

National Standards Commission



Certificate of Approval

No 10/1/10A

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

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

LPG Engineering Model Stargas LPG Driveway Flowmeter

submitted by LPG Engineering Pty Ltd
 13/257 Colchester Road
 KILSYTH VIC 3137.

This Certificate is issued upon completion of a review of NSC approval No P10/1/10.

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

A handwritten signature in black ink, appearing to read 'J. Birch'.

CONDITIONS OF APPROVAL

This approval is subject to review on or after 1/4/96.
This approval expires in respect of new instruments on 1/4/97.

Instruments purporting to comply with this approval shall be marked NSC No 10/1/10A and only by persons authorised by the submitter.

It is the submitter's responsibility to ensure that all instruments marked with this approval number are constructed as described in the drawings and specifications 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 Certificates Nos S1/0 and/or S2/0, as appropriate.

Special:

The initial verification of each driveway flowmeter shall be carried out under the supervision of a government-licensed LPG installer or a person experienced in the design and installation of LPG systems.

Instruments installed under this approval are to be calibrated at intervals not exceeding 6 months.

DESCRIPTIVE ADVICE

Pattern: approved 11/3/91

The pattern is an LPG Engineering model Stargas dual driveway flowmeter for the delivery of liquefied petroleum gas.

Variants: approved 11/3/91

1. As a single driveway flowmeter.
2. In alternative housings.

Variants: approved 6/11/91

3. With a Neptune type 4D 25 mm flowmeter.

Technical Schedule No 10/1/10A describes the pattern and variants 1 to 3.

FILING ADVICE

The documentation for this approval comprises:

- Certificate of Approval No 10/1/10A dated 27/11/91
- Technical Schedule No 10/1/10A dated 27/11/91 (incl. Test Procedure)
- Figures 1 to 3 dated 27/11/91



National Standards Commission

TECHNICAL SCHEDULE No 10/1/10A

Pattern: LPG Engineering Model Stargas LPG Driveway Flowmeter.

Submitter: LPG Engineering Pty Ltd
13/257 Colchester Road
KILSYTH VIC 3137.

1. Description of Pattern

- The pattern is an LPG Engineering model Stargas LPG driveway flowmeter (Figures 1 and 2) for the delivery of liquefied petroleum gas of density 0.500 to 0.540 kg/L (at 15°C), at temperatures between 0°C and +45°C.

Instruments are approved for locally or remotely-authorized operation with maximum and minimum flow rates of 50 L/min and 15 L/min respectively. Instruments may be used with compatible control consoles which have been Commission-approved for use with the type of indicator fitted to the flowmeter.

1.1 Component Structure

The component parts of each driveway flowmeter comprise components as detailed below. Figure 3 is a single hydraulic system which is typical.

(i) Supply Tank

The supply tank may be located above or below ground.

(ii) Pump

The pump shall be positioned below the supply tank so that it is always in a state of flooded suction (**positive suction head**). There shall be no restrictive fittings within ten pipe diameters of the pump inlet. The inlet pipe to the pump is larger than the outlet from the pump. The external pump by-pass relief valve is installed in a line returning to the supply tank.

(iii) Meter

Two Neptune type 4D 19 mm liquefied petroleum gas meters are used (Figure 3).

(iv) Gas Purger

The meter is protected from the measurement of vapour by correct installation and by a Neptune 19 mm gas purger. The purger incorporates a strainer and float valve and is vented through a non-return valve, via a vapour return line of not less than 20 mm in diameter to the vapour space in the supply tank. A thermometer pocket is situated in the strainer cover.

(v) Driveway Flowmeter Indicator

A Production Engineering model Retron 80 electronic computing indicator is used and is driven from the output shaft of the meter.

Volume	999.99 L in 0.01 L increments
Unit Price	999.9 c/L in 0.1 c increments
Price	\$999.99 in 1 c increments

The unit price change/test button is located on the computer unit.

