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CERTIFICATE OF APPROVAL No 5/6H/2

VARIATION No 1

This is to certify that the following modification of the patterns of the

Liquip Flowmeter with A. O. Smith T11 Meter

approved in Certificate of Approval No 5/6H/2 dated 30 September 1977

submitted by Liquid Handling Equipment Pty Ltd,
216 Railway Terrace,
Guildford, New South Wales, 2161,

has been approved under the Weights and Measures (Patterns of Instruments) Regulations as being suitable for use for trade.

Date of Approval: 24 April 1978

The approved modification, described in Technical Schedule No 5/6H/2 - Variation No 1 and in drawings and specifications lodged with the Commission, provides for the maximum flow rate to be a flow rate between 150 and 360 L/min and the maximum system pressure to be 600 kPa.

The approval is subject to review on or after 1 July 1982.

All instruments conforming to this approval shall be marked with the approval number "NSC No 5/6H/2".

Signed

Acting Executive Officer

12/5/78

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6H/2

Pattern: Liquip Flowmeter witn A. O. Smitn Tll Meter

Submittor: Liquid Handling Equipment Pty Ltd,
216 Railway Terrace,
Guildford, New Soutn Wales, 2161.

Date of Approval: 11 August 1977

Conditions of Approval:

1. Tne maximum flow rate is a flow rate between 100 and 140 litres per minute.

2. Tne pump suction operates under a positive liquid nead.

3. Tne liquids measured are limited to petroleum products of viscosities between 0,6 and 4 mPa.s.

4. Tne liquid (commercial or tecnnical name) for wnicn tne instrument is verified is nominated on tne instrument data plate.

All instruments conforming to tnis approval snall be marked "NSC No 5/6H/2".

Description:

Tne pattern (see Figure 1) is a venicle-mounted instrument for tne delivery of liquid petroleum of viscosity between 0,6 and 4 mPa.s at a maximum flow rate of 140 litres per minute and a maximum system pressure at no flow of 480 kPa.

Tne flowmeter comprises tne following:

1. Positive displacement pump mounted on tne assembly at a point lower tnan tne minimum neignt of tne liquid in tne supply tank. Tne supply pipe from tne tank to tne pump nas a continuous fall to tne pump. Tne pump by-pass is set so tnat tne maximum no-flow system pressure is 480 kPa. Provision is made for a pressure gauge to be connected

between the pump and the gas purger.

2. A. O. Smith T11 gas separator (see Figure 2).

3. A. O. Smith T11 meter (see Figure 2).

4. Veeder-Root 7085 zero-start single-handle reset indicator and ticket printer (see Figure 2). The ticket printer has 1-litre increments and the indicator has a scale interval of 1 litre; the first element is marked with ten scale-mark lines numbered from 0 to 9. The aperture through which the first element is viewed is widened in the direction of travel.

5. Non-return valve.

6. Hose — any type, bore or length of hose may be used provided that the minimum delivery, determined from Table 1 and marked on the instrument's data plate for reference by the Weights and Measures Authority, is acceptable to that Authority taking into account the usage of the instrument.

7. Anti-drain valve (see Figure 3) — an anti-drain valve, or anti-drain valve and swivel coupling, is fitted on the end of the nose. The anti-drain valve retains a pressure of not less than 55 kPa.

8. Nozzle — any nozzle fitted with an integral anti-drain valve which retains a pressure of not less than 5 kPa and which is located downstream of the main nozzle valve.

9. Marking — instrument data plate sealed to the instrument **marked:**

(a) "approved for kerosene" or "approved for heating oil";*

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* The approval for the following liquids is based upon the liquid having a viscosity within the range specified for temperatures of 5°C to 40°C, taking into account the variations in the viscosity of each product which occur with the output from a single refinery or between different refineries and at different times throughout **each year:**

Liquid[1]	Permitted viscosity range
Kerosene[2]	0,6 to 2,2 mPa.s
Heating oil	0,8 to 4,0 mPa.s

Note: [1] A known trade abbreviation of the name of the liquid is acceptable.
[2] Kerosene includes white spirits and aviation turbine fuel.

(b) "minimum delivery ...y... litres", y being tne minimum delivery determined from Table 1.

10. Sealing —

(a) tne indicator, ticket printer and calibration-adjustment cover, by passing a sealing wire tnrougn tne attacnment-mounting bolts and terminating tne ends beneatn a lead stamping plug (see Figure 2);

(b) tne instrument data plate by attacning it by a lead stamping plug or by tnreading tne indicator sealing wire tnrougn a nole in tne data plate.

