NATIONAL STANDARDS COMMISSION

CERTIFICATE OF APPROVAL No 5/6B/48

This is to certify that the patterns of the

Wayne Flowmeter (Loading-rack) with A. O. Smith C Series Meter

submitted by Wayne Pumps Australia Pty Ltd,
29 Anzac Highway,
Keswick, South Australia, 5035,

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

Date of Approval: 9 March 1979

The patterns are described in Technical Schedule No 5/6B/48 and in drawings and specifications lodged with the Commission.

The approval is subject to review on or after 1 March 1984.

All instruments conforming to this approval shall be marked with the approval number "NSC No 5/6B/48".

Approval is granted on condition that:

1. The maximum flow rate is a flow rate between 290 and 580 L/min; the minimum flow rate is 20% of the maximum flow rate achievable with a particular instrument.

2. The viscosity of the liquid measured is between 0,4 and 200 mPa.s.

3. The liquid (commercial or technical name) for which the instrument is verified is nominated on the instrument data plate.

4. The pump suction operates under a positive liquid head.

5. The supply tank is of sufficient capacity to ensure that the liquid in the tank does not fall to a level at which air could be drawn into the pump, or a device is fitted to prevent the

level of the liquid falling to a level at which air could be drawn into the pump.

6. The measured liquid does not have free gas entrained with or in it.

7. The maximum speed of the first element of the indicator or indicator and ticket printer is not more than:

   (a) 100 r/min — Veeder-Root 7085 or 7084 indicator and ticket printer and Veeder-Root 1624 indicator; and

   (b) 200 r/min — Veeder-Root 7890 indicator and ticket printer and Veeder-Root 7887 indicator.

Signed

Executive Officer

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6B/48

Pattern: Wayne Flowmeter (Loading-rack) with A. O. Smith C Series Meter

Submittor: Wayne Pumps Australia Pty Ltd,
29 Anzac Highway,
Keswick, South Australia, 5035.

Date of Approval: 9 March 1979

Description:

The pattern (Figure 1) is a flooded-suction loading-rack flowmeter.

The flowmeter comprises the following:

1. Supply tank.

2. Pump — a positive or non-positive displacement pump, mounted lower than the minimum height of the liquid in the supply tank. The supply pipe from the tank has a continuous fall to the pump. Provision is made for a pressure gauge to be connected to the suction side of the pump.

3. Non-return valve in the pipe between the pump and the meter or an arrangement of the components and piping to keep the system full of liquid at all times.

4. Gas purger — a gas purger and strainer may be fitted.*

5. A. O. Smith 50 mm "C" Series meter (Figure 2).

---

* The gas purger and strainer is not a part of the measuring instrument examined and approved by the Commission; its inclusion is approved by the Commission only on the basis that it may be used as a strainer and/or to minimise possible damage to the meter in the event of a breakdown or other incident permitting free gas in the supply pipe upstream of the meter.

6. Veeder-Root 7085 or VR 7890 zero-start single-handle reset indicator and ticket printer (Figure 2). 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.

7. Preset counter* — an A. O. Smith 343-30 or Veeder-Root 7889 preset counter may be fitted (Figure 2). The counter causes the outlet-control valve to close in two stages.

8. Outlet-control valve — the valve may be closed manually or by the counter.

9. Loading arm arranged so that the highest point of the pipework forms a weir at a fixed level from which the delivery pipe falls continuously to the outlet for all configurations of the loading arm.

   An outlet valve is installed at or upstream of the highest point and a syphon breaker is installed to ensure complete drainage of the pipework downstream of the weir.

   Alternatively, an anti-drain valve which retains a pressure of not less than 55 kPa or a dry-break coupling may be installed in the pipework at the delivery point. This obviates the need for the syphon breaker and the need to locate the outlet-control valve at or before the highest point in the pipework.