The operating cycle is started by removing the nozzle from its receptacle. The displays will be cleared of any previous sale and the remote pump will start. After a delay of about 6 seconds a segment check is initiated; when completed only the unit price is displayed. At the end of this cycle a solenoid valve opens. Provided that the nozzle has been attached to a receiving container, which may be done at any time during the cycle, filling can now commence. Replacement of the nozzle stops the remote pump but allows the details of the delivery to remain until the next reset cycle.

(vi) Electronic Temperature Conversion

Temperature conversion is achieved by means of an electronic convertor built into the Retron 80 indicator. The probe for the temperature convertor is located in the stream of liquid in the measuring chamber.

Fifteen seconds after the nozzle has been returned to its receptacle, pressing the unit price change/test button 16 times will cause the indicator to display the standard Retron 80 diagnostics. This display will be repeated 4 times and then change to the special display for LPG. The top row of digits is the liquid density for which the temperature convertor is set; the centre row will show the current K factor and the bottom display is the temperature that the probe is reading in degrees Celsius.

Removing the nozzle from its receptacle cancels the diagnostic display and initiates the normal operating cycle.

(vii) Differential Valve

A Neptune 19 mm spring-loaded diaphragm valve, which is integral with the meter, 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 gas-purger vent.

The pressure-equalising pipe incorporates a 2-way solenoid valve which is also connected to the pump supply via an excess-flow valve. This solenoid valve is controlled by the Retron 80 indicator and closes the differential valve during the reset cycle so that delivery is not possible before the reset cycle is completed.

(viii) Vapour Indicator

A sight glass flow indicator is fitted in the pipework downstream of the meter.

(ix) Outlet Piping

The pipe from the meter to the hose is fitted with an ISC valve immediately after the pressure differential valve. The ISC valve incorporates an excess-flow and positive shut-off valve, and an air ram linked to the emergency stop system.

(x) Hose

The dispenser is fitted with a hose of either 12.5 mm or 20 mm bore, complying with the SAA code for hoses in use with liquefied petroleum gases.

The hose is supported on a hose mast and is fitted with a hose break coupling.

(xi) Nozzle

The nozzle used is either a Gilbarco model 102-ZVG 1.3, also known as an Elaflex (refer NSC approval No S158) or a Gasguard model L.G. 1.

(xii) Pressure Equalisation

Provision is made for a vapour line from the vapour space in the supply tank to a pressure prover used for testing, either directly or via a tee in the vapour return line from the vapour eliminator. During a normal delivery there is no vapour return connection between the receiving container and the supply tank.

1.2 Markings

The instrument data plate permanently fixed to the external housing of the driveway flowmeter is marked with the following:

Manufacturer's name or mark	
Year of manufacture	
Serial number	
NSC approval number	NSC No 10/1/10A
Maximum flow rate L/min
Minimum flow rate L/min
Liquid temperature range	0°C to +45°C
Approved for LPG of density range	0.500 to 0.540 kg/L
Density for which temperature convertor is set kg/L
Maximum operating pressure	2450 kPa

In addition, these markings shall include a notice stating that the density for which temperature convertor is set may be displayed using the diagnostic display of the flowmeter indicator.

1.3 Sealing

The indicator and meter calibration adjustments are sealed. Alternatively, the computer calibration adjustments may be sealed.

The temperature convertor switch and the vapour return line provided for pressure equalisation during testing with a pressure prover, are also sealed.

1.4 Verification/Certification Provision

Provision is made for the application of a verification/certification mark.

2. Description of Variants

2.1 Variant 1

As a single driveway flowmeter.

2.2 Variant 2

In alternative housings.

2.3 Variant 3

With a Neptune type 4D 25 mm liquefied petroleum gas meter replacing the meter of the pattern. The approved flow rates remain the same.

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 the temperature convertor deactivated; and

±1.2% with the temperature convertor activated.

The following test procedure is to be used at each six-monthly calibration test, in addition to any tests specified in the Inspector's Handbook. 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 to ensure that there is still sufficient pressure at the inlet to the pump to avoid vapour being generated.

