National Standards Commission

Certificate of Approval

No 10/2/2

Issued under Regulation 9
of the
National Measurement (Patterns of Measuring Instruments) Regulations

This is to certify that an approval for use for trade has been granted in respect of the

Liquid Controls Model MA7-GY-10 Bulk LPG Flowmetering System

submitted by Emco Wheaton (Australia) Pty Ltd
145 Heidelberg Road
Northcote VIC 3070.

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 Certificate is issued upon completion of a review of NSC approval No P10/2/2.

CONDITIONS OF APPROVAL

This approval is subject to review on or after 1 February 1999.
This approval expires in respect of new instruments on 1 February 2000.

Instruments purporting to comply with this approval shall be marked NSC No 10/2/2 and only by persons authorised by the submittor.

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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 Commission 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 the Commission's Document 106.

The Commission reserves the right to examine any instrument or component of an instrument purporting to comply with this approval.

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

DESCRIPTIVE ADVICE

Pattern: approved 28 January 1994

- A bulk flowmetering system using a Liquid Controls model MA7-GY-10 flowmeter which is approved for the delivery of liquefied petroleum gas.

Variants: approved 28 January 1994

1. With certain other model Liquid Controls LPG flowmeters.

2. With a Liquid Controls model D-5120 TVC or a model D-5025 TVC/FG mechanical volume conversion for temperature device.

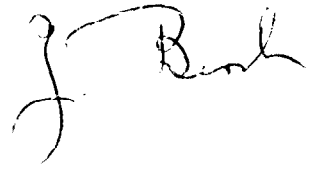
Technical Schedule No 10/2/2 describes the pattern and variants 1 and 2.

FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No 10/2/2 dated 29 July 1994
Technical Schedule No 10/2/2 dated 29 July 1994 (incl. Table 1 and Test Procedure)
Figures 1 to 5 dated 29 July 1994

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.



National Standards Commission

TECHNICAL SCHEDULE No 10/2/2

Pattern: Liquid Controls Model MA7-GY-10 Bulk LPG Flowmetering System.

Submittor: Emco Wheaton (Australia) Pty Ltd
145 Heidelberg Road
Northcote VIC 3070.

1. Description of Pattern

A bulk flowmetering system using a Liquid Controls model MA7-GY-10 50 mm flowmeter which is approved for the delivery of liquefied petroleum gas of density between 0.500 kg/L and 0.580 kg/L at 15°C, for liquid temperatures between 0°C and 45°C. (refer to Table 1)

The maximum and minimum flow rates are 380 L/min and 75 L/min respectively. The minimum quantity is 100 litres.

1.1 Flowmetering System (Figure 1)

The flowmetering system may be in a pipeline, mounted on a vehicle or in a transportable module. The system comprises:

(i) Supply Tank

A supply tank located above the pump.

(ii) Pump

The pump is positioned as close as possible to the supply tank. The inlet pipe to the pump is the same size or larger than the outlet and has a continuous fall to the pump. A strainer may be fitted between the supply tank and the pump.

If the pump is not for the exclusive use of the flowmeter the flow rate through the meter must stay within the appropriate flow rate range for all combinations of alternative uses of the pump.

(iii) Gas Purger

The meter is protected from the measurement of vapour by correct installation and by a Liquid Controls 50 mm float-operated gas purger/strainer assembly (Figure 2). The gas purger is vented through a non-return valve, via a vapour return line not less than 20 mm in diameter to the vapour space of the supply tank.

A thermometer well is located in the back cover of the strainer.

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(iv) Meter (Figure 2 & Table 1)

A Liquid Controls model MA7-GY-10 50 mm LPG flowmeter.

(v) Indicating System

An Emco Wheaton model Selectronic pulse generator/indicator incorporating an electronic volume conversion for temperature device (as described in the documentation of NSC approval No S275). The temperature probe is inserted into the main liquid flow, at the front cover of the strainer.

