

National Standards Commission



Certificate of Approval

No 5/6B/90

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

Satam Model ZC.17.24/24 Bulk Flowmetering System

submitted by Compac Industries Limited
52 Walls Road
Penrose Auckland New Zealand.

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 1/3/96.
This approval expires in respect of new instruments on 1/3/97.

Instruments purporting to comply with this approval shall be marked NSC No 5/6B/90 and only by persons authorised by the submittor.

The Commission reserves the right to examine any instrument or component of an instrument purporting to comply with this approval.

It is the submittor'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.

DESCRIPTIVE ADVICE

Pattern: approved 30/11/93

- A Satam model ZC.17.24/24 bulk flowmetering system.

Variants: approved 30/11/93

1. As a loading-rack flowmetering system.
2. As a modular flowmetering system.
3. As a bulk flowmetering system using other Satam ZC.17 series flowmeters.
4. With a Veeder-Root VR7889 series preset indicator.

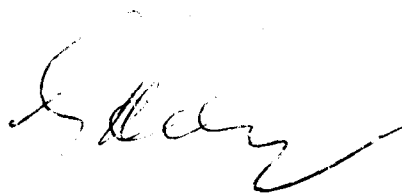
Technical Schedule No 5/6B/90 describes the pattern and variants 1 to 4.

FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No 5/6B/90 dated 31/1/94
Technical Schedule No 5/6B/90 dated 31/1/94 (incl. Table 1 and Test Procedure)
Figures 1 to 5 dated 31/1/94

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 5/6B/90

Pattern: Satam Model ZC.17.24/24 Bulk Flowmetering System.

Submittor: Compac Industries Limited
52 Walls Road
Penrose Auckland New Zealand.

1. Description of Pattern

A bulk flowmetering system using a Satam model ZC.17.24/24 flowmeter which is approved for use with liquid hydrocarbons having a kinematic viscosity between 0.5 and 12.5 mm²/s.

The system shall be used with maximum and minimum flow rates such that the ratio between maximum and minimum does not exceed 5:1, and within the range of 400 L/min to 40 L/min.

The minimum quantity is 100 L.

1.1 Pipeline Flowmetering System (Figure 1)

(i) Supply Tank

A supply tank.

(ii) Pump

A pump of either positive displacement or centrifugal type - in the latter case the pump is 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.

If the pump is not for the exclusive use of the flowmeter the flow rate through the meter must stay within the appropriate flow rate range for all combinations of alternative uses of the pump.

(iii) Non-return Valve

A non-return valve between the pump and the meter or an arrangement of the components and piping to keep the system full of liquid at all times.

(iv) Gas Purger/Strainer

A gas purger/strainer assembly fitted as close as practical to the meter inlet (Figure 2). The gas purger is approved on the condition that the pump is operated under a positive suction head.

The gas purger/strainer assembly may be modified for use as a strainer only where the tank has automatic alarming of low-liquid level, or has a float-operated shut-off valve in the pump supply, or has other means to prevent gas entering the system.

(v) Meter

A Satam model ZC.17.24/24 flowmeter (Figure 2 and Table 1). Provision shall be made for a pressure gauge to be connected downstream of the meter.

(vi) Indicating System

Any combination of the following assemblies:

- (a) A Veeder-Root 7887 series zero start indicator.
- (b) A Veeder-Root VR7890 series indicator/printer.
- (c) A rigid extension drive from the meter to the indicator.
- (d) Any compatible Commission-approved pulse generator, electronic bulk flowmeter controller/indicator (which may incorporate a volume conversion for temperature device), and flow control valve.

NOTE: Where systems include a pulse generator and electronic indicator, the pulse generator shall be driven directly from the output shaft of the meter; it shall not be driven via a mechanical indicator nor via reduction gear trains.

The use of a right-angled drive would be considered as direct as long as the drive consists of two bevel gears with a 1:1 ratio and provided the right-angled drive is before the drive to any mechanical indicator.

Where the pulse generator is not driven directly, any electronic indicator connected to it shall be marked NOT IN USE FOR TRADE.

(vii) Transfer Device

A transfer device in the form of a positive shut-off component such as a manually or automatically-operated control valve located downstream of the meter with no intermediate outlet.

1.2 Sealing and Verification Provision

Provision is made for sealing the indicator or indicator/ticket printer, and the calibration device of the meter.

