NATIONAL STANDARDS COMMISSION

NATIONAL MEASUREMENT (PATTERNS OF INSTRUMENTS) REGULATIONS

REGULATION 9

PROVISIONAL CERTIFICATE OF APPROVAL No P10/2/2

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

Liquid Controls Model MA-7-GY-10 Bulk LPG Flowmetering System

submitted by Emco Wheaton (Australia) Pty Ltd
49 Powers Road
Seven Hills New South Wales 2147.

CONDITIONS OF APPROVAL
General:
This approval is subject to review on or after 1/3/88.
This approval expires in respect of new instruments on 1/3/89.

Instruments purporting to comply with this approval shall be marked NSC No P10/2/2.

This approval may be withdrawn if instruments are constructed other than in accordance with the drawings and specifications lodged with the Commission.

The Commission reserves the right to examine any instrument purporting to comply with this approval.

Special:
Instruments installed under this approval are to be tested at six-monthly intervals after the initial verification test. Such tests are to be arranged by the submittor and supervised by the State Weights and Measures Authority; the results are to be sent to the Commission.

In the event of unsatisfactory performance or of suitable test results not being received by the Commission, this approval may be withdrawn.

Note: This approval relates to the metrological performance of the metering system; inspectors are advised that the system must comply with the requirements of other statutory authorities relating to safety, handling, storage and transportation of liquefied petroleum gas.

Signed

Executive Director

Descriptive Advice

Pattern: provisionally approved 24/7/86

- Liquid Controls model MA-7-GY bulk LPG flowmetering system.

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Variant: provisionally approved 24/7/86

1. With an alternative pressure differential valve.

Technical Schedule 10/2/2 describes the pattern and variant.

Filing Advice

The documentation for this approval comprises:

Provisional Certificate of Approval No P10/2/2 dated 25/3/87
Technical Schedule No 10/2/2 dated 25/3/87
Test Procedure No 10/2/2 dated 25/3/87
Figures 1 to 4 dated 10/2/87

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Technical Schedule No 10/2/2

Pattern: Liquid Controls Model MA-7-GY-10 Bulk LPG Flowmetering System.

Submittor: Emco Wheaton (Australia) Pty Ltd
49 Powers Road
Seven Hills New South Wales 2147.

1. Description of Pattern

The pattern is a bulk flowmetering system for the delivery of liquefied petroleum gas of a density set between 0.500 and 0.580 kg/L at 15°C, at temperatures between 0 and 45°C. The maximum and minimum flow rates are 380 L/min and 75 L/min respectively. A typical system is shown in Figure 1 or, when vehicle-mounted, as shown in Figure 2.

1.1 Component Structure

(i) Supply Tank

The supply tank is 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 larger than the outlet from the pump.

(iii) Strainer

A Liquid Controls model FA-7 strainer assembly may be fitted to protect the meter from foreign matter. A thermometer pocket is located in the strainer flange opposite the outlet flange of the strainer.

(iv) Gas Purger

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

(v) Meter

A Liquid Controls model MA-7-GY-10 50 mm LPG flowmeter (Figure 3).

(vi) Temperature Compensator

A Liquid Controls model TVC/FG (fixed gravity) temperature compensator is attached to the top of the meter, and has a temperature sensing bulb inserted into the main liquid flow, at the front strainer flange.

(vii) Flowmeter Indicator

A Veeder Root series 7887 zero-start indicator or series 7890 zero-start ticket-printing indicator (Figure 4) is attached to the top of the temperature compensator. The first element of the indicator and/or printer has 1 litre increments.

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(viii) Differential Valve

A Liquid Controls 50 mm spring-loaded piston valve maintains 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 vapour-eliminator vent.

(ix) Outlet Piping

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

(x) Hose

If fitted with a hose it shall comply with the SAA code for hoses in use with liquefied petroleum gases, with a bore not exceeding 45 mm . A stop valve is fitted on the end of the delivery hose.

1.2 Markings

Instruments are marked with the following data, together in the one location.

Manufacturer's name or mark	
Year of manufacture	
Meter model	
Serial number	
NSC approval number	P10/2/2
Maximum flow rate	... L/min
Minimum flow rate	... L/min
Liquid temperature range	$0^{o}C$ to $45^{o}C$
Approved for LPG, of density	0.500 to 0.580 kg/L
Density for which temperature compensator is set	
Maximum operating pressure	

1.3 Sealing

The meter calibration device and the temperature compensator calibration device and "Activate and Deactivate" switch are sealed.

1.4 Verification Mark

Provision is made on the meter for a verification mark to be applied.

