Australian Government
Department of Industry, Science and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 5/6B/221

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.

Smith® Genesis GSC-3-ST Bulk Flow metering System

submitted by Smith Meter Inc.
1602 Wagner Avenue
Pennsylvania 16510
United States of America

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 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 – certificate issued	29/04/15
1	Pattern amended (submitted by) – certificate issued	23/07/25

CONDITIONS OF APPROVAL

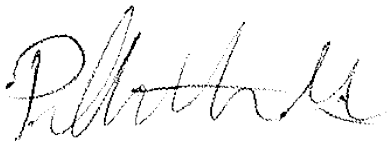
General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 5/6B/221' 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 Certificate of Approval 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*.



Dr Phillip Mitchell
A/g Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No 5/6B/221

1. Description of Pattern approved on 29/04/15

A bulk flow metering system incorporating an Smith® Genesis GSC-3-ST positive displacement flowmeter with an integral pulse transmitter (Figure 1 and Table 1) for bulk metering of petroleum products other than LPG.

Approved products include industrial oils, various grades of liquid hydrocarbons including petrol/ethanol blends and pure ethanol ('E100') and various grades of pure biodiesel and biodiesel/distillate blends (to Australian government standard).

1.1 Field of Operation

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

•	Minimum measured quantity (V_{min})	100 L	(#1)
•	Maximum flow rate (Q_{max})	1900 L/min	
•	Minimum flow rate (Q_{min})	127 L/min	
•	Maximum pressure of the liquid (P_{max})	1965 kPa	
•	Minimum pressure of the liquid (P_{min})	50 kPa (nominal)	(#2)
•	Range of liquids viscosity	0.5 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) 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 calculator/indicator is adjusted for use with one product viscosity for which it is to be verified and as marked on the data plate.

Note: As an alternative to L or L/min, measurements may be displayed as m^3 or m^3/min.

1.2 Components of Measuring System

(i) Supply 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 flow meters.

Systems fitted with a positive displacement pump shall include a gas elimination device capable of continuously separating any air/vapours entrained in the liquid upstream of the flow meter.

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. These systems shall include a gas elimination device capable of removing any pockets of air/vapours that may form in the pipework upstream of the flow meter.

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 upstream of 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, comprising a model RB Air Release coupled to a model E-Type or 'straight through' type strainer (**) of the correct line size (Figure 2) or any other compatible (#) approved gas elimination device, is fitted upstream of the flowmeter to prevent vapour entering the flowmeter.

(**) Reference ~~FMC~~ Specification SS03039 or SS03041 or SS03046E

For applications where the duration of the shutdown period does not cause thermal contraction of the liquid and formation of pockets of gas upstream of the flow meter, 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

An Smith® Genesis GSC-3-ST positive displacement flowmeter (Figure 3) fitted with the integral HRE pulse generator that provides a pulse output proportional to the volume throughput. The pulse generator has the following characteristics:

Input supply voltage	10 to 30 V DC
Pulse output	Square wave output proportional to supply voltage
Maximum pulse output	7 KHz per channel

The Genesis flowmeter has optional provision for an integrated RTD temperature probe for interfacing to the calculator/indicator; in addition an optional W&M test probe well is available. If not fitted, then provision is made for inserting a thermometer and fitting a pressure gauge for the purpose of verifying the liquid temperature and pressure at the meter during the verification. The thermometer well and the pressure gauge may be fitted in the vicinity of the meter outlet. Alternatively, the thermometer well may be incorporated in the gas elimination device if the device is in close proximity of the meter inlet.

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

(vi) Calculator/Indicator

The signal output from the measurement transducer is interfaced to an approved Smith Meter Inc AccuLoad III calculator/indicator as described in the documentation of approval NMI S413 or other compatible (#) approved calculator/indicator.

The calculator/indicator is to provide volume correction at 15 °C for the measured product.

(#) '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.

Any compatible (#) four-wire, 100 Ω platinum resistance temperature detector (PRTD) or compatible (#) temperature transmitter is fitted in the vicinity of the flowmeter.

(#) '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.

(vii) Checking Facility

When the voltage supply to the transmitter is interrupted, the calculator/indicator is to stop the delivery.

(viii) Flow Control

Smith Meter digital valve is installed downstream of the measurement transducer and is interfaced to the AccuLoad calculator/indicator for controlling the flow transfer of product to the receiving storage tank.

Additional piping may be installed after the digital valve to allow the flow meter to be verified, however such piping shall insure that flow cannot be diverted to other than the receiving tank.

(vii) Transfer Device

The transfer device is located downstream of the flow meter 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.

1.3 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 5/6B/221
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 100 L'.

1.4 Verification Provision

Provision is made for the application of a verification mark.

1.5 Sealing Provision

The cover of the integral meter pulser enclosure should be sealed.