(vi) Pressure Differential Valve

A Liquid Controls 50 mm spring-loaded piston or spring-loaded diaphragm pressure differential valve maintains a pressure of at least 100 kPa above the vapour pressure in the metering chamber to prevent the formation of vapour. A pressure-equalising pipe is connected from the differential valve to the supply tank, through the vapour return line from the gas purger vent.

(vii) Outlet Piping/Transfer Device

The pipe from the meter/pressure differential valve to the outlet is fitted with a non-return valve (which may be integral with the meter), a control valve and has provision for a pressure gauge. A flow rate control valve may also be fitted.

If fitted with a delivery hose it shall comply with the SA code for hoses in use with liquefied petroleum gases. A shut-off device is fitted on the end of the hose.

The control valve/shut-off device is the transfer device for the measurement.

1.2 Sealing and Verification/Certification Provision

Provision is made for the calibration function button at the rear of the indicator and for the meter calibrator to be sealed.

Provision is also made for a verification/certification mark to be applied.

1.3 Markings

Instruments are marked with the following data, together in the one location (*):

Manufacturer's name or mark	
Meter model	
Serial number	
NSC approval number	10/2/2
Maximum flow rate	..... L/min
Minimum flow rate	..... L/min
Liquid temperature range (*)	0°C to 45°C
Approved for LPG of density (*)	..... to ..... kg/L
Density for which temperature convertor is set (#) (*)	..... kg/L
Minimum quantity	 L
Maximum operating pressure	..... kPa

(#) If the indicator does not have the facility to display the set density or is not connected to a printer which prints the set density, the density of the product used to calibrate the instrument shall be marked on a metal label attached to the instrument by the calibrator sealing wire.

(*) These may be marked on a metal label attached to the instrument by the calibrator sealing wire.

2. Description of Variants

2.1 Variant 1

A bulk flowmetering system using any model Liquid Controls LPG flowmeter listed in Table 1.

The model MA5-GY-10 38 mm flowmeter is fitted with a 38 mm float-operated gas purger/strainer assembly and a 38 mm spring-loaded piston or spring-loaded diaphragm valve.

The model MSA30-GY-10 75 mm flowmeter is fitted with a 75 mm float-operated gas purger/strainer assembly and a 75 mm OCV model 110 pilot-controlled-diaphragm differential valve (Figure 3).

TABLE 1

Meter Model (Size)	Flow Rate (L/min) Maximum	Minimum	Minimum Quantity (L)
MA5-GY-10 (38 mm)	227	45	50
MA7-GY-10 (50 mm)	380	75	100
MSA30-GY-10 (75 mm)	1325	265	300

2.2 Variant 2

With a Liquid Controls model D-5120 TVC or a model D-5025 TVC/FG mechanical volume conversion for temperature device (Figures 4 and 5) which have a temperature sensing bulb inserted into the main liquid flow at the front cover of the strainer and are approved for the delivery of LPG of density between 0.505 kg/L and 0.560 kg/L.

For both models provision is made for the bellows lever adjustment cover to be sealed. For the model D-5120 TVC provision is also made for the calibration adjustment cover to be sealed. For the model D-5025 TVC/FG provision is made for the main slider adjustment cover plate and the activate/deacitvate mechanism access plug to be sealed.

The volume conversion device may be used with a Veeder Root model 788700 zero-start mechanical indicator (Figure 4) or a model 789000 single-handle-reset zero-start indicator/ticket printer (Figure 5). The indicator or indicator/ticket printer use 1 litre increments and the maximum speed of rotation of the right-hand element shall not exceed 200 rpm.

TEST PROCEDURE

Instruments should be tested in accordance with any tests included in the approval documentation for the indicator used, and in accordance with any relevant tests specified in the Inspector's Handbook.