10. Sealing —

   (a) the meter-calibration cover, the indicator and ticket printer attachment-mounting bolts and the preset counter attachment-mounting bolts are sealed with a sealing wire, the ends of which are terminated beneath a fixed lead-plug seal (Figure 7); and

   (b) a data plate marked with the liquid or liquids and the maximum flow rate for which the instrument is verified is

* The preset counter is not a part of the measuring instrument examined and approved by the Commission; its inclusion is approved by the Commission only on the basis that it facilitates the measurement of a set quantity of liquid and its use does not affect the performance of the measuring instrument.

attached to the instrument either by the sealing wire or by a separate lead-plug security seal (Figure 7).*

Variants:

1. A Veeder-Root 1624 or VR 7887 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 (Figure 3). The aperture through which the first element is viewed is widened in the direction of travel.

2. A Veeder-Root 7084 single-handle reset accumulative ticket printer and zero-start indicator. 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. The ticket printer and indicator are similar in appearance to the VR 7085 ticket printer and indicator (Figure 2).

3. Pulse-transmitter unit, Type PE-SX, D or E (Figure 4), which provides quantity output pulses to peripheral devices which are not

---

* The approval for each of 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:

Specific liquid[1]	Permitted viscosity range
Petrol	0,4 to 0,7 mPa.s
Kerosene[2]	0,6 to 2,2 mPa.s
Heating oil[3]	1,1 to 4,0 mPa.s
Diesel fuel	1,7 to 8,3 mPa.s
.....[4]	8,3 to 200 mPa.s

Notes: [1] A known trade abbreviation of the name of the liquid is acceptable.
[2] "Kerosene" includes white spirits and aviation turbine fuel.
[3] Petrol, kerosene and heating oil have a viscosity of less than 3 mPa.s at 20°C.
[4] Name of liquid petroleum to be inserted.

a part of the measuring instrument.* These devices, which may only be provided with the authorisation of the Weights and Measures Authority of the State, may for example, store or process the data, etc. The attachment bolts of the pulse generator are sealed similarly to the indicator attachment bolts. Provision is made to seal the outputs of the pulse-transmitter units to prevent the addition of peripheral equipment, or to seal peripheral equipment to the output.

The use of such peripheral equipment will not affect the operation of the flowmeter.

4. A rigid extension drive from the meter to the indicator and ticket printer, in which case separate seals are provided for the meter and the indicator and ticket printer.

5. Veeder-Root VR 7887 indicator — a 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 (Figure 5). The aperture through which the first element is viewed is widened in the direction of travel. A shutter covers the indicator elements during the zero reset.

6. Veeder-Root VR 7890 indicator and ticket printer — a zero-start single-handle reset indicator and ticket printer (Figure 6). 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 of the indicator is viewed is widened in the direction of travel. A shutter covers the indicator elements during the zero reset.

---

* Devices which determine and indicate the value of a physical quantity, devices which calculate price and in the presence of the purchaser or vendor indicate price, devices which control the measurement and devices which are intended to provide the purchaser or vendor with a permanent record, recorded at the time of the measurement, of the physical quantity or physical quantity and price, are a part of the measuring instrument which requires approval by the Commission. Devices intended to provide the purchaser or vendor with an indication, or a permanent record, recorded at the time of the measurement of the physical quantity compensated in value for temperature, are not peripheral devices.

Test Procedure:

1. Accuracy requirements

The maximum permissible error at verification is:

(a) for systems intended to operate over a 5 : 1 flow-rate range, ± 0,3% at any flow rate; or

(b) for systems intended to operate at a constant flow rate (± 10% nominal), ± 0,15% at any flow rate.

2. The instrument should be tested with the liquid or liquids marked on the instrument data plate.

3. If a device is fitted to prevent the level of the liquid in the supply tank falling to the level of the pump, at least one delivery should occur during which this device stops the delivery. It will be necessary to refill the supply tank to finish the delivery into the proving measure. The effect on the quantity delivered should not exceed 1% of the minimum delivery.

4. Minimum delivery — the minimum delivery will be 200 litres when an accumulative ticket printer is fitted, 100 litres when a zero-start ticket printer is fitted, and 20 litres when only an indicator is fitted.

5. Flow rate — if the pump has alternative outputs, check that the meter flow rate stays within the approved 5 : 1 flow-rate range for all combinations of alternative uses of the output from the pump.

6. Positive head — a pressure gauge fitted to the inlet side of the pump should indicate a positive head at all flow rates.