Provision is also made for a verification mark to be applied.

1.3 Markings

Instruments are marked with the following minimum data, together in the one location:

Manufacturer's name or mark	
Meter model	
Serial number	
NSC approval number	5/6B/90
Maximum flow rate L/min
Minimum flow rate L/min
Minimum quantity L
Type of liquid for which the meter is verified #
Maximum operating pressure kPa

May be located separately, e.g. on a metal tag sealed to the instrument.

2. Description of Variants

2.1 Variant 1

As a loading-rack flowmetering system (Figure 3) which is similar to the pipeline system except that the control valve is installed at or upstream of the transfer device, which is one of the following:

- (i) Top-loading arrangement - the highest point of the pipework forms a weir at a fixed level from which the delivery pipe drains to the outlet for all configurations of the hose or loading arm whilst in operation. A syphon breaker is installed to ensure complete draining of the pipework downstream of the weir.

Alternatively, an anti-drain valve which retains a pressure of not less than 55 kPa may be installed at the delivery point of the pipework or hose; or

- (ii) Bottom-loading arrangement - a dry-break coupling located at the delivery point of the pipework or hose.

2.2 Variant 2

As a modular flowmetering system (Figure 4) which is similar to the pipeline and loading-rack systems, except that it is a module of metering components in its own assembly rather than built into another structure. It may be portable, including being vehicle-mounted.

The system consists of a gas purger/strainer, a meter and a transfer device. It may contain the pump, together with a pressure control valve (if necessary), and a hose reel; in the latter case, the transfer device is in the form of either a nozzle or dry-break coupling at the end of a flexible hose.

The pump is located lower than the minimum height of the liquid in the supply tank. A non-return valve is located between the pump and the meter, or the components and piping are arranged to keep the system full of liquid at all times.

Any nozzle used shall have an integral outlet control valve. If fitted with an integral anti-drain valve, the valve shall be immediately before the outlet control valve. A separate anti-drain valve may be fitted to the nozzle end of the hose if an integral anti-drain valve is not part of the nozzle. The anti-drain valve retaining pressure shall be not less than 55 kPa.

2.3 Variant 3

A bulk flowmetering system using any Satam ZC.17 series flowmeter listed in Table 1, used with maximum and minimum flow rates such that the ratio between maximum and minimum does not exceed 5:1, within the flow rate ranges as listed in the Table.

Figure 5 shows a model ZC.17.80/80 meter.

TABLE 1

Meter Model	No. of Capsules	Pipeline Size mm (inch)	Flow Rate L/min		Minimum Quantity L
			Maximum	Minimum	
ZC.17.24/24	Single	51 (2.0)	400	40	100
ZC.17.24/48	Single	51 (2.0)	800	80	200
ZC.17.80/80	Single	76 (3.0)	1330	130	300
ZC.17.80/150	Double	102 (4.0)	2500	250	500
ZC.17.80/250	Triple	152 (6.0)	4100	410	1000

Approved Models and Capacities

2.4 Variant 4

The pattern with a Veeder-Root VR7889 series preset indicator, in which case a flow control valve shall be fitted to ensure that the instrument operates with maximum and minimum flow rates such that the ratio between maximum and minimum does not exceed 3:1, and within the flow rate range given in Table 1 for the model of meter used.

Such instruments may be marked with the nominal operating flow rate instead of the maximum and minimum flow rates.

Instruments may also be fitted with a compatible Commission-approved pulse generator and electronic bulk flowmeter controller/indicator within the conditions described in clause 1.1 (vi) (d) for the pattern.

