

National Standards Commission



Certificate of Approval

No 10/1/12

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

CleverHead Model 93 LPG Driveway Flowmeter

submitted by Ian Tayles
40 Andersons Road
Echuca South VIC 3564.

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.

CONDITIONS OF APPROVAL

This approval is subject to review on or after 1/9/97.
This approval expires in respect of new instruments on 1/9/98.

Instruments purporting to comply with this approval shall be marked NSC No 10/1/12 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 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.

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 1/9/92

- The pattern is a CleverHead model 93 dual LPG driveway flowmeter using Schlumberger (Neptune) type 4D 25 mm LPG meters.

Variant: approved 1/9/92

1. Using LiquaTech model LPM 100 25 mm LPG meters.
2. As a single driveway flowmeter.
3. In alternative housings.

Technical Schedule No 10/1/12 describes the pattern and variants 1 to 3.

FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No 10/1/12 dated 18/10/93
Technical Schedule No 10/1/12 dated 18/10/93 (incl. Test Procedure)
Figures 1 to 3 dated 18/10/93

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 10/1/12

Pattern: CleverHead Model 93 LPG Driveway Flowmeter.

Submittor: Ian Tayles
40 Andersons Road
Echuca South VIC 3564.

1. Description of Pattern

The pattern is a CleverHead model 93 dual LPG driveway flowmeter (Figures 1 and 2) for the delivery of liquefied petroleum gas of density 0.510 to 0.580 kg/L (at 15°C), at temperatures between 5°C and 40°C, with maximum and minimum flow rates of 60 L/min and 15 L/min respectively.

1.1 Component Structure

The component parts of each driveway flowmeter are detailed below. The hydraulic diagram of the flowmeter is shown in Figure 3.

(i) Supply Tank

The supply tank may be located above or below ground.

(ii) Pump

The pump may be positioned above the supply tank, in which case the pump shall be specifically designed for use with LPG in **suction lift** installations. Alternatively, the pump may be positioned below the supply tank so that it is always in a state of flooded suction (**suction head** installation). There shall be no restrictive fittings within ten pipe diameters of the pump inlet.

The inlet pipe to the pump is the same size or larger than the outlet from the pump. The external pump by-pass relief valve is installed in a line returning to the supply tank. The by-pass valve is either installed adjacent to the pump, or alternatively a suitable priming valve shall be in that location and the by-pass valve may then be located within the flowmeter housing.

(iii) Meters

Two Schlumberger (Neptune) type 4D 25 mm liquefied petroleum gas meters are used.

(iv) Vapour Detection/Elimination System

The meter is protected from the measurement of vapour by correct installation and by the following components:

(a) Vapour Eliminator

The integral vapour eliminator 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 vapour eliminator housing.

(b) Pressure Sensor

A pressure sensor is incorporated in the pipeline upstream of the meter. The sensor continuously monitors the system pressure and enables the computer to close the system down when insufficient pressure is detected.

(c) Differential and Solenoid Valves

A Schlumberger (Neptune) spring-loaded-piston differential 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 vapour eliminator vent.

The pressure-equalising pipe incorporates a two-way solenoid valve which is also connected upstream of the meter via a flow-limiting orifice. This solenoid valve, which is controlled by the computer, closes the differential valve during the reset cycle and when insufficient pressure is detected.

(v) Vapour Indicator

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

(vi) Driveway Flowmeter Computer/Indicator

A CleverHead model CHC21 computer, two model CHD31 liquid crystal display indicators, and two model CHP81 pulse transmitters are used. The pulse transmitters are mounted one on each meter and are driven directly by the meter output shafts.

The CHD31 indicators feature a two-line alphanumeric message display to provide additional information to the purchaser and/or attendant, including error messages.

Volume	999.99 L in 0.01 L increments
Unit Price	999.9 c/L in 0.1 c/L increments
Price	\$999.99 in 1 c increments
Totaliser	99999 L in 1 L increments

The operating cycle is started by removing the nozzle from its receptacle. The display will be cleared of any previous sale and the remote pump will start. The computer commences a series of performance checks and initiates a check of the LCD segments; 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. (Details of the delivery previous to that just completed are also stored and may be recalled by pressing the TOTALISER button located on the indicator.)

(vii) Electronic Volume Conversion for Temperature

Temperature conversion factors from ASTM-IP Petroleum Measurement Tables - Metric Edition, Table 54 are stored in memory for each whole degree from 3°C to 42°C inclusive. Conversion factors for fractions of degrees are calculated by linear interpolation between factors for adjacent whole degrees. Separate tables are stored for densities from 0.510 to 0.580 kg/L in 0.01 kg/L increments; the appropriate table is selected using the programming keypad provided at each site. The probe for the temperature convertor is located in the stream of liquid adjacent to the measuring chamber.

