

CERTIFICATE OF APPROVAL No 5/6H/3

This is to certify that the patterns of the

Liquip (Lubricating Oil) Flowmeter with A. O. Smith T11 Meter

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

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

Date of Approval: 3 February 1978

The patterns are described in Technical Schedule No 5/6H/3, and in drawings and specifications lodged with the Commission.

The approval is subject to review on or after 1 February 1983.

All instruments conforming to this approval shall be marked with the approval number "NSC No 5/6H/3".

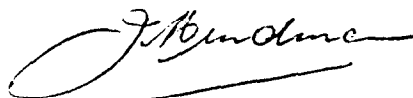
Approval is granted on condition that:

1. The flow rate is limited to between 14 and 140 litres per minute.
2. The maximum system pressure is 500 kPa.

The pump suction operates under a positive liquid head.

4. The viscosity of the liquid measured lies in the range 100 to 1000 mPa.s for a temperature range of 5 ° to 40 ° C.
5. The liquid (commercial or technical name) for which the instrument is verified is nominated on the instrument data plate.

Signed



Acting Executive Officer



# NATIONAL STANDARDS COMMISSION

## TECHNICAL SCHEDULE No 5/6H/3

Pattern: Liquip (Lubricating Oil) Flowmeter with A. O. Smith T11  
Meter

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

Date of Approval: 3 February 1978

### Conditions of Approval:

1. The flow rate is limited to between 14 and 140 litres per minute.
2. The maximum system pressure is 500 kPa.
3. The pump suction operates under a positive liquid head.
4. The viscosity of the liquid measured lies in the range 100 to 1000 mPa.s for a temperature range of 5° to 40°C.
5. The liquid (commercial or technical name) for which the instrument is verified is nominated on the instrument data plate.

All instruments conforming to this approval shall be marked "NSC No 5/6H/3".

### Description:

The pattern (see Figure 1) is a vehicle-mounted instrument for the delivery of liquid petroleum of viscosity between 100 and 1000 mPa.s at a flow rate between 14 and 140 litres per minute and at a maximum system pressure of 500 kPa.s.

The flowmeter comprises the following:

1. Liquip low-level float valve in the supply tank which ensures that the delivery stops before the liquid level falls low

24/3/78

.../2

- enough to allow air to enter the system.
2. Positive displacement pump mounted on the assembly at a point lower than the minimum height of the liquid in the supply tank.
  3. Non-return valve located between the pump and meter or between the meter and the hose.
  4. A. O. Smith T11 meter (see Figure 2).
  5. Veeder-Root 1624 zero-start indicator with a scale interval of 1 litre; the first element is marked with ten scale-mark lines numbered from 0 to 9 (see Figure 2). The aperture through which the first element is viewed is widened in the direction of travel.
  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 hose. 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(s) sealed to the instrument, marked:
    - (a) "approved for ...x... lubricating oil",  
where x is the commercial or technical name; for example, "Shell Super" or "SAE 30";
    - (b) "maximum flow rate 140 litres per minute";
    - (c) "minimum delivery ...y... litres", y being the minimum delivery determined from Table 1.
  10. Sealing — the following parts of the flowmeter are sealed with a lead stamping plug and a sealing wire if appropriate:
    - (a) the meter and indicator,

(b) the instrument data plate (see Figure 2),

The approval includes the flowmeter with a zero-start single-handle-reset Veeder-Root 7085 indicator and ticket printer (see Figure 4). The ticket printer has 1-litre increments and the indicator has a 1-litre scale interval; 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.

Special Tests:

The instrument should be tested with the liquid for which it will be used and which is marked on the data plate.

Minimum Delivery:

The minimum delivery is marked on the instrument data plate.

Weights and Measures inspectors should check that the maximum hose dilation determined by the method described below corresponds with the appropriate minimum delivery — see Table 1.

Hose Dilation:

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

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.

Variation of Quantity in Nozzle:

If the integral anti-drain valve in the nozzle is not fitted or is not operating, the quantity of liquid contained in the nozzle and its fittings between the external anti-drain valve and the main nozzle valve will be an additional non-flow-dependent error for which no allowance has been made in the calculation of minimum delivery.