Tne approval includes tne indicator being a Veeder-Root 1624 zero-start indicator witn scale interval of 1 litre; tne first element is marked witn ten scale-mark lines numbered from 0 to 9 (see Figure 4). Tne aperture tnrougn wnicn tne first element is viewed widens in tne direction of travel.

Special Tests:

Tne instrument snould be tested witn tne liquid for wnicn it will be used and wnicn is marked on tne data plate.

Minimum Delivery:

Tne minimum delivery is marked on tne instrument data plate.

Weignts and Measures inspectors snould cneck tnat tne maximum nose dilation determined by tne metnod described below corresponds witn tne appropriate minimum delivery — see Table 1.

Hose Dilation:

A measure of tne nose-dilation quantity may be obtained by tne following metnod:

Witn tne pump stopped and tne nose fully wound on its reel, open tne nozzle to reduce tne pressure in tne nose to tne anti-drain valve retaining pressure of about 55 kPa. Tnen fully unwind tne nose from tne reel, zero tne indicator, start tne pump and, after allowing not less tnan 30 seconds for tne nose to fully dilate, and witn tne pump still running, read tne quantity on tne indicator. Tnis quantity is equal to tne maximum nose dilation.

Gas Purging:

Tne effect of gas on tne quantity delivered snould not exceed

1,0 litre wnen a delivery is interrupted due to tne supply tank running dry, and tne delivery is continued by, for example, cnanging supply tanks. To test gas purging it will be necessary to allow tne supply tank to empty during a test delivery, to stop tne pump, and to refill or cnange tne supply tank to allow tne delivery into tne proving measure to be completed.

Non-flow-dependent Errors:

1. Tne non-flow-dependent errors are up to:

   (a) 1-litre rounding error for tne ticket printer witn 1-litre increments;

   (b) 0,2-litre reading error for tne indicator wnicn nas tne first element indicating by 1-litre graduations;

   (c) 1,0-litre gas-purging error; and

   (d) ...z...-litre nose dilation, z being tne maximum value of nose dilation for wnicn tne instrument is verified — see Table 1.

2. Tne minimum delivery for wnicn tne relative error from all sources would not exceed 1,5% (derived from Table 1) is marked on tne instrument data plate.

TABLE 1

Minimum delivery marked on instrument data plate	Maximum nose dilation	
	Indicator only fitted	Indicator and printer fitted
ℓ	ℓ	ℓ
50	0,3	-
100	0,8	0
150	1,3	0,5
200	1,8	1,0
250	2,3	1,5
300	2,8	2,0
350	3,2	2,5
400	3,8	3,0
450	4,3	3,5
500	4,8	4,0

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6H/2

VARIATION No 1

Pattern: Liquip Flowmeter with A. O. Smith T11 Meter

Submittor: Liquid Handling Equipment Pty Ltd,
216 Railway Terrace,
Guildford, New South Wales, 2161.

Date of Approval of Variation: 24 April 1978

The modification described in this Schedule applies to the patterns described in Technical Schedule No 5/6H/2 dated 30 September 1977.

All instruments conforming to this approval shall be marked "NSC No 5/6H/2".

Description:

The approved modification provides for the maximum flow rate to be a flow rate between 150 and 360 L/min and the maximum system pressure to be 600 kPa. The minimum flow rate is 20% of the maximum flow rate achievable with a particular instrument.

The instrument data plate which is sealed to the instrument is marked:*

(a) "approved for petrol only"; or

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* The approval for the following liquids is based upon the liquid having a viscosity within the range specified for temperatures of 5°C to 40°C, taking into account the variations in the viscosity of each product which occur with the output from a single refinery or between different refineries and at different times throughout each year:

Liquid[1]	Permitted viscosity range
Petrol	0,4 to 0,7 mPa.s
Kerosene[2]	0,6 to 2,2 mPa.s
Heating oil	1,1 to 4,0 mPa.s
Diesel fuel	1,7 to 8,3 mPa.s

Note: [1] A known trade abbreviation of the name of the liquid is acceptable.
[2] Kerosene includes white spirits and aviation turbine fuel.

(b) "approved for kerosene, heating oil, and diesel fuel"*; and

(c) "maximum no-flow pressure ...x... kPa", x being the maximum system pressure when the nozzle is closed.

Special Tests:

The instrument should be tested with one or more of the liquids for which it will be used and which are marked on the data plate. The maximum flow rate at which the instrument is able to be tested should be the maximum flow rate marked on the instrument data plate.

1. Hose Dilation

Weights and Measures inspectors should check that the maximum hose dilation, determined by the method described below, corresponds with the minimum delivery marked on the data plate and complies with **Table 1.**

A measure of the hose-dilation quantity may be obtained by the following method:

(a) With the pump operating, open and close the nozzle, then with the nozzle closed check that the no-flow system pressure is within 20 kPa of the maximum no-flow system pressure marked on the instrument data plate.