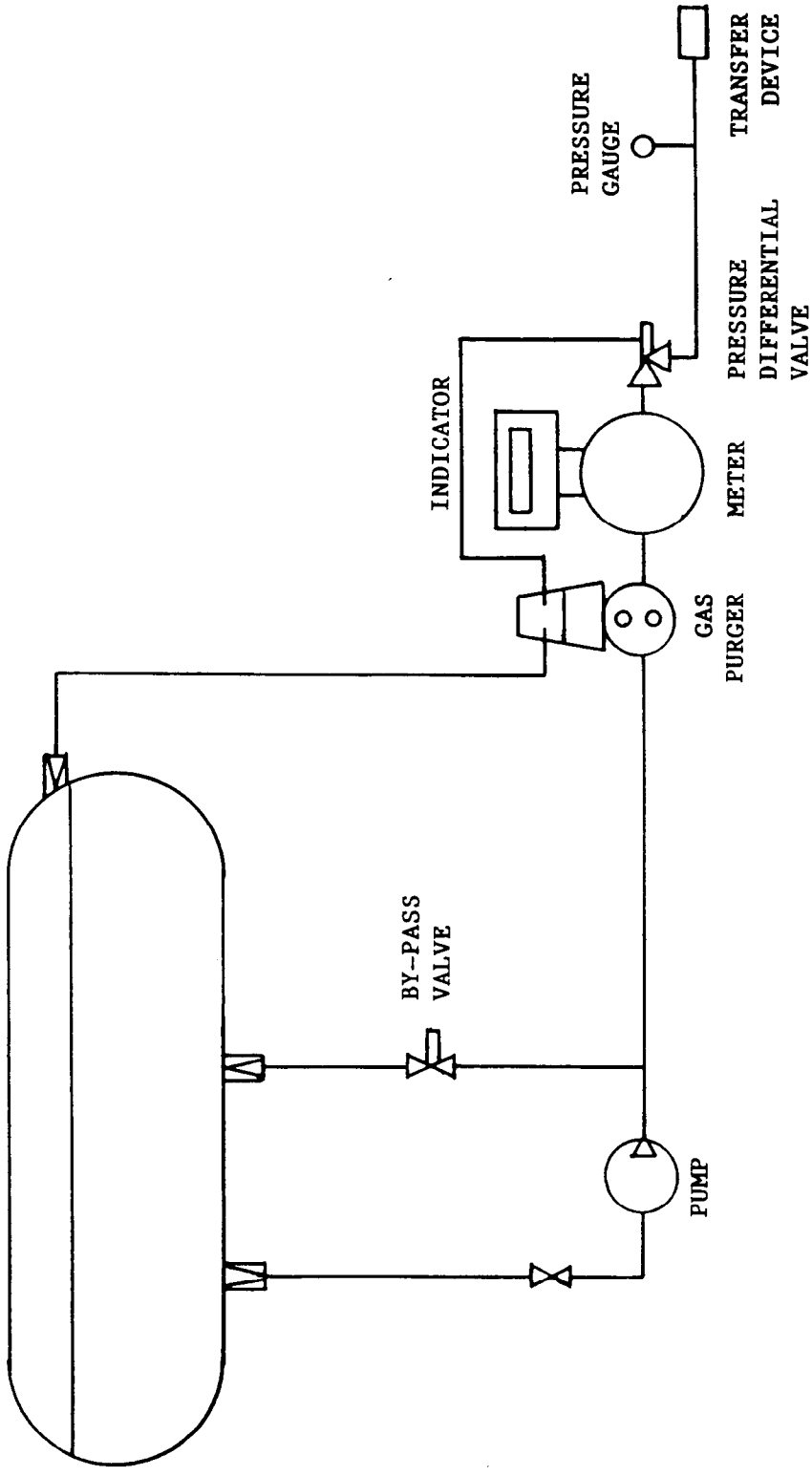
Maximum Permissible Errors at Verification/Certification

The maximum permissible errors applied during a verification test from normal flow rate to the minimum flow rate specified in the Certificate of Approval or Technical Schedule are:

±1.0% with volume conversion for temperature device deactivated, and

±1.2% with volume conversion for temperature device activated.