The calibration adjustment provided by the calculator/indicator should be sealed as described in its approval documentation.

2. Description of Variant 1 approved on 29/04/15

Using certain other Smith Meter Inc. Genesis Series flowmeters which are similar to the pattern except as set out below in Table 1 (the pattern is shown in **bold**).

TABLE 1

Flowmeter Model	Minimum Flow Rate (*Qmin*) (L/min)	Maximum Flow Rate *(Qmax*) (L/min)	Minimum Delivery *(Vmin*) (L)	K-factor (p/L)
GSC-2-ST	38	570	100	100, or 200 or 500
GSC-3-ST	**127**	**1900**	**500**	**100**

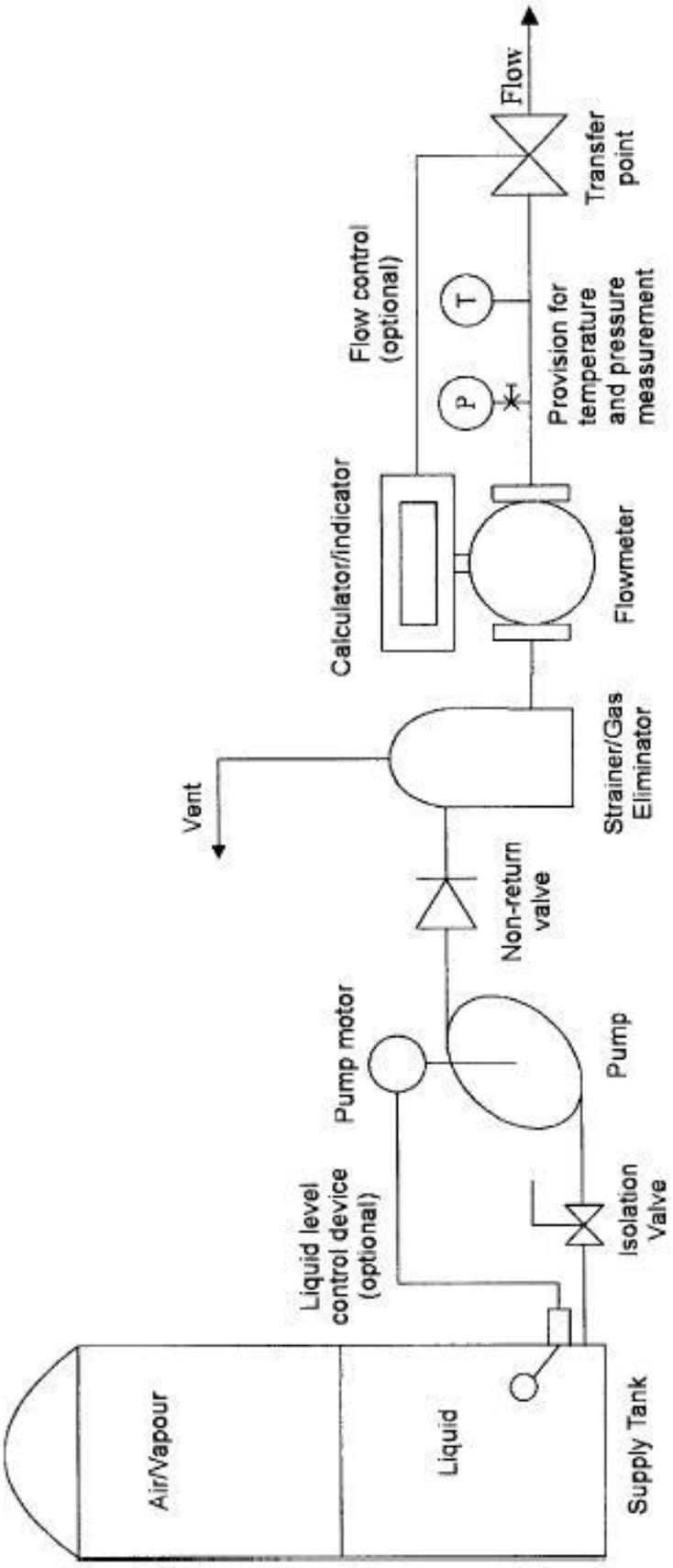
TEST PROCEDURE

Instruments shall be tested and verified in conjunction with any tests specified in the approval documentation for the instruments to which the pattern is connected, as appropriate, and in accordance with any relevant tests specified in the National Instrument Test Procedures, using the type of liquid with which they will be used and which is marked on the instrument.

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.

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

Figure 5/6B/221 – 1



Smith® Genesis GSC-3-ST
Bulk Flow metering System (The Pattern)

Figure 5/6B/221 – 2

(a) Model E Strainer/RB Head Air Eliminator

(b) Alternative RB Head

Figure 5/6B/221 – 3

Smith Meter Inc. Genesis GSC Series Flowmeter

~ End of Document ~