7. Loading arm — if an anti-drain valve or drybreak coupling is not fitted at the end of the loading arm, check —

(a) that for all configurations of the pipework the highest point in the pipework forms a weir from which the delivery pipe falls continuously to the delivery points;

(b) that for all configurations of the pipework the syphon breaker ensures complete drainage downstream of the weir without varying the quantity upstream of the weir.

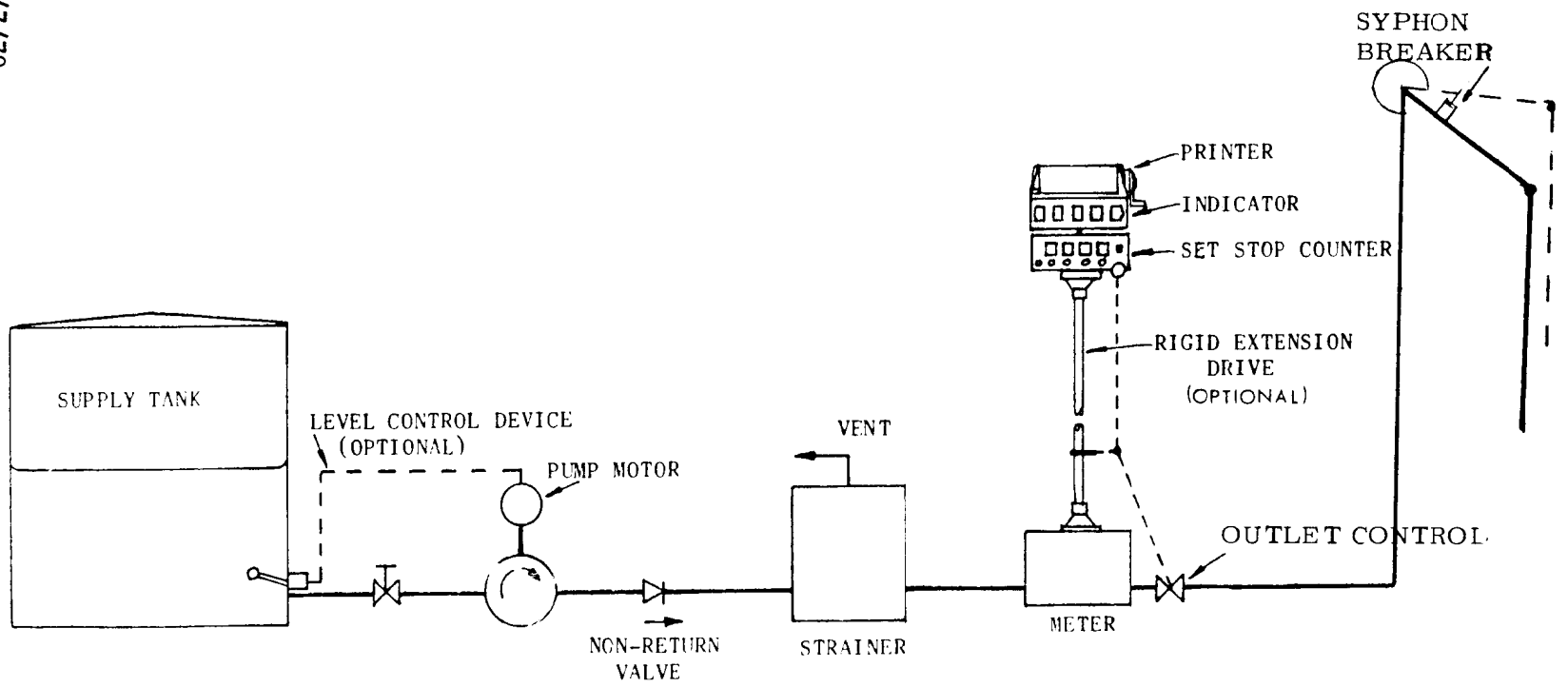
The complete drainage downstream of the weir may be checked

by making a delivery with the delivery spear inserted into the bottom of the proving measure, than after the delivery removing the spear from the measure. The level in the measure should not increase.

Variation of the quantity upstream of the weir will be indicated as an error on the next delivery.