2. Description of Variant 1

With alternative pressure differential valve which has a spring-loaded diaphragm valve, instead of the spring-loaded piston valve of the pattern (Figure 4).

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TEST PROCEDURE No 10/2/2

The following test procedure is to be used at each six-monthly reverification test. The tests are to be arranged so that one is carried out in the hotter period of each year and the other in the cooler period. One test should also be arranged when there is a low liquid level in the supply tank.

The maximum permissible error applied during a verification test from normal flow rate to the minimum flow rate specified in the Technical Schedule is:

± 1.0% with temperature compensator deactivated, and

± (1.2% + 0.02% per ^{o}C difference from 15^{o}C) with temperature compensator activated.

1. Meter Test With Temperature Compensator Deactivated

(i) Carry out at least three runs at the normal flow rate at which the meter is used.

(ii) Repeat the above test with the flow rate set at 75 L/min.

2. Meter Test With Temperature Compensator Activated

Repeat the above tests and calculate the equivalent volume that would have been delivered at 15^{o}C using the temperature indicated at the meter and the ASTM-IP Petroleum Measurement Tables, for the density of the liquid for which the temperature compensator is set.

National Standards Commission

NOTIFICATION OF CHANGE

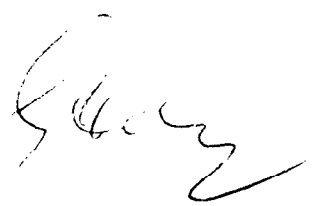
VARIOUS CERTIFICATES OF APPROVAL

The following changes are made to the approval documentation for various LPG flowmeter approvals as listed below:

In the approvals listed below, remove from the Certificate, Technical Schedule and Test Procedure, any Condition of Approval or clause that refers to instruments being verified, re-verified or calibrated at specific intervals. (Note that the re-verification period is determined by the Trade Measurement Authority in the State or Territory in which the instrument is located.)

APPROVAL NUMBER	PATTERN
10/1/2	Halco Neptune 32/38 mm LPG Flowmeter
P10/1/3	Acme Model LGD 100 LPG Driveway Flowmeter
10/1/3A	Acme Model LGD 105S LPG Driveway Flowmeter
P10/1/5	Batchen Model Mk II LPG Driveway Flowmeter
P10/1/6	Wayne Model ELC1 LPG Driveway Flowmeter
10/1/6A	Email Model ELC1 LPG Driveway Flowmeter
P10/1/7	Indeng Model MKO LPG Driveway Flowmeter
10/1/8	Gilbarco Model T093D LPG Driveway Flowmeter
10/1/8A	Gilbarco Model T093D LPG Driveway Flowmeter
10/1/9	Batchen Model Commander LPG Driveway Flowmeter
P10/1/10	LPG Engineering Model Stargas LPG Driveway Flowmeter
10/1/10A	LPG Engineering Model Stargas LPG Driveway Flowmeter
10/1/11	LPG Engineering Model Stargas EPSN LPG Driveway Flowmeter
10/1/12	CleverHead Model 93 LPG Driveway Flowmeter
10/1/13	Batchen Model SCB Commander LPG Driveway Flowmeter
P10/2/2	Liquid Controls Model MA-7-GY-10 Bulk LPG Flowmeter
10/2/3	Neptune Model 4D 32 mm Bulk LPG Flowmeter
P10/2/4	Euromatic Model FL 11/2-125 Turbine Bulk LPG Flowmeter

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.