(viii) Outlet Piping

The pipe from the meter to the hose is fitted with a back-check valve, a positive shut-off valve, a sight-glass, a hydrostatic relief valve and an excess flow valve.

(ix) Hose

The dispenser is fitted with a hose of 15 or 20 mm bore, complying with Australian Standard AS 1869 for hoses in use with liquefied petroleum gases.

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

(x) 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.

(xi) 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	
Model number	
Serial number	
NSC approval number	NSC No 10/1/12
Maximum flow rate L/min
Minimum flow rate L/min
Approved for LPG of density range	0.510 to 0.580 kg/L
Density for which temperature convertor is set kg/L
Maximum operating pressure	2450 kPa

1.3 Sealing

The computer and meter calibration adjustments are accessed using the programming keypad provided at each site, and only by means of an authorised personal identification number (PIN).

1.4 Verification/Certification Provision

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

2. Description of Variants

2.1 Variant 1

With LiquaTech model LPM 100 25 mm liquified petroleum gas meters replacing either or both meters of the pattern. The approved flow rates remain the same.

2.2 Variant 2

As a single driveway flowmeter.

2.3 Variant 3

In alternative housings.

TEST PROCEDURE

At each six-monthly calibration, instruments should be tested in accordance with any tests included in the approval documentation for the indicator used, where it is approved separately, and in accordance with any relevant 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.

NOTE: For testing purposes, a programming keypad, which is provided for each site, is necessary for activating/deactivating the temperature convertor.

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.

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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.