8. Test delivery — if the test delivery is less than 10 times the minimum delivery, inspectors should ensure that the non-flow-dependent error (reading error of the indicator or rounding error of the ticket printer) is minimised by making the delivery end at a graduation line.

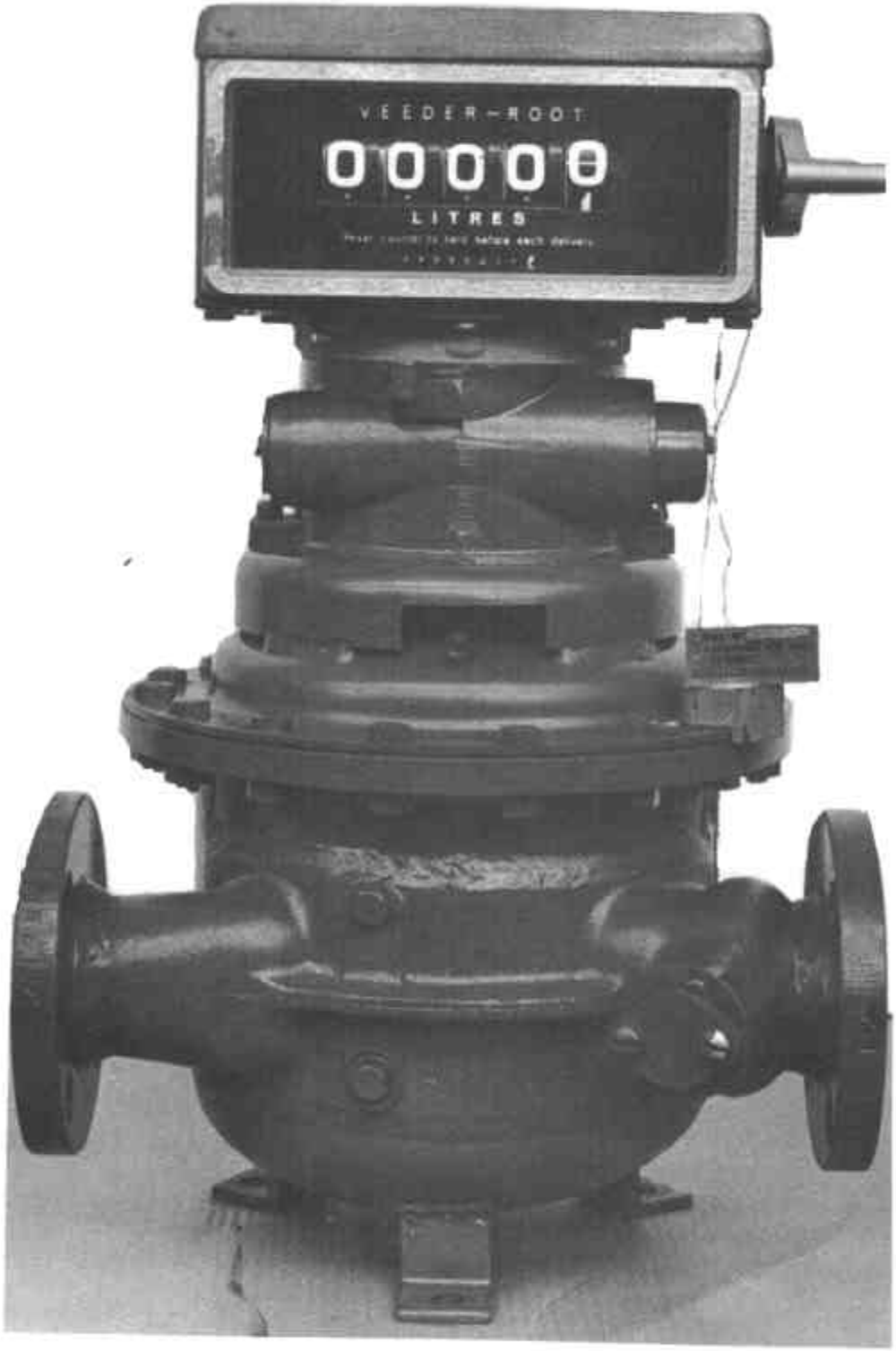
FIGURE 5/6B/48 - 1



Loading-rack Flowmeter — Schematic Diagram

A. O. Smith C Series Meter with VR 7085 Indicator and