FIGURE 10/2/2 - 1



Typical Bulk LPG Flowmetering System

FIGURE 10/2/2 - 2

Liquid Controls Model MA7-GY-10 LPG Flowmeter

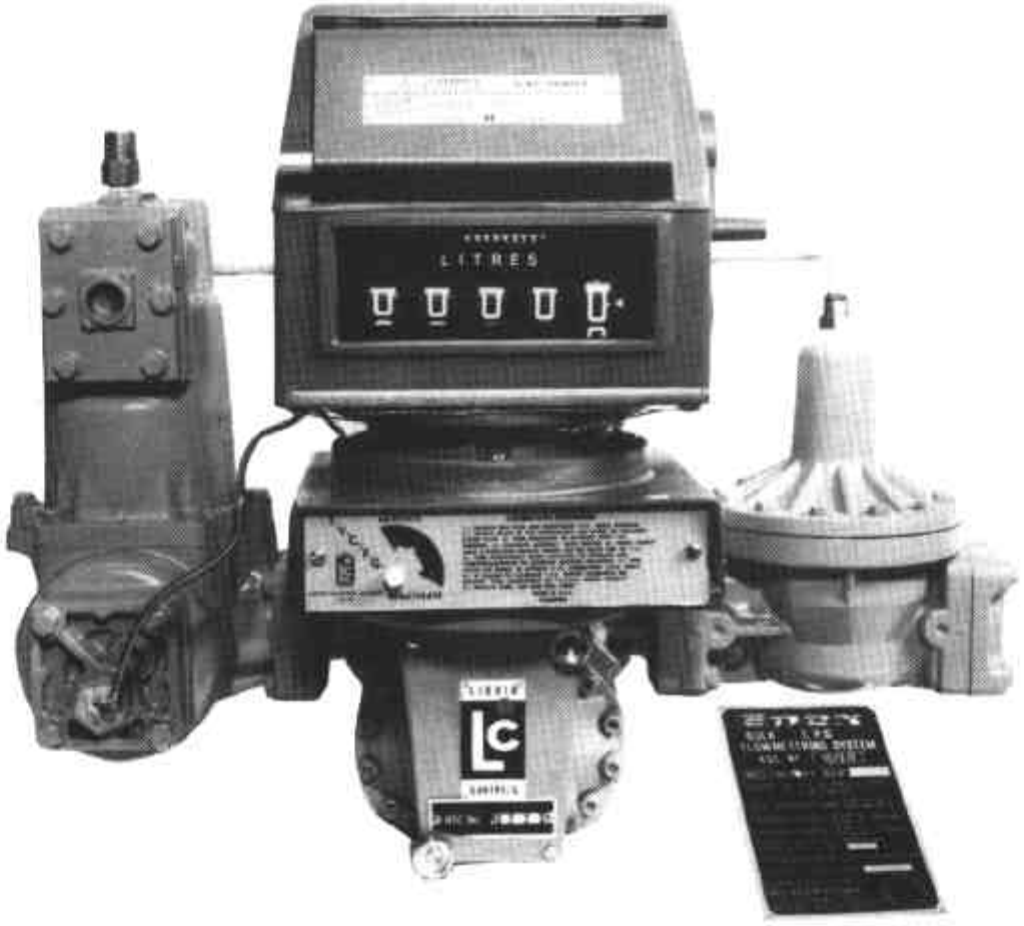
FIGURE 10/2/2 - 3

Liquid Controls Model MSA30-GY-10 LPG Flowmeter

FIGURE 10/2/2 - 4

Model D-5120 TVC Volume Conversion Device
With Veeder Root Model VR788700 Indicator

FIGURE 10/2/2 - 5



Including Model D-5025 TVC/FG Volume Conversion Device
and Veeder Root Model VR789000 Indicator/Ticket Printer