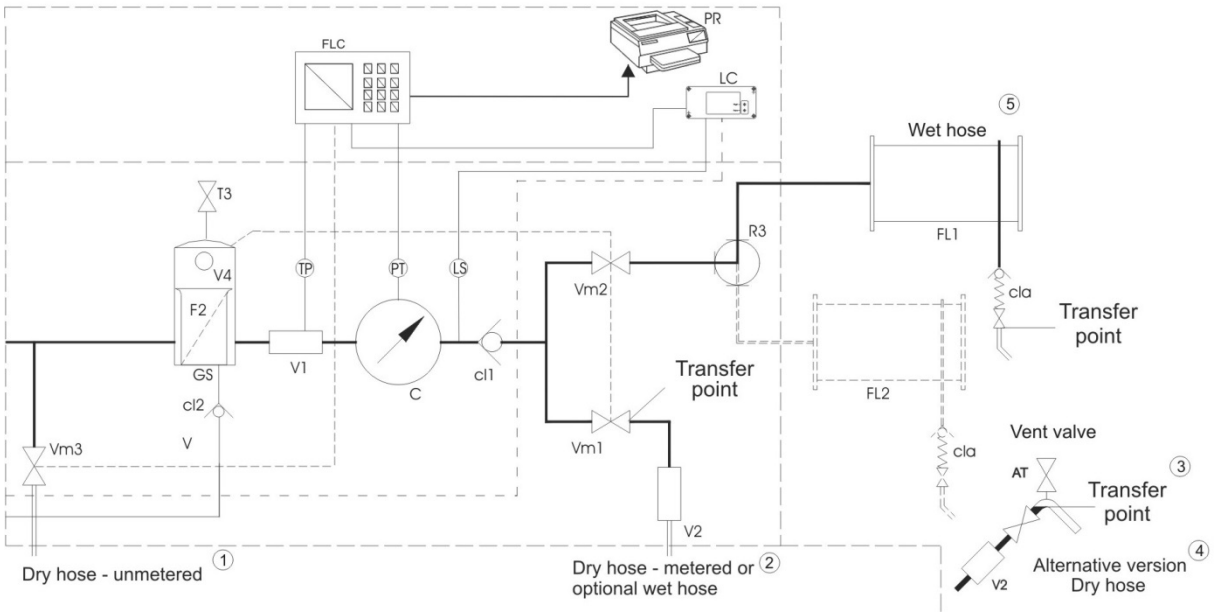
Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

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 applicable are those applicable to the fuel dispensers to which the instrument approved herein is fitted, as stated in the approval documentation for the fuel dispensers or in Schedule 1 of the *National Trade Measurement Regulations 2009*.