Ticket Printer, Preset Control and Outlet-control Valve

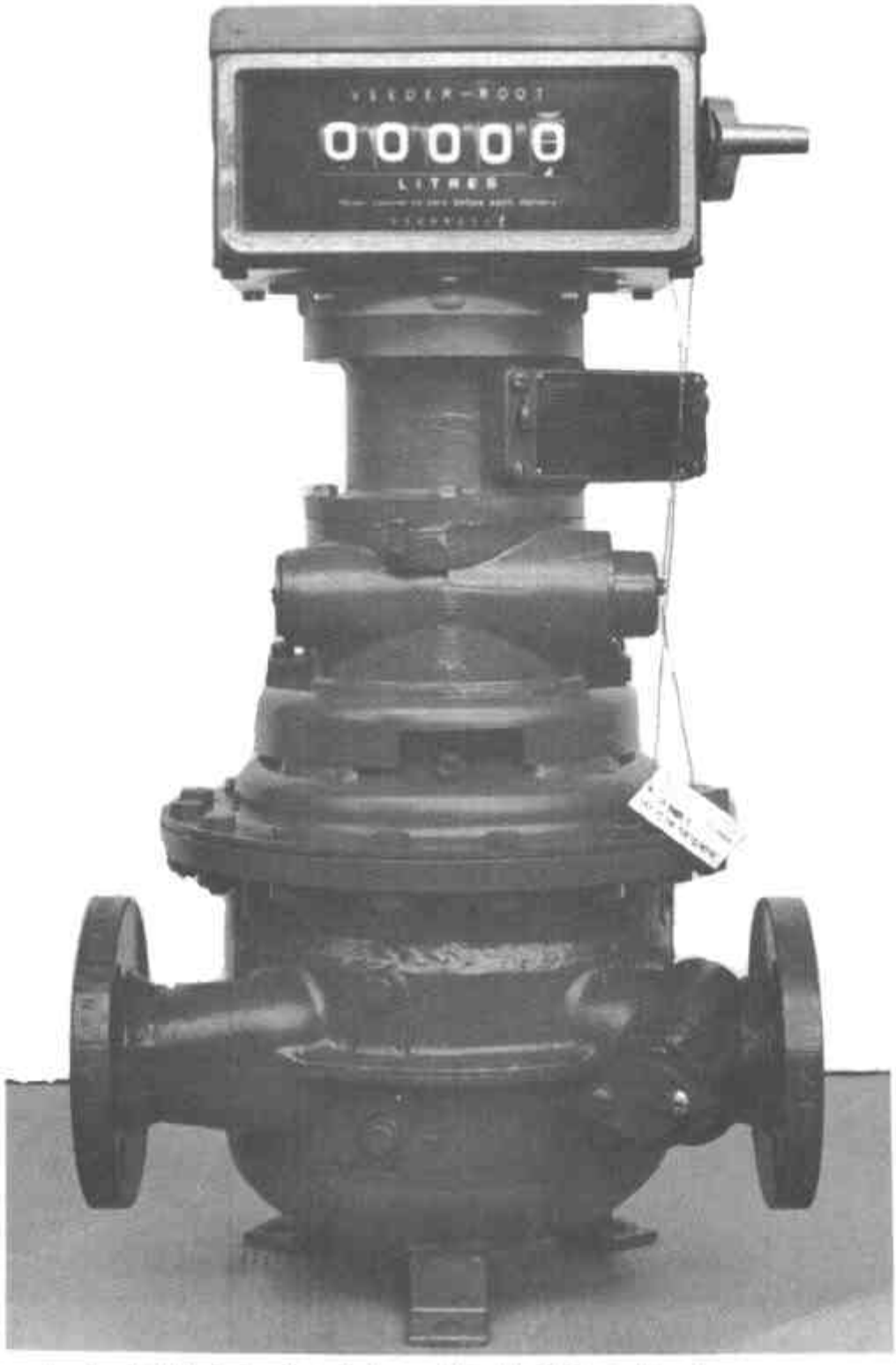
FIGURE 5/6B/48 - 3



A. O. Smith C Series Meter with VR 1624 Indicator

25/7/79

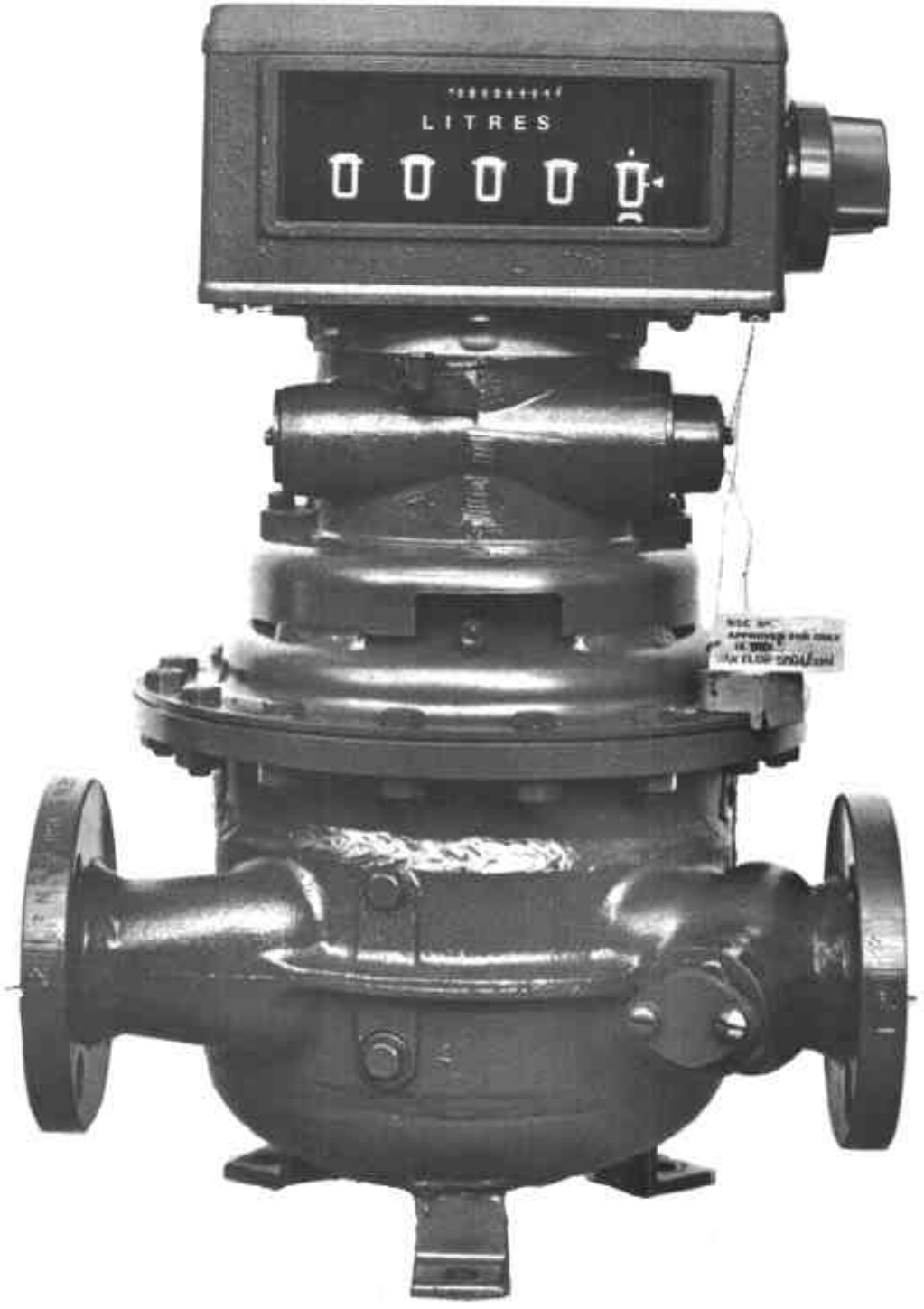
