

CERTIFICATE OF APPROVAL No 5/6B/44

This is to certify that the patterns of the

Exep Flowmeter with Liquid Controls M5 or M7 Meter

submitted by Engineering Products Pty Ltd,  
418 Burnley Street,  
Burnley, Victoria, 3121,

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

Date of Approval: 7 April 1977

The patterns are described in Technical Schedule No 5/6B/44, and in drawings and specifications lodged with the Commission.


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

All instruments conforming to this approval shall be marked with the approval number "NSC No 5/6B/44".

Approval is granted on condition that:

1. The flow rate is limited to a maximum of 230  $\ell$ /min.
2. The maximum system pressure is limited to 600 kPa.
3. The pump suction operates under a positive liquid head.
4. The viscosity of the liquid measured is within the range 0,6 to 4 mPa.s.
5. The liquid for which the instrument is verified is nominated on the instrument data plate.

Signed

  
Executive Officer



# NATIONAL STANDARDS COMMISSION

## TECHNICAL SCHEDULE No 5/6B/44

Pattern: Epex Flowmeter with Liquid Controls M5 or M7 Meter

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418 Burnley Street,  
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### Conditions of Approval:

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### Description:

The pattern (see Figure 1) is a vehicle-mounted instrument for the delivery of liquid petroleum of viscosity between 0,6 and 4 mPa.s at a maximum flow rate of 230 l/min and at a maximum system pressure at no flow of 600 kPa.

The flowmeter comprises the following:

1. Positive displacement pump mounted on the assembly at a point lower than the minimum height of the liquid in the supply tank. The supply pipe from the tank to the pump slopes downward to the pump. The pump by-pass is set so that the maximum no-flow system pressure is not more than that marked on the instrument data plate. Provision is made for a pressure gauge to be

connected between the pump and the gas purger.

2. Liquid Controls E.1-42100 (or A 8110) gas purger (see Figure 2).
3. Liquid Controls M7 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 date 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 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 55 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 kerosene" or "approved for heating oil";\*
  - (b) "minimum delivery ...y... litres", y being the minimum delivery determined from Table 1;

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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:

<u>Liquid<sup>1</sup></u>	<u>Permitted viscosity range</u>
Kerosene <sup>2</sup>	0,6 to 2,2 mPa.s
Heating oil	0,8 to 4,0 mPa.s

Note: <sup>1</sup> A known trade abbreviation of the name of the liquid is acceptable.

<sup>2</sup> Kerosene includes white spirits and aviation turbine fuel.

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

10. Sealing —

- (a) the indicator and ticket printer by passing a sealing wire through the attachment mounting bolts and terminating the ends beneath a lead stamping plug on the calibration-adjustment cover;
- (b) the calibration-adjustment cover by lead stamping plugs at the top and bottom;
- (c) the instrument data plate by attaching it by a lead stamping plug or by threading the indicator sealing wire through a hole in the data plate.

The approval includes:

1. the indicator being a Veeder-Root 1624 or 1558 (169200 USA) zero-start indicator with scale interval of 1 litre; the first element is marked with ten scale-mark lines numbered from 0 to 9 (see Figures 4 and 5). The aperture through which the first element is viewed widens in the direction of travel;
2. the indicator and ticket printer being a Veeder-Root 1558 indicator (UK) or 169100 or 169200 (USA) and Model KE 1630 ticket printer modified for single-handle reset by fitting a chain drive. 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 (see Figure 6);
3. an M5 meter (see Figure 6).

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 nose dilation determined by the method described below corresponds with the appropriate minimum delivery; Table 1 refers.

**Hose Dilation:**

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

1. With the pump operating, open and close the nozzle, then check that the no-flow system pressure is within 20 kPa of the maximum no-flow system pressure marked on the instrument's data plate.
2. With the pump stopped and the nose fully wound on its reel, open the nozzle to reduce the pressure in the nose to the anti-drain valve retaining pressure of about 55 kPa. Then fully unwind the nose from the reel, zero the indicator, start the pump and, after allowing not less than 30 seconds for the nose to fully dilate, and with the pump still running, read the quantity on the indicator. This quantity is equal to the maximum nose dilation.

**Gas Purging:**

The effect of gas on the quantity delivered should not exceed 1,0 litre 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 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.