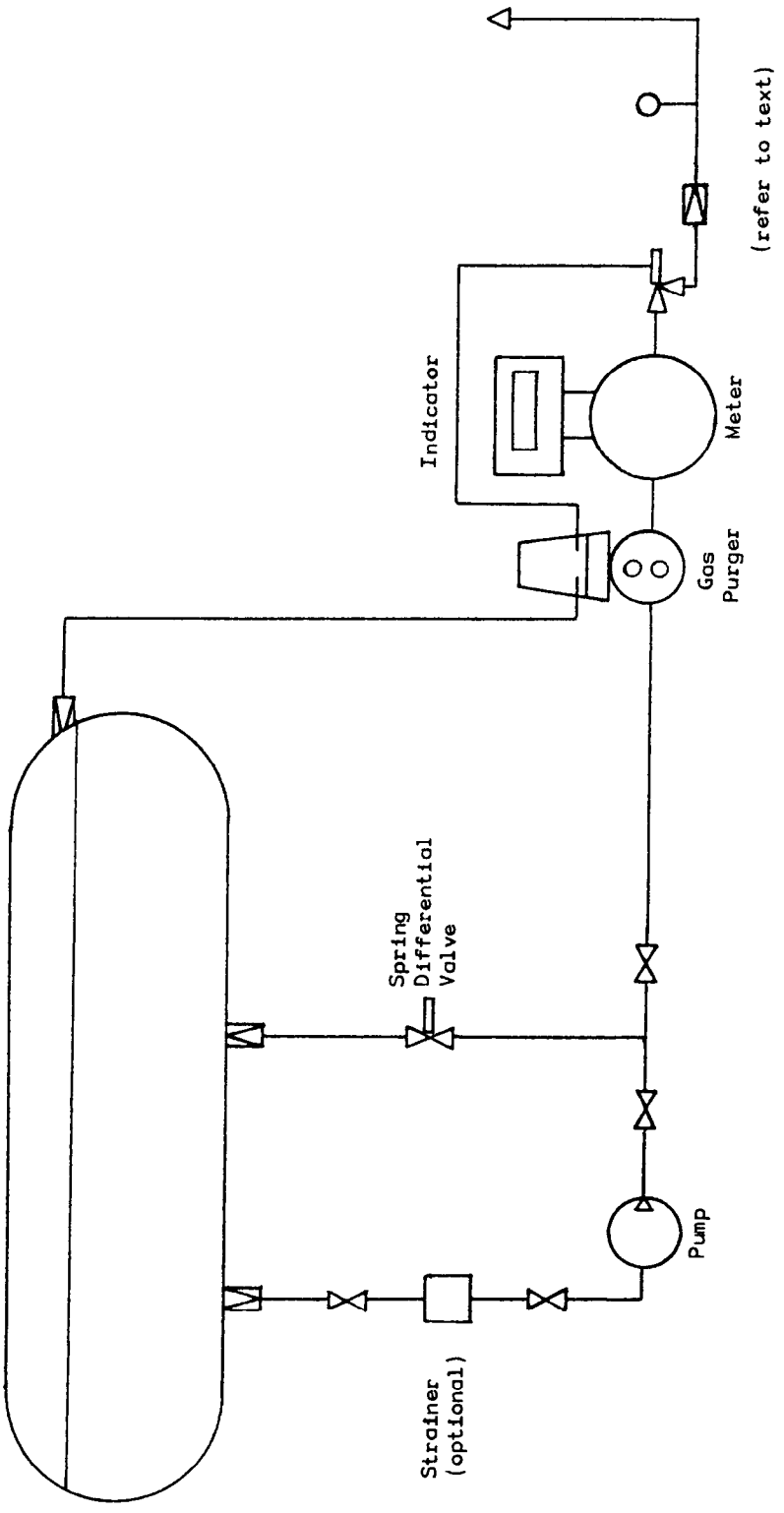
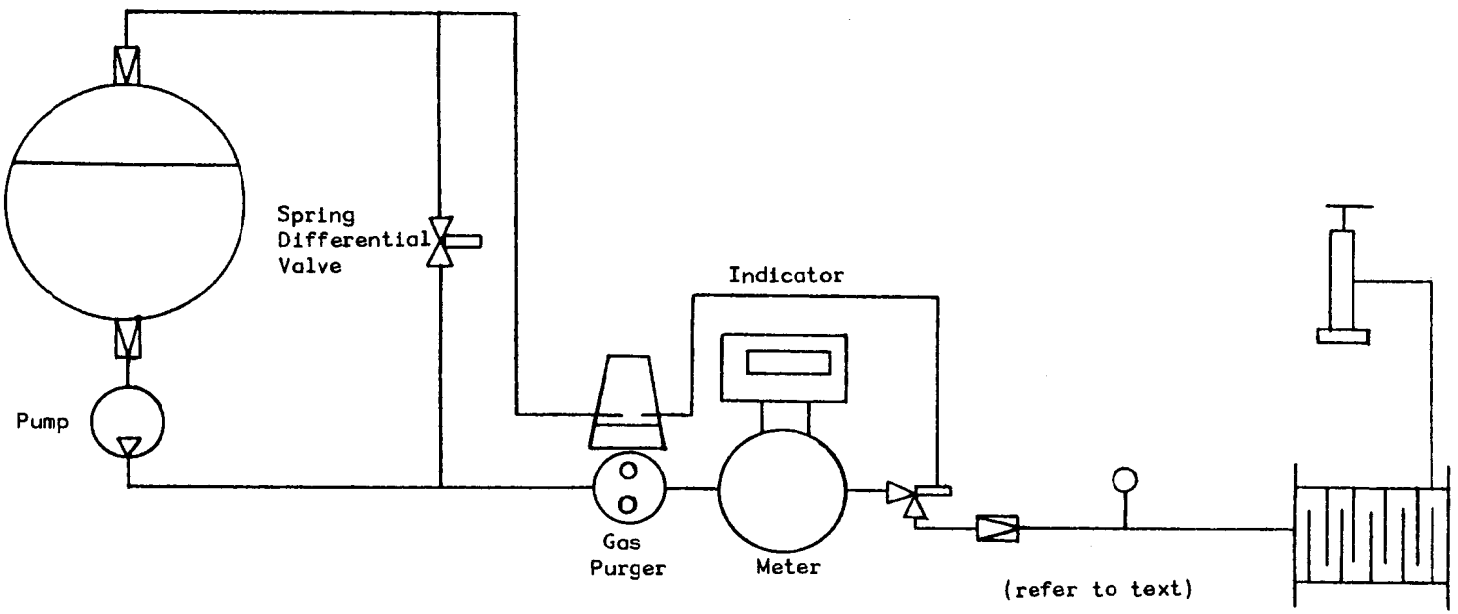