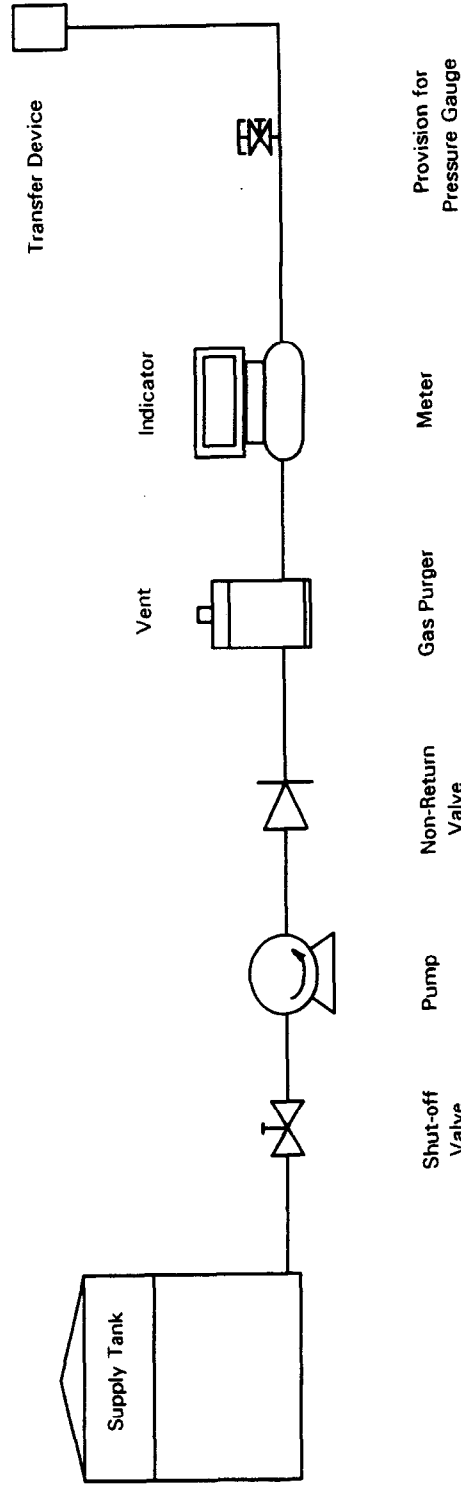
TEST PROCEDURE

Instruments should be tested in accordance with the Inspector's Handbook using the liquid with which they will be used and which is marked on the data plate.

Maximum Permissible Errors at Verification/Certification

The maximum permissible error applied during a verification test from normal flow rate to the minimum flow rate specified in the Certificate of Approval or Technical Schedule is $\pm 0.3\%$.