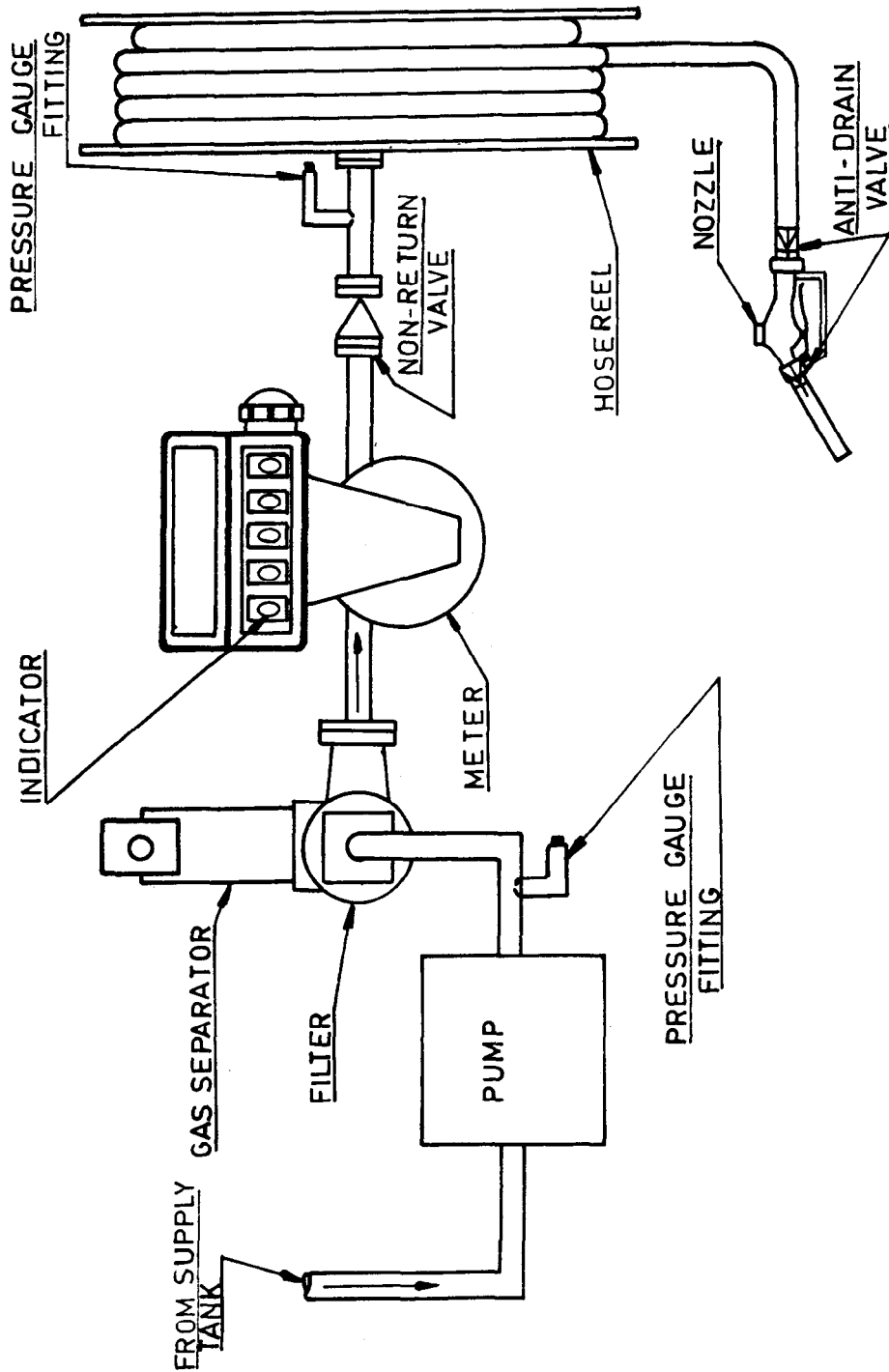
**Non-flow-dependent Errors:**

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 graduations;
  - (c) 1,0-litre gas-purging error; and
  - (d) ...z...-litre nose dilation, z being the maximum value of nose 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 marked on the instrument data plate.