(b) With the pump stopped and the hose fully wound on its reel, open the nozzle to reduce the pressure in the hose to the anti-drain valve retaining pressure of about 55 kPa. Then fully unwind the hose from the reel, zero the indicator, start the pump and, after allowing not less than 30 seconds for the hose to fully dilate, and with the pump still running, read the quantity on the indicator. This quantity is equal to the maximum hose dilation.

2. Gas Purging

The effect of gas on the quantity delivered should not exceed 1,0% of the minimum delivery marked on the instrument data plate when a delivery is interrupted due to the supply tank running dry, and the delivery is continued by, for example, changing supply tanks. To test gas purging it will be necessary to allow the supply tank

* The approval includes similar products of viscosity between 0,6 and 8,3 mPa.s

to empty during a test delivery, to stop the pump, and to refill or change the supply tank to allow the delivery into the proving measure to be completed.

Non-flow-dependent Errors

1. The non-flow-dependent errors are up to:

   (a) 1-litre rounding error for the ticket printer with 1-litre increments;

   (b) 0,2-litre reading error for the indicator which has the first element indicating by 1-litre scale intervals;

   (c) ...w...-litre gas-purging error, w being 1% of the minimum delivery marked on the instrument data plate;

   (d) ...z...-litre hose dilation, z being the maximum value of hose dilation for which the instrument is verified — see Table 1.

2. The minimum delivery for which the relative error from all sources would not exceed 1,5% is derived from Table 1 and marked on the instrument data plate.

NATIONAL STANDARDS COMMISSION

NOTIFICATION OF CHANGE

CERTIFICATE OF APPROVAL No 5/6H/2

CHANGE No 1

The description of the

Liquip Flowmeter with A. O. Smith T11 Meter

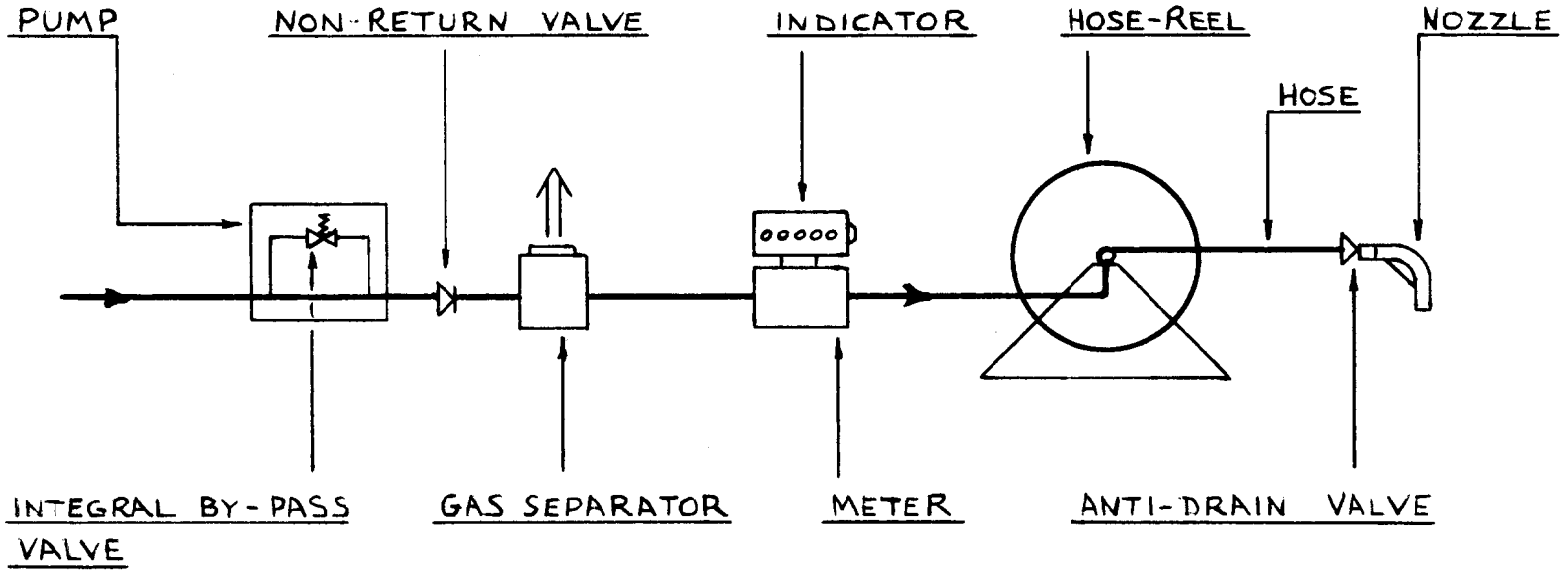
given in Technical Schedule No 5/6H/2 - Variation No 1 dated 12 May 1978, is altered on page 2 after paragraph (c) "Maximum no-flow pressure", by adding a fourth paragraph:

"(d) Minimum delivery ..... litres".