The efficiency of the integral anti-drain valve may be determined by the following method:

Start the pump, open and close the main nozzle valve, stop the

pump, through the drain plug reduce the hose pressure to less than 55 kPa and then open the nozzle main valve. There should be no significant draining from the nozzle if the integral anti-drain valve is satisfactory.

#### 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 graduations; and
  - (c) ...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% (derived from Table 1) is marked on the instrument data plate.

#### Low-level Float:

At least one delivery should be made during which the low-level float valve in the supply tank stops the delivery. It will be necessary to refill the supply tank to finish the delivery into the proving measure. The effect of the operation of the low-level float valve on the quantity delivered should not exceed 0,5% of the minimum delivery marked on the instrument data plate.

#### Flow Rate:

If the pump has an alternative outlet for unmeasured liquid, check that the valve or valves are arranged so that only one outlet may be open at any one time — that is, only the measured outlet or only the unmeasured outlet; no intermediate position which allows both outlets to be open is permitted.

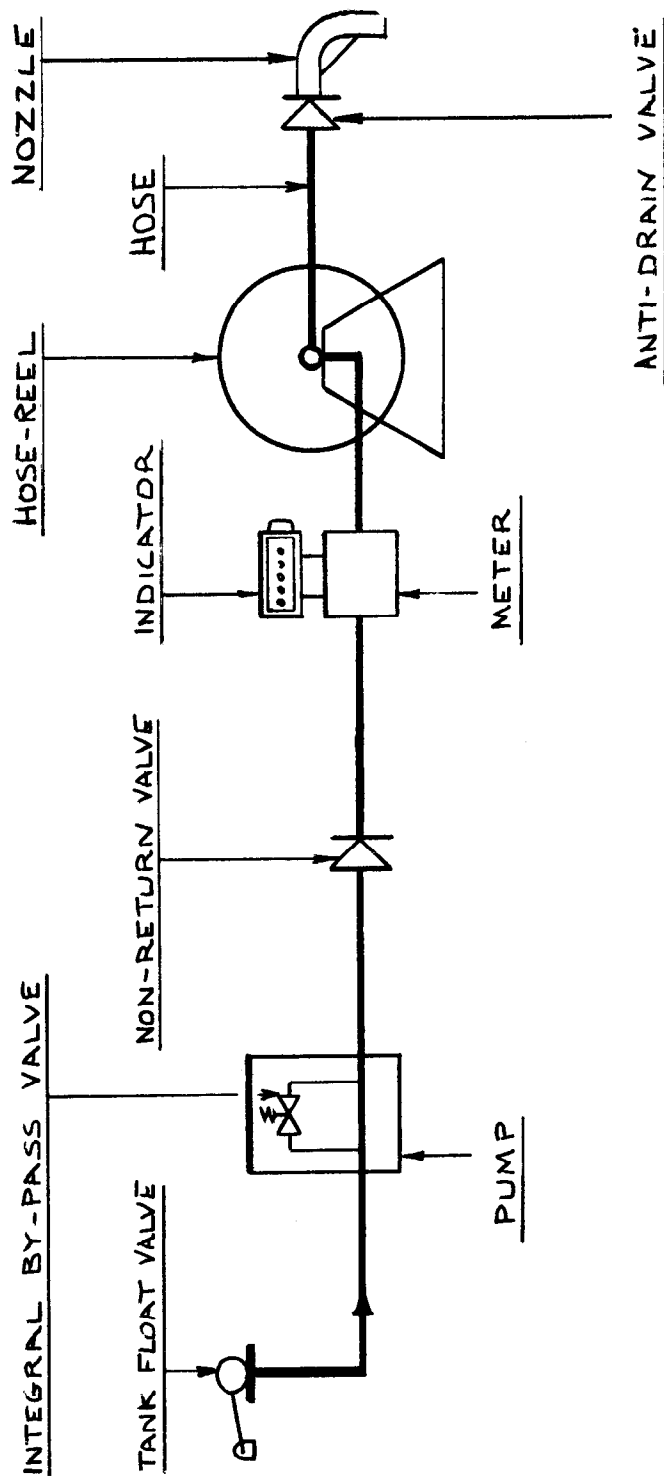
TABLE 1

---

Minimum delivery marked on instrument data plate	Maximum nose dilation	
	Indicator only fitted	Indicator and printer fitted
<i>l</i>	<i>l</i>	<i>l</i>
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