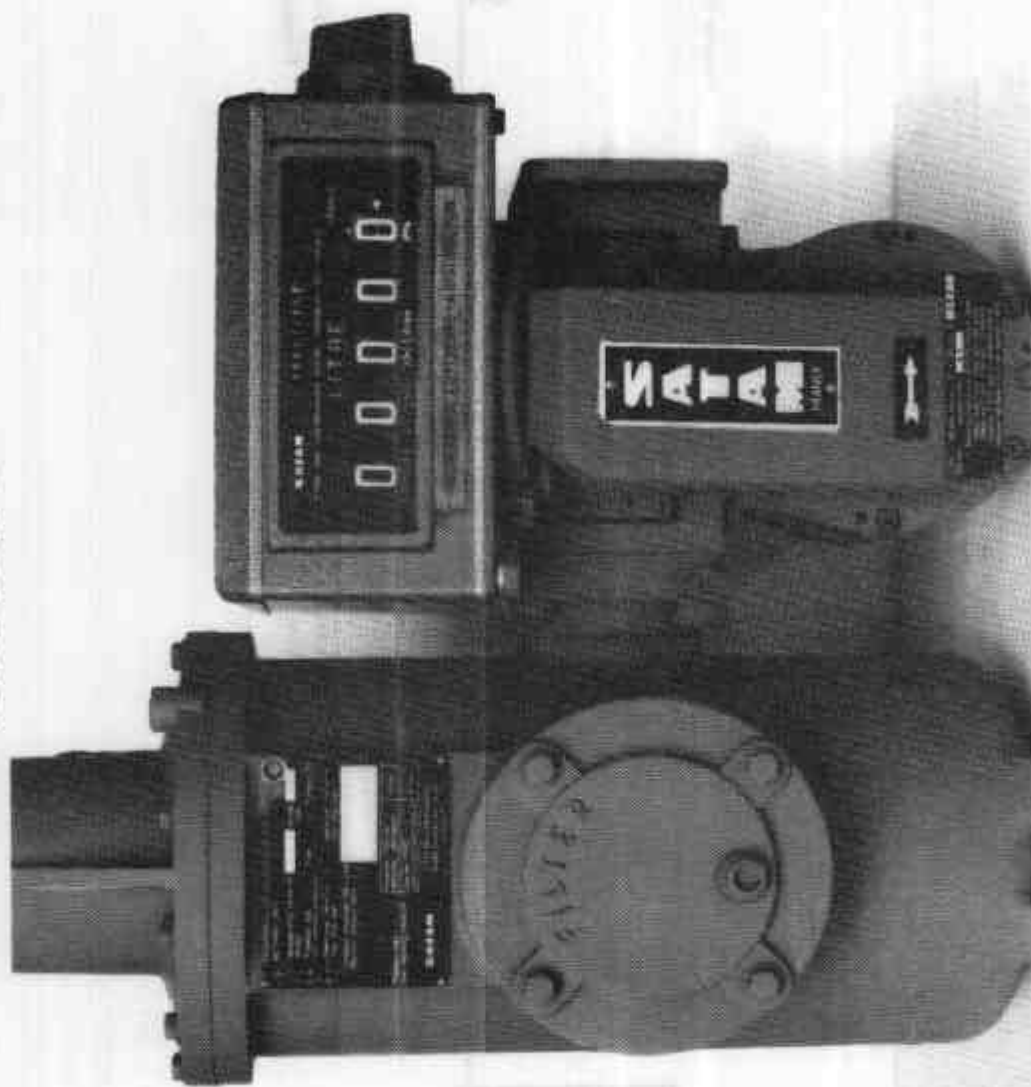
FIGURE 5/6B/90 - 1



Typical Pipeline Flowmetering System

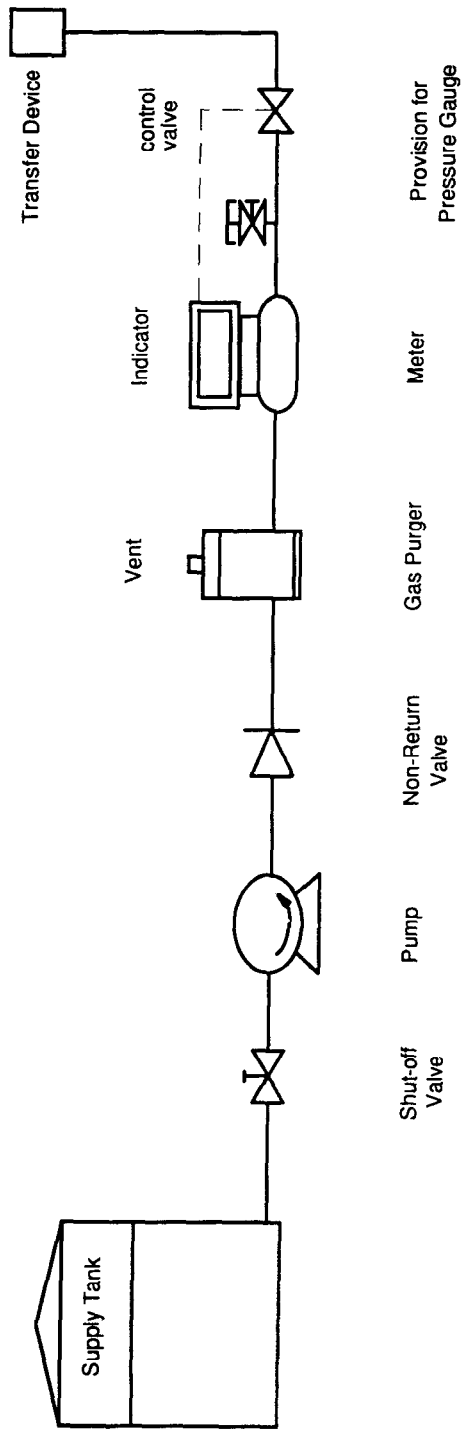
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FIGURE 5/6B/90 - 2