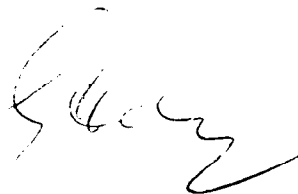


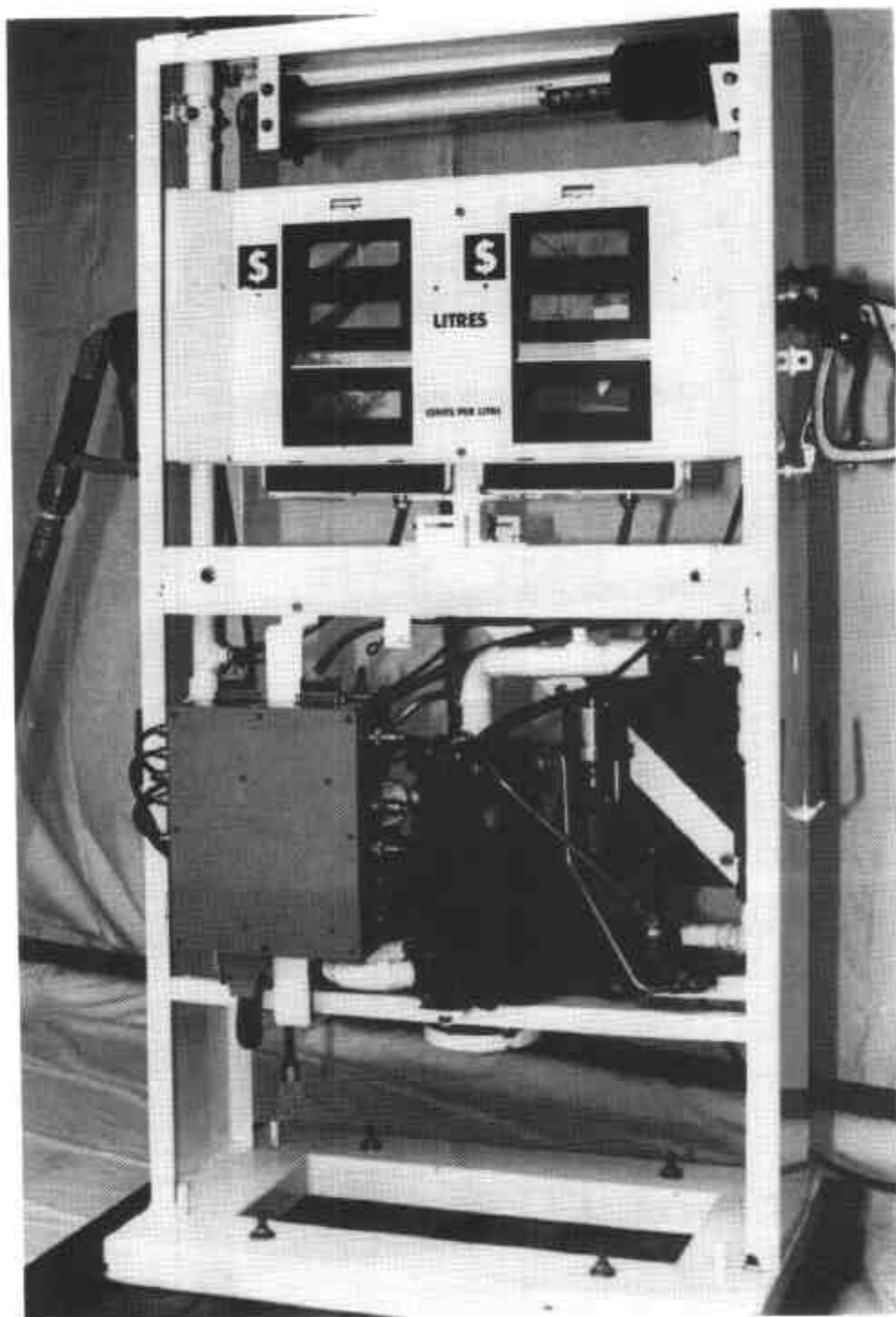
FIGURE 10/1/12 - 1



CleverHead Model 93 LPG Driveway Flowmeter

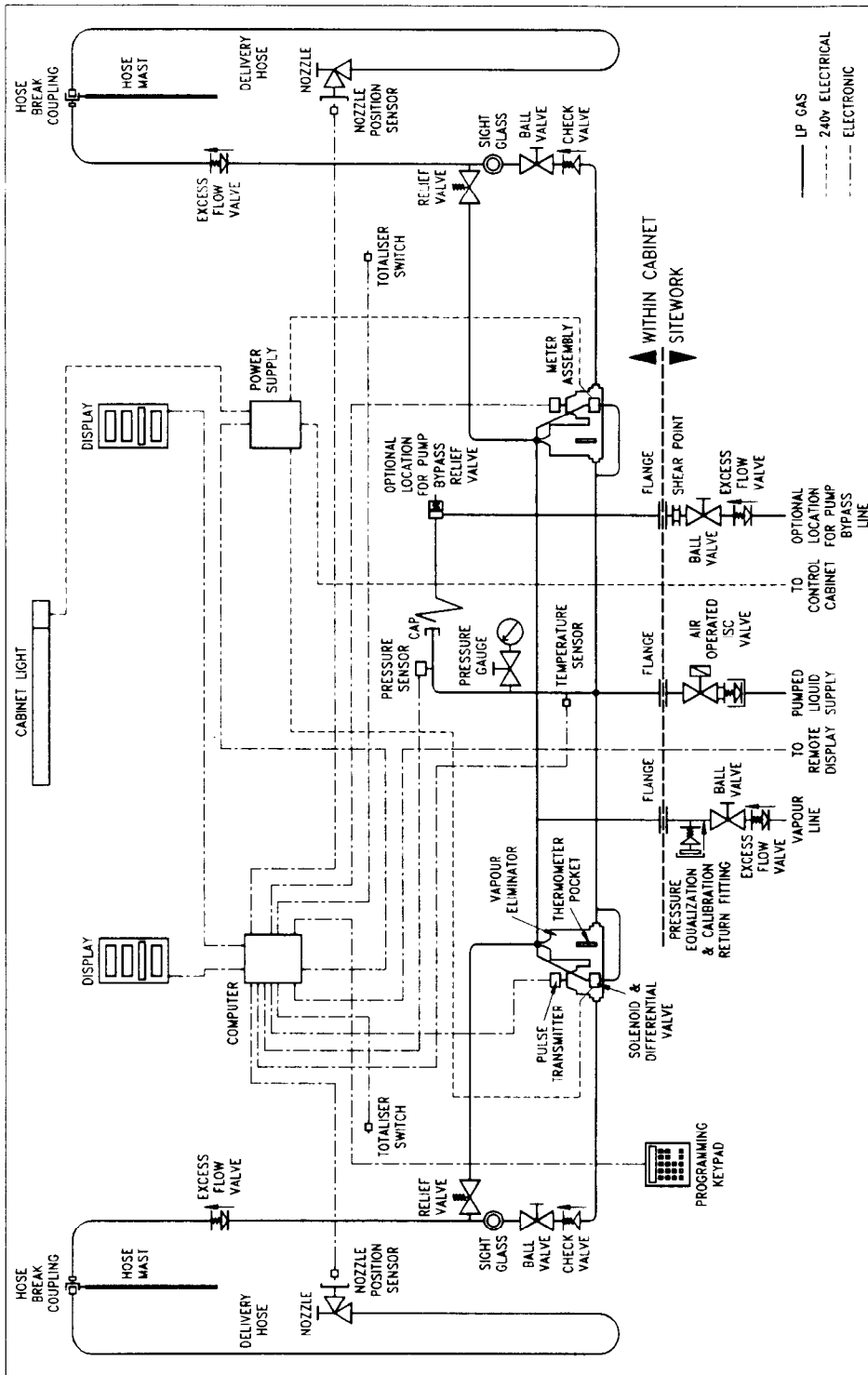
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FIGURE 10/1/12 - 2



Model CleverHead 93 Without Covers

FIGURE 10/1/12 - 3



Typical Hydraulic Arrangement