1. Meter Test With Temperature Convertor 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 15 L/min.

2. Meter Test With Temperature Convertor Activated

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

National Standards Commission



NOTIFICATION OF CHANGE

VARIOUS CERTIFICATES OF APPROVAL

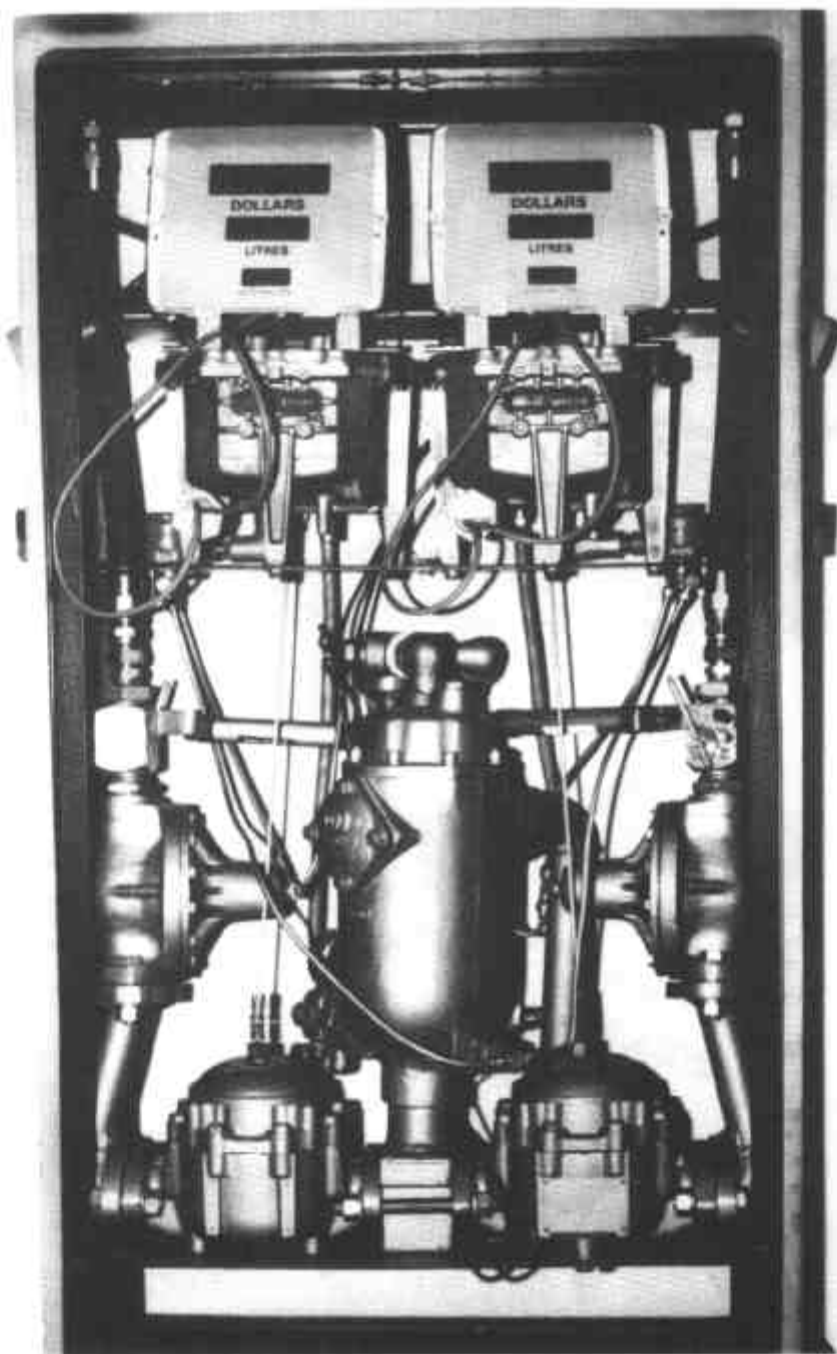
The following changes are made to the approval documentation for various LPG flowmeter approvals as listed below:

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.

