



Australian Government
Department of Industry,
Innovation and Science

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval NMI 5/6B/228

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.

Alderley Condensate Loading/Transfer Flowmetering System

submitted by

Alderley Systems Ltd
Kingfisher House, Arnolds Field Estate
The Downs, Wickwar, GL12 8JD, United Kingdom

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 1/02/22, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants1 approved – certificate issued	10/01/19

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 5/6B/228' 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*.



Darryl Hines

Manager
Pattern Approval, Policy and
Licensing Section

TECHNICAL SCHEDULE No 5/6B/228

1. Description of Pattern **approved on 10/01/19**

An Alderley Condensate Loading/Transfer Flowmetering System incorporating an Emerson Micro Motion series Flow meter (Figure 1) with Coriolis type flow sensors for bulk metering of liquids 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})	5000 L	(#1)
• Maximum flow rate (Q_{max})	1667 m ³ /h	
• Minimum flow rate (Q_{min})	240 m ³ /h	
• Maximum pressure of the liquid (P_{max})	1000 kPa	
• Minimum pressure of the liquid (P_{min})	100 kPa (nominal)	
• Range of liquids viscosity	0.4 to 20 mPa.s (at 20°C)	
• Liquid temperature range	-10°C to 55°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.

1.2 Components of Measuring System

(i) Supply tank

To ensure air does not enter the pipework, the supply tank incorporates a Rosemount model TGU 55 level Transmitter (Figure 2) or equivalent (**) for detecting low liquid level. If the level transmitter is activated the delivery will stop.

(**) '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 system.

(ii) Pump

A positive displacement, centrifugal or submersible turbine type pump may be used to provide flow through one or more flowmeters. The pump is fitted in a positive suction head (flooded suction) installation, i.e. below the liquid level in the supply tank.

For all combination of usage, the pump(s) shall be of sufficient capacity to ensure that each flowmeter can operate within its approved flow rate range.

(iii) Non-return Valve

A non-return valve between the pump and the flowmeter to prevent the reverse flow of the liquid, 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

A gas elimination device need not be fitted as the flow metering system is designed to keep the pipework full of liquid at all times, and on the occasion that small amounts of vapour may form in the pipework, the mass of this vapour will be insignificant compared to the mass of liquid.

(v) Measurement Transducer

The measurement transducer of the pattern comprises a Micro Motion Elite CMFHC4 (#) series of flow sensors (Figure 3) interfaced to an Micro Motion model 2700 (#) microprocessor-based transmitter designed to provide pulse output signal proportional to the mass throughput. The transmitter is connected to an AC or DC power supply.

(vi) Calculator/Indicator

The signal output from the measurement transducer is interfaced to an approved Emerson process Flowboss model S600 as described in the documentation of approval NMI S774 or any other compatible (#) NMI-approved 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.

(vii) Transfer Device

A transfer device, which defines the start and stop of the quantity measured, is installed downstream of the mass flowmeter. The transfer device is in the form of a positive shut-off component such as a manually or automatically-operated shut-off valve.

The transfer device may also be designed to control the flow rate within the specified flow rate range of the flowmeter.

1.3 Verification Provision

Provision is made for the application of a verification mark.

1.4 Sealing Provision

Provision is made for sealing the cover of the transmitter which contains the calibration functions of the instrument.

1.5 Markings and Notices

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

Manufacturer’s identification mark or trade mark
Meter model
Serial number of the instrument
Pattern approval mark	NMI 5/6B/228
Year of manufacture
Maximum flow rate, Q_{max} m ³ /h
Minimum flow rate, Q_{min} m ³ /h
Maximum pressure of the liquid, P_{max} 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 1000 L’, or alternatively the controller/indicator is programmed for deliveries equal to or greater than the stated minimum delivery

TEST PROCEDURE

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

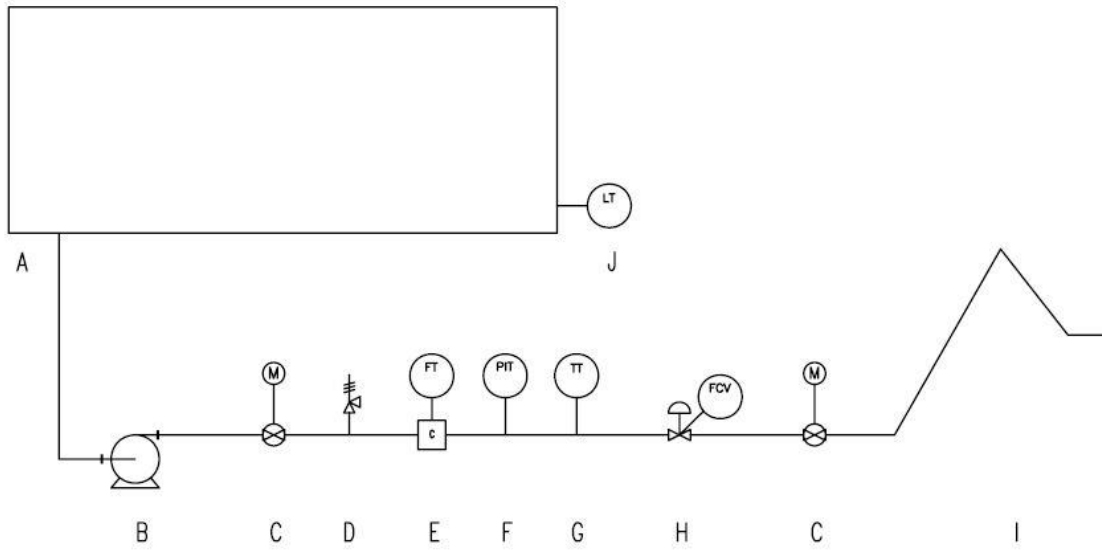
Tests should be conducted in conjunction with any tests specified in the approval documentation for any controller/indicator and/or any conversion device, etc. used.

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*.

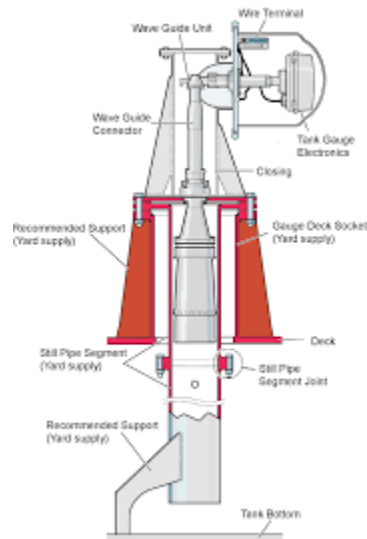
FIGURE 5/6B/228 – 1



- A TANK
- B PUMP
- C MOTOR OPERATED VALVE
- D RELIEF VALVE
- E CORIOLIS METER
- F PRESSURE TRANSMITTER
- G TEMPERATURE TRANSMITTER
- H FLOW CONTROL VALVE
- I LOADING ARM
- J LEVEL TRANSMITTER

Typical Condensate Flowmetering System

FIGURE 5/6B/228 – 2



Rosemount TGU 55, Tank Radar Gauge, Still Pipe Antenna Gauge for Tank Level transmitter

FIGURE 5/6B/228 – 3



Emerson Micro Motion CMF Coriolis Meter

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