11/8/78

FIGURE 5/6H/2 - 1

30/9/77



T11 Flowmeter — Schematic Diagram

T11 Meter, Gas Purger, and Veeder-Root 7085
Indicator and Ticket Printer

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FIGURE 5/6H/2 - 3

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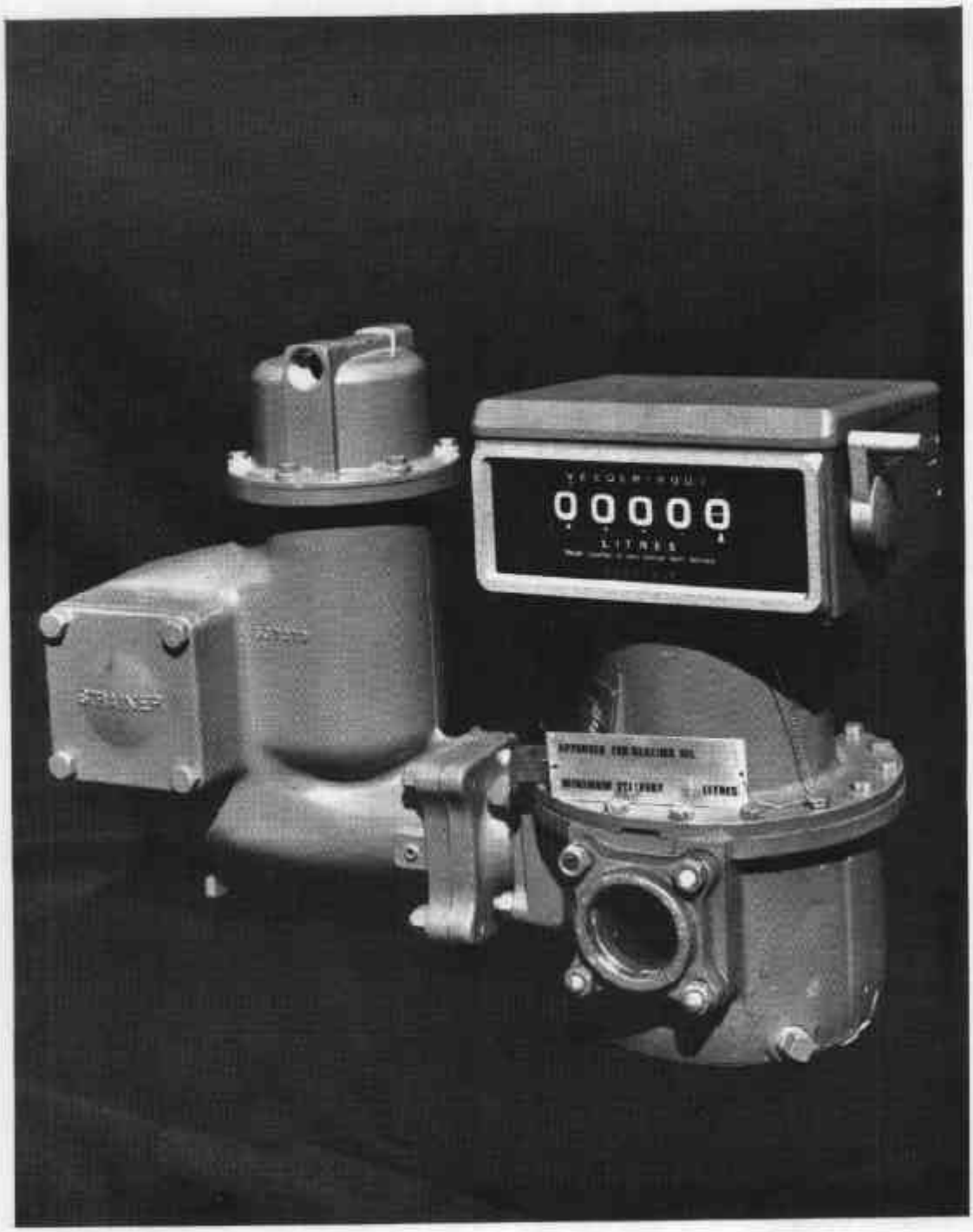
Anti-drain Valve and Swivel Coupling

FIGURE 5/6H/2 - 4



T11 Meter, Gas Purger, and Veeder-Root 1624 Indicator

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