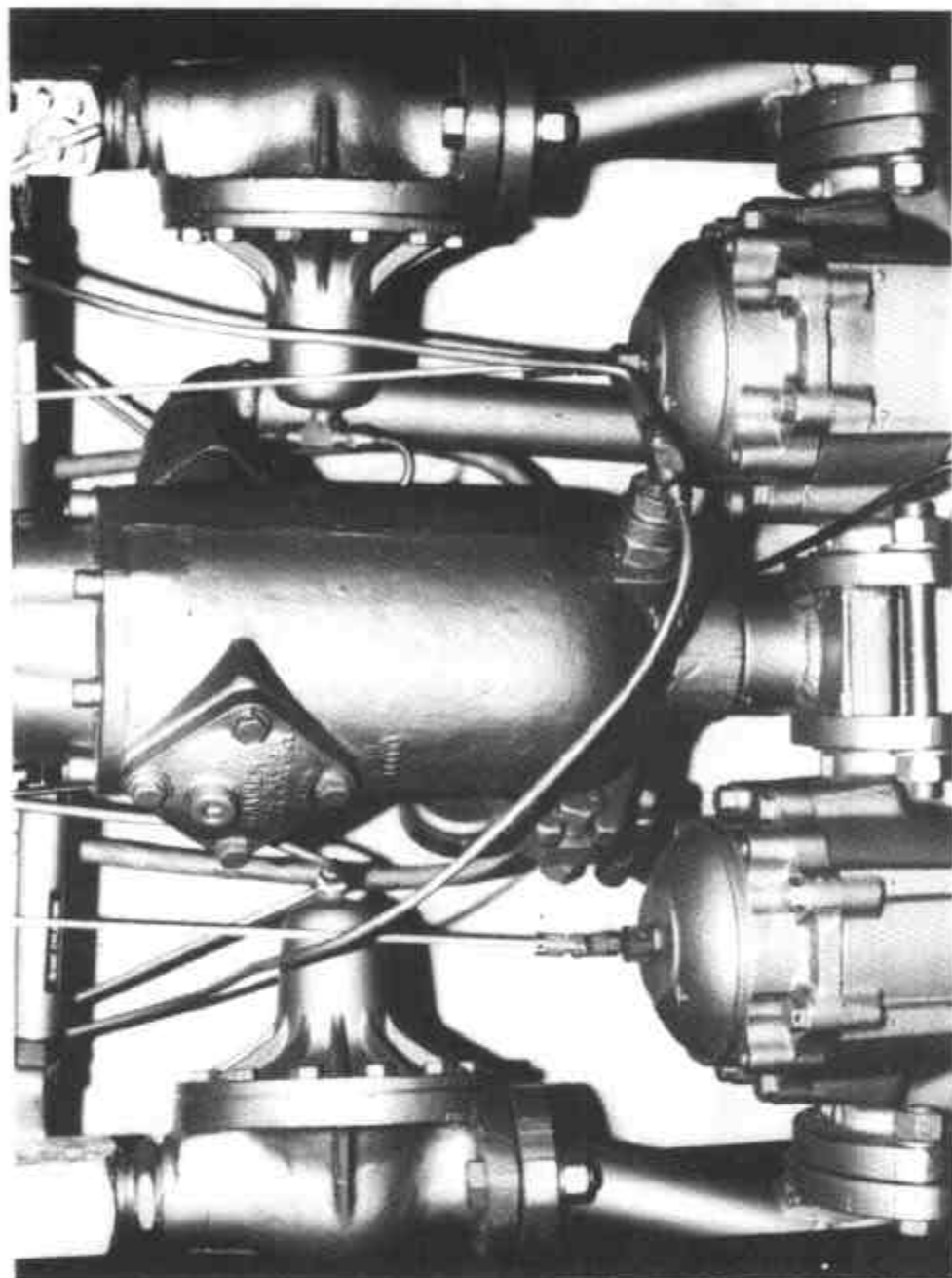
FIGURE 10/1/10A - 1



LPG Engineering Model Stargas LPG Driveway Flowmeter

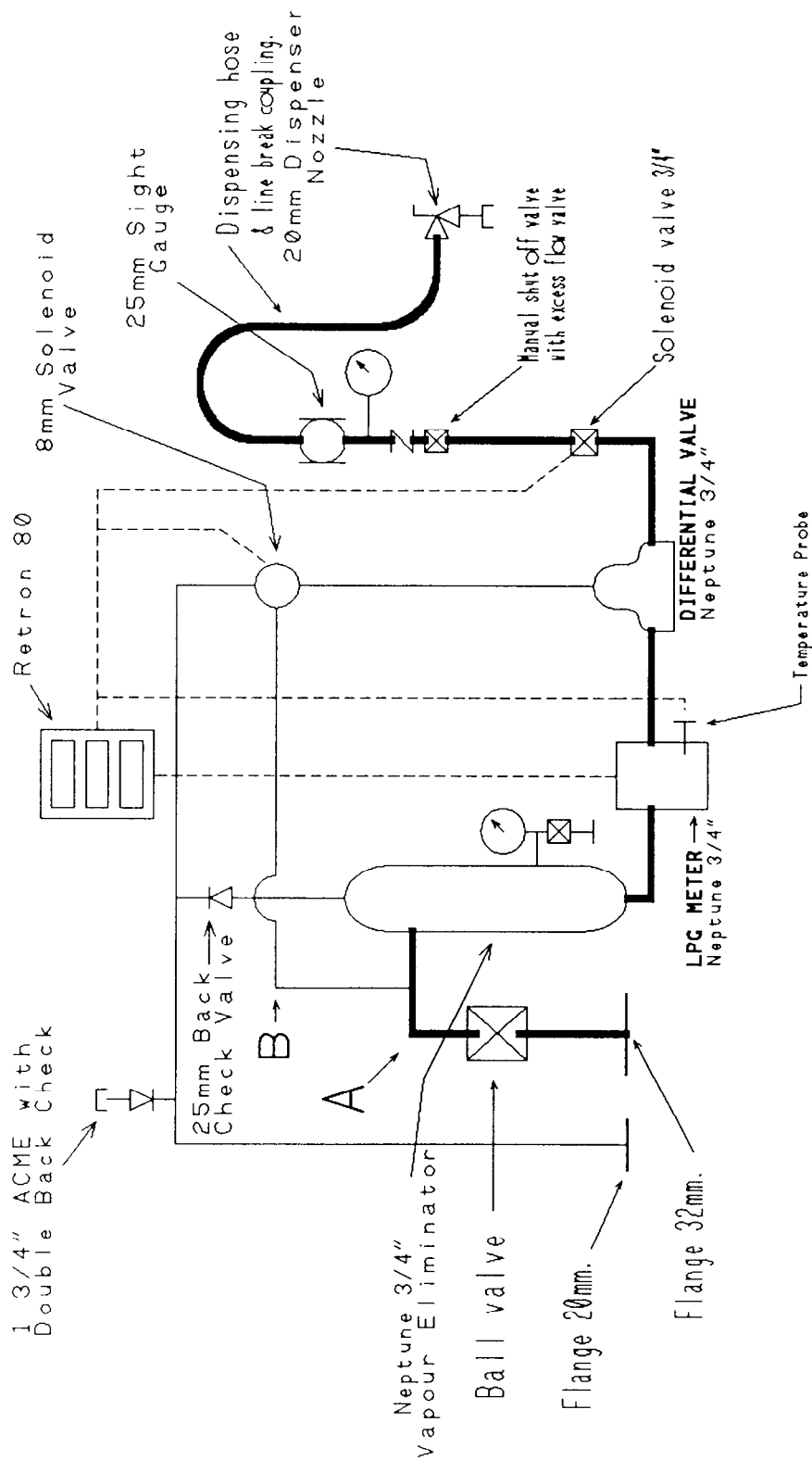
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FIGURE 10/1/10A - 2



Neptune LPG Meters

FIGURE 10/1/10A - 3



Stargas (Single) Schematic Diagram