FIGURE 5/6B/48 - 4



A. O. Smith C Series Meter with VR 1624 Indicator
and Pulse Transmitter

25/7/79

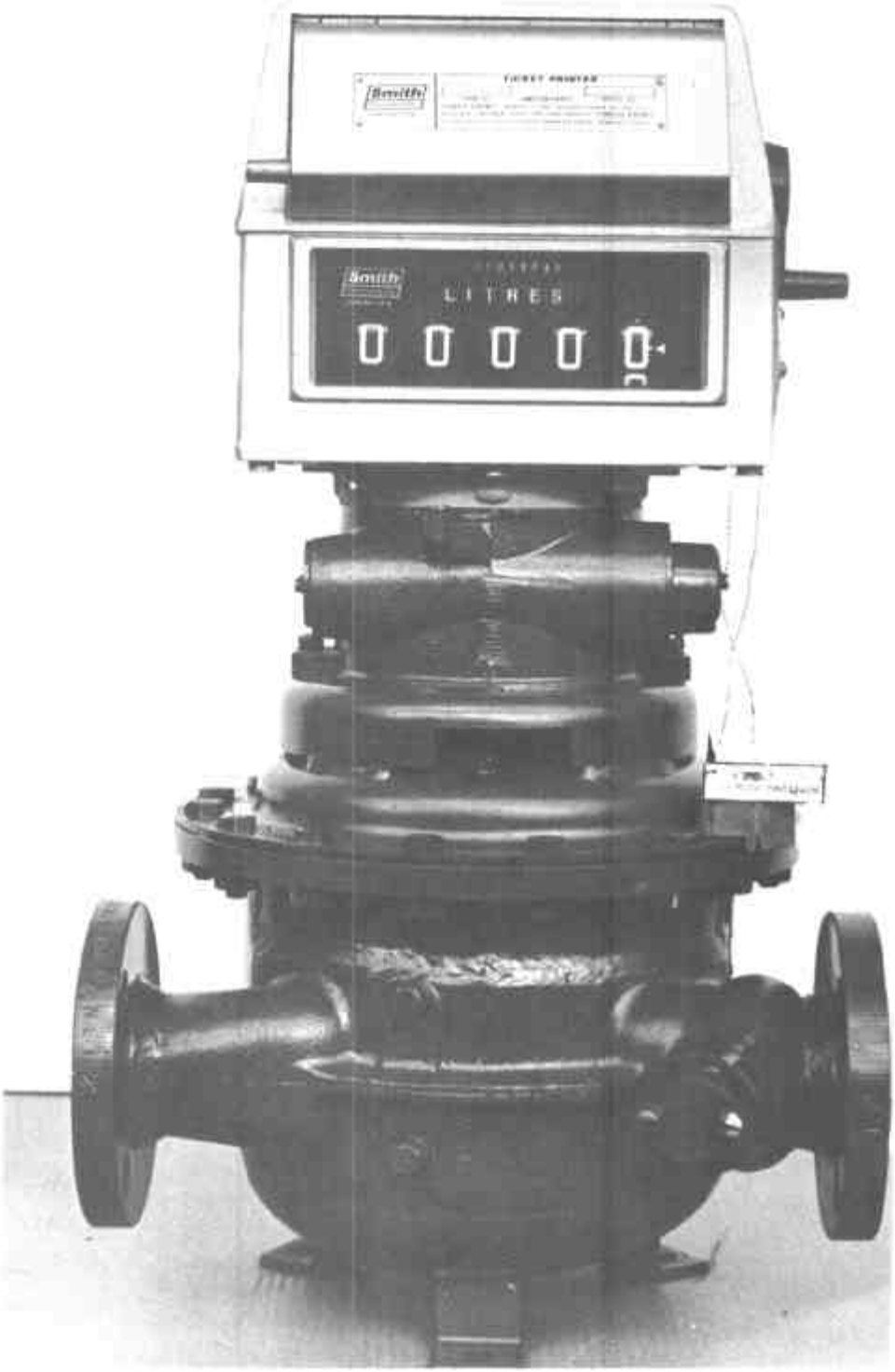
FIGURE 5/6B/48 - 5



A. O. Smith C Series Meter with VR 7887 Indicator