FIGURE 10/2/2 - 1

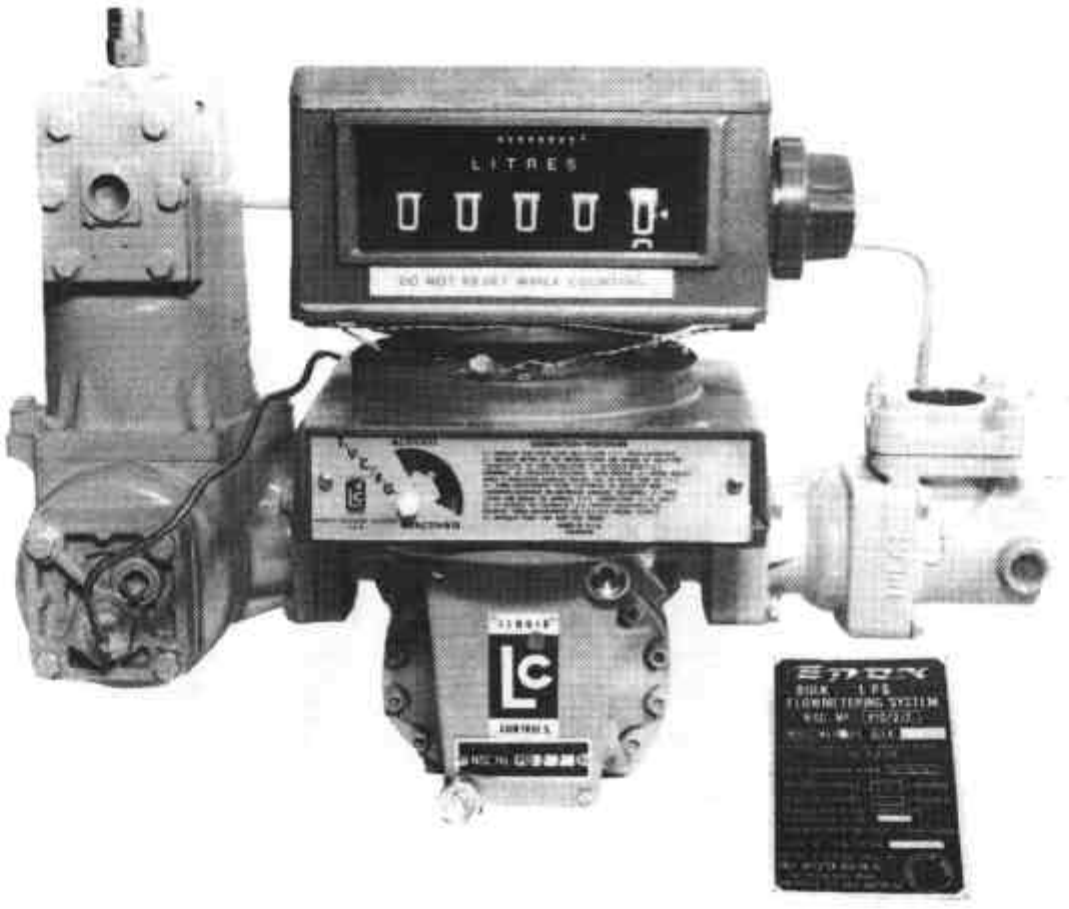
Typical Bulk LPG System

FIGURE 10/2/2 - 2



Typical Vehicle-mounted LPG System

FIGURE 10/2/2 - 3



Liquid Controls MA-7-GY-10 LPG Flowmeter

FIGURE 10/2/2 - 4

With Tick(xrinting Indicator And Diaphragm Differentio(lve

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25/3/87