---

FIGURE 5/6H/3 - 1



Liquip (Lubricating Oil) Flowmeter

FIGURE 5/6H/3 - 2



A. O. Smith T11 Meter with Veeder-Root 1624 Indicator

24/3/78

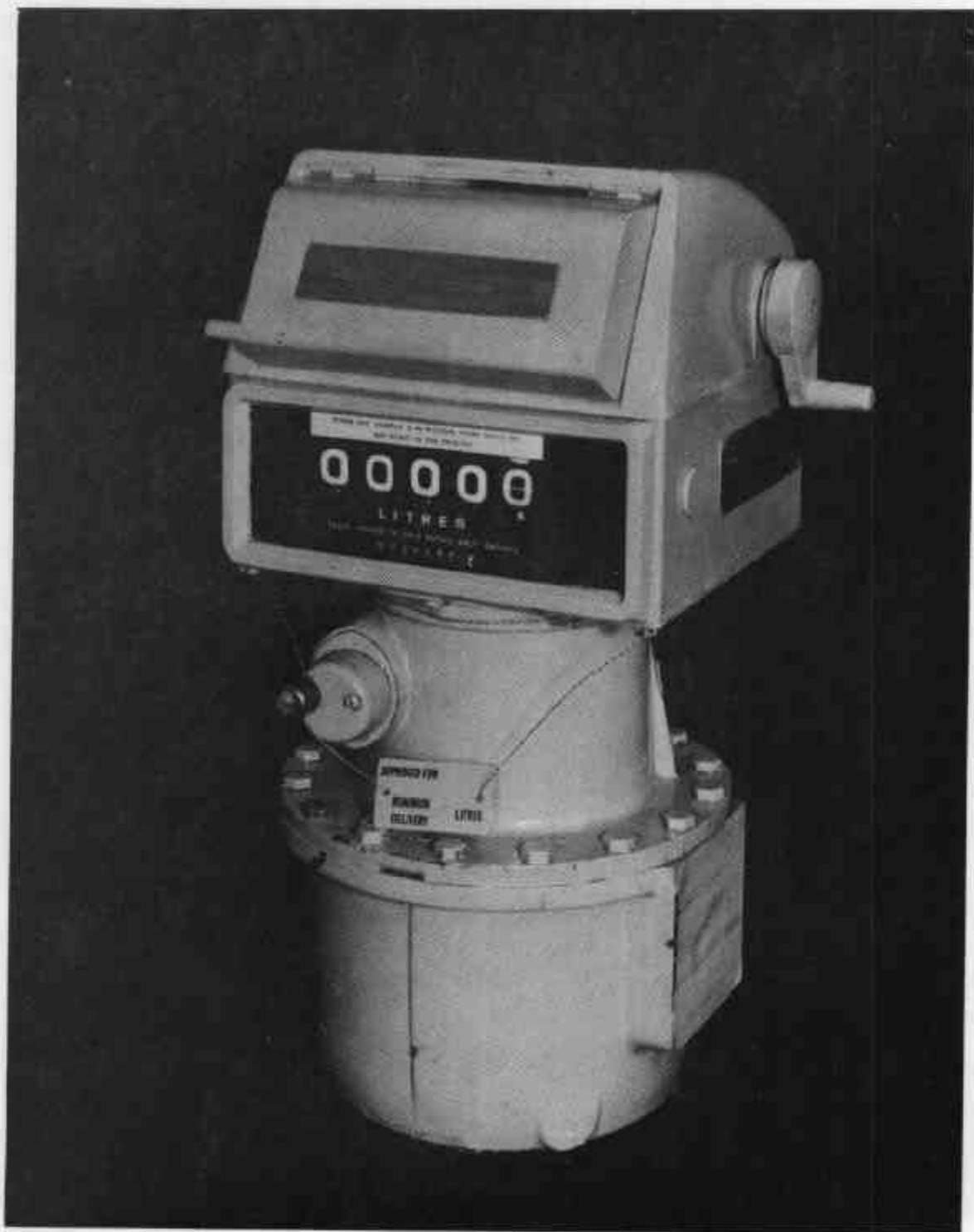


FIGURE 5/6H/3 - 3



Anti-drain Valve

24/3/78



A. O. Smith T11 Meter with Veeder-Root 7085 Indicator  
and Ticket Printer

24/3/78