25/7/79

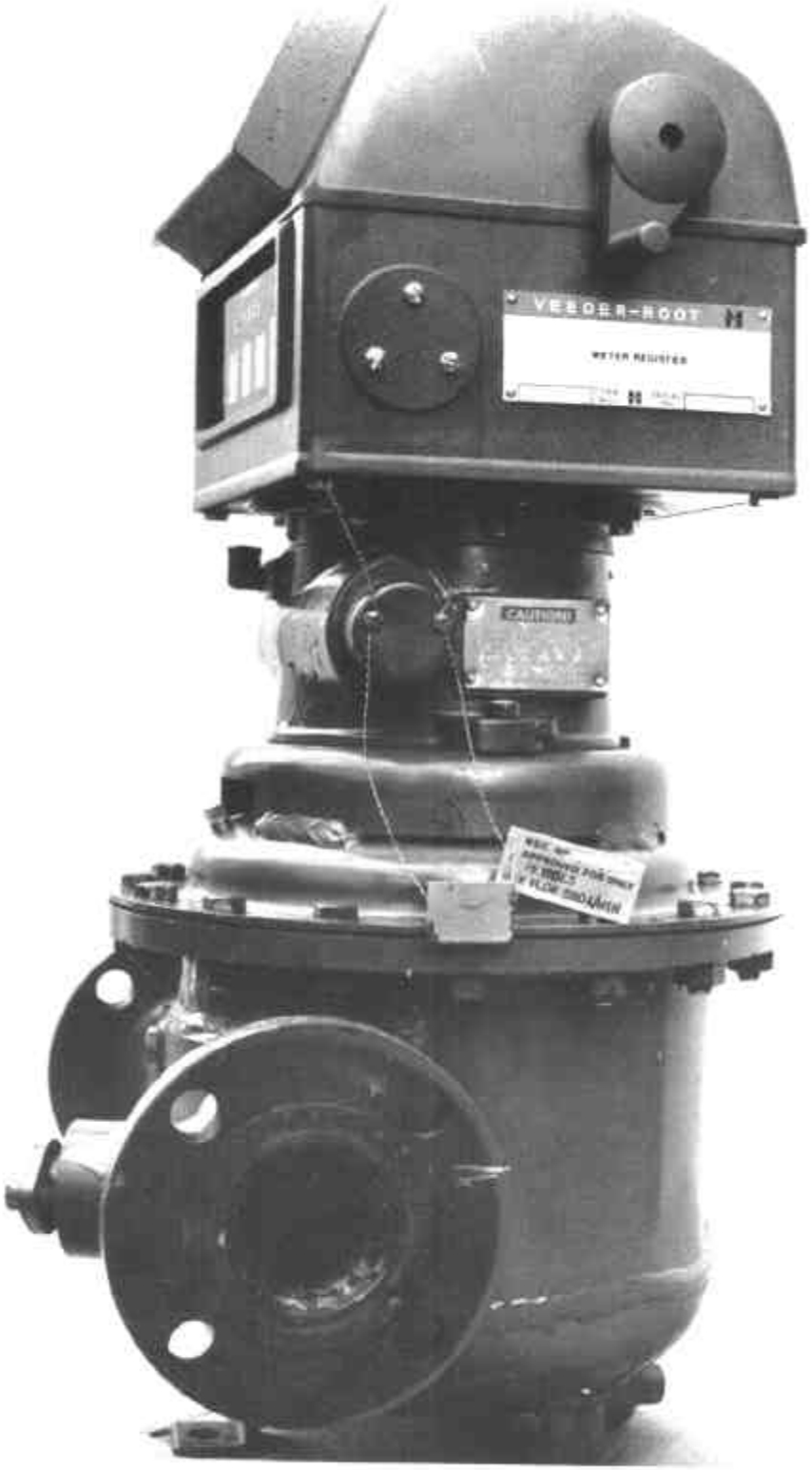
FIGURE 5/6B/48 - 6



A. O. Smith C Series Meter with VR 7890 Indicator and Ticket Printer

25/7/79

FIGURE 5/6B/48 - 7



A. O. Smith C Series Meter showing Sealing

25/7/79