FIGURE 5/6B/220 – 1

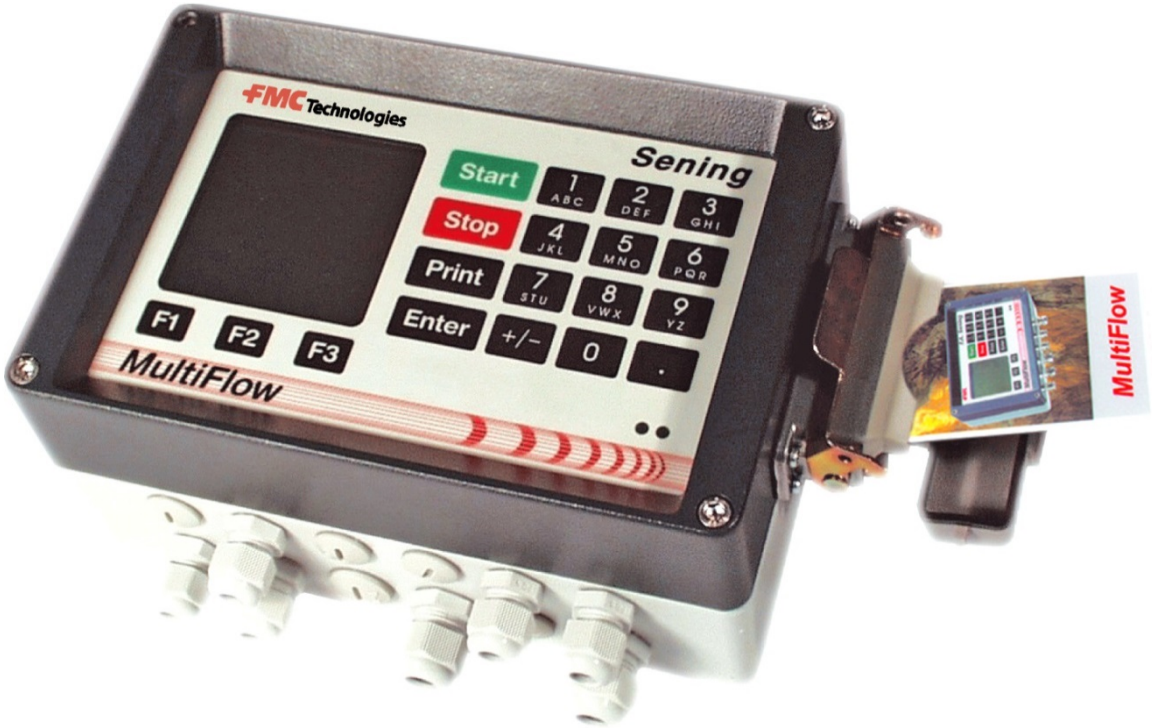


F. A. Sening Model GMVT 805 Bulk Flowmetering System

FIGURE 5/6B/220 – 2

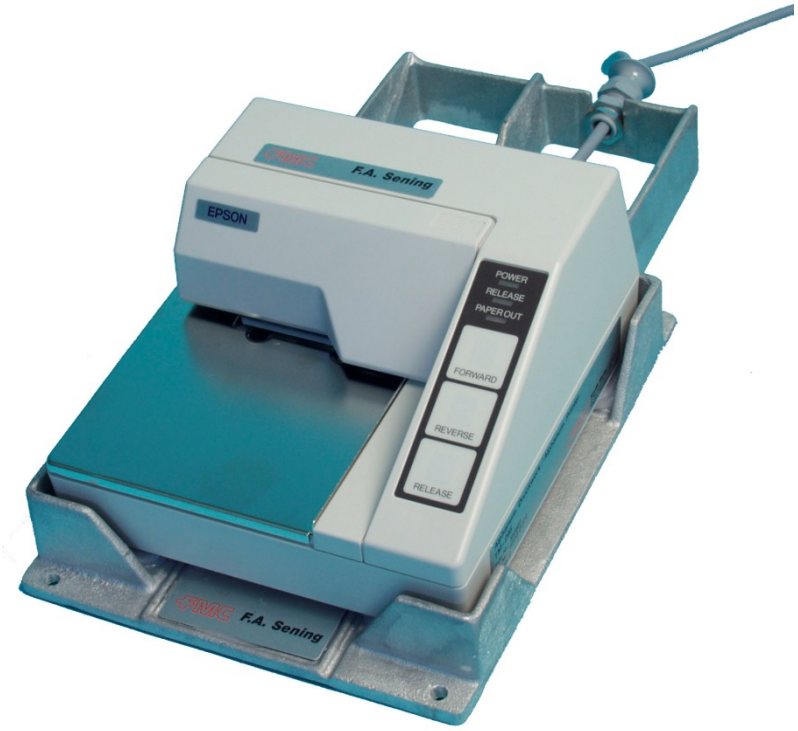
F.A. Sening Model GMVT 805 Flowmeter

FIGURE 5/6B/220 – 3



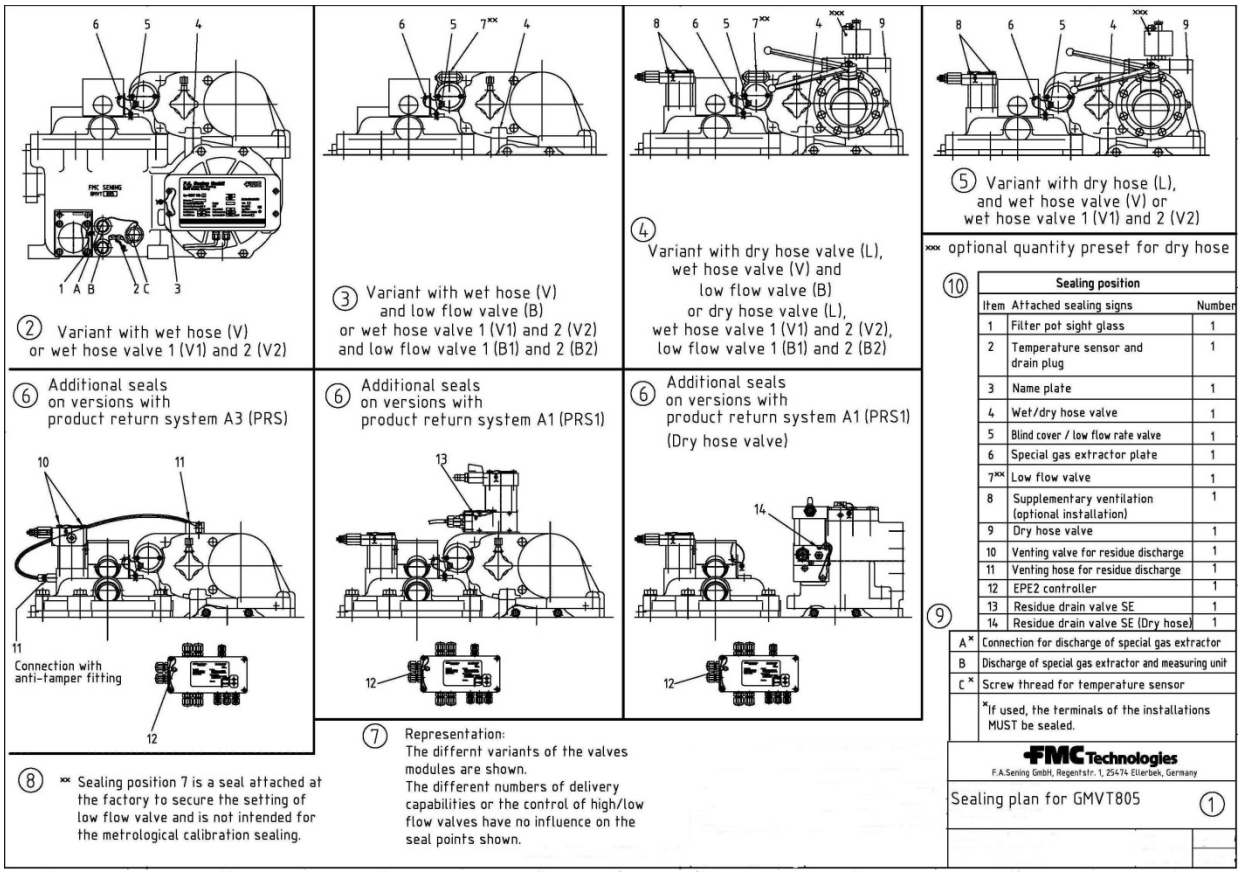
F.A. Sening Model MultiFlow Calculator/Indicator

FIGURE 5/6B/220 – 4



Epson Model TM-295 Printer

FIGURE 5/6B/220 – 5



Sealing Methods

FIGURE 5/6B/220 – 6

Smith Model T-20 Flowmeter (Variant 1)

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