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 5/6B/44 - 1



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Epex Flowmeter with M5 or M7 Meter --- Schematic Diagram



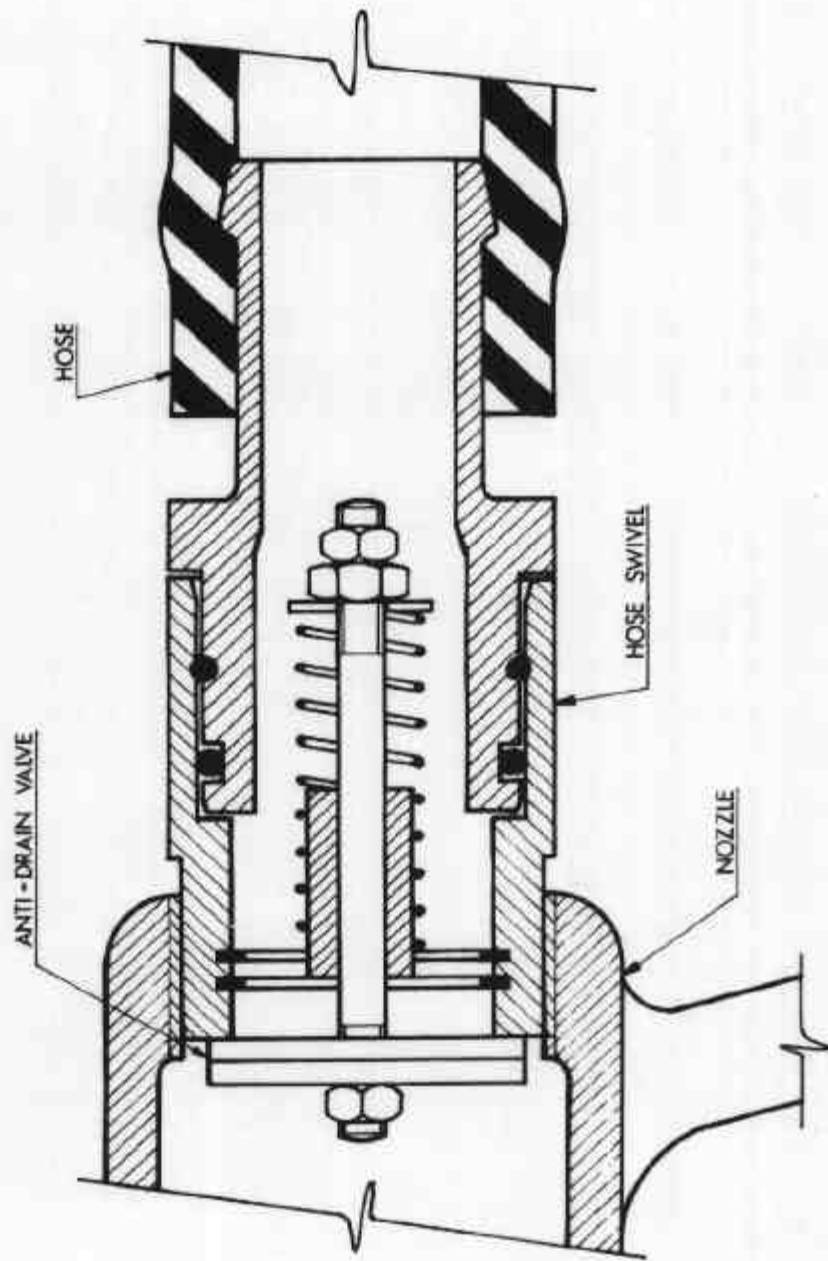
Liquid Controls M7 Meter, Gas Purger, and  
Veeder-Root 7085 Indicator and Ticket Printer

(Note: The ends of the indicator sealing wire should terminate  
beneath a lead-plug seal.)

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FIGURE 5/6B/44 - 3



Anti-drain Valve and Swivel Coupling — Schematic Diagram

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FIGURE 5/6B/44 - 4



Veeder-Root 1624 Indicator

FIGURE 5/6B/44 - 5



Veeder-Root 1558 Indicator

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FIGURE 5/6B/44 - 6



Liquid Controls M5 Meter, Gas Purger, and  
Veeder-Root 1558 Indicator and KE 1630 Ticket  
Printer Modified for Single-handle Reset

(Note: The ends of the indicator sealing wire should  
terminate beneath a lead-plug seal).

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