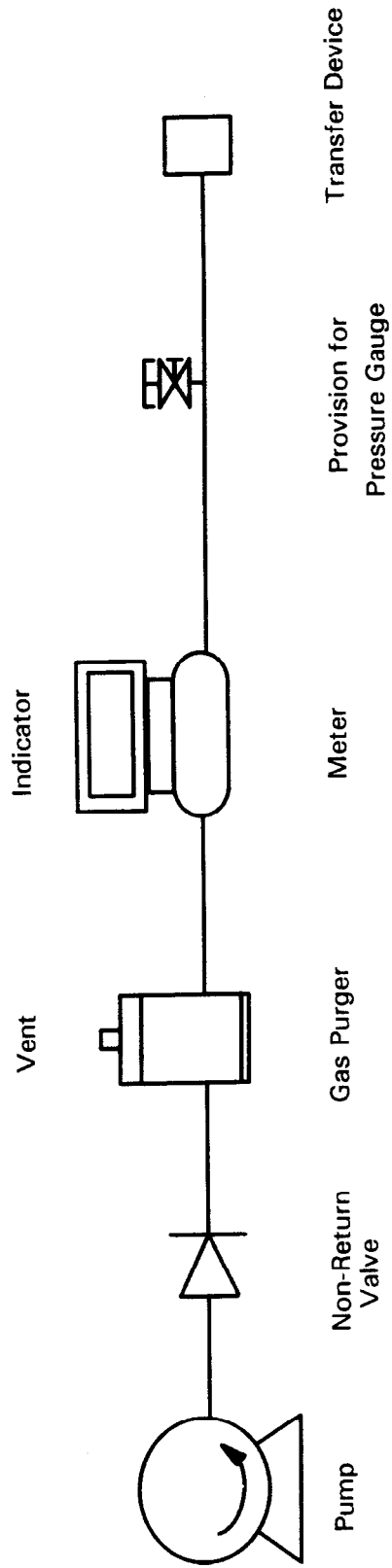
Satam Model ZC.17.24/24 Flowmeter

FIGURE 5/6B/90 - 3



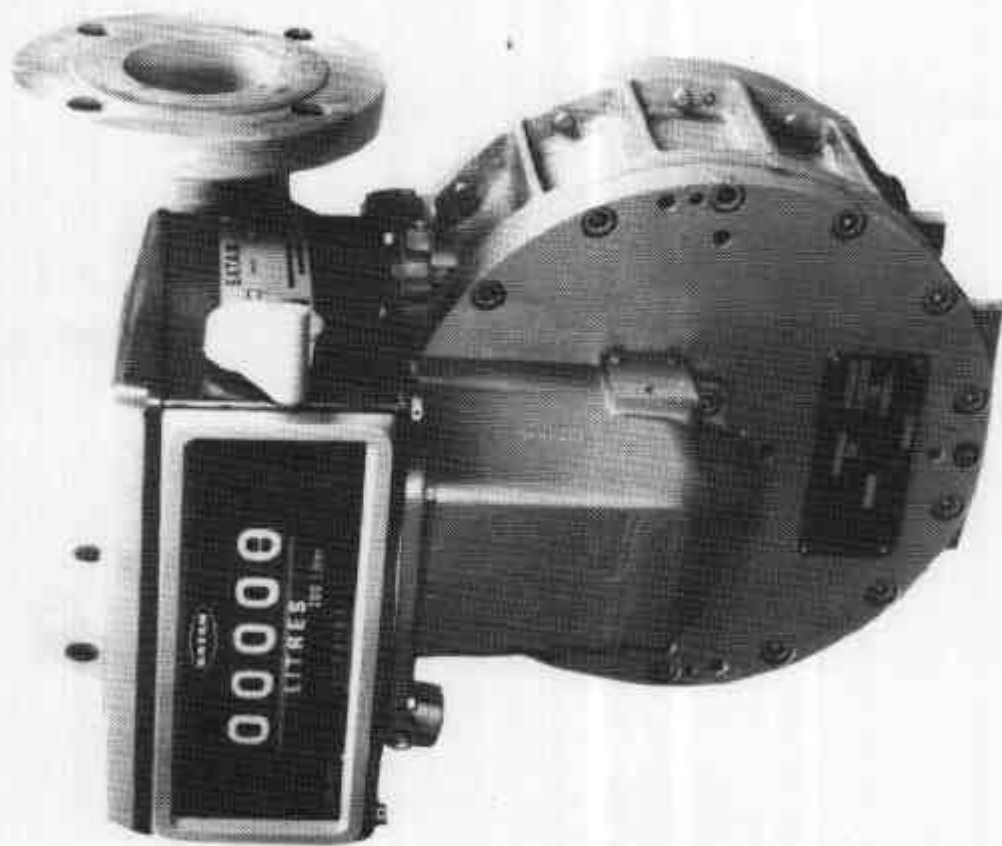
Typical Loading-rack Flowmetering System

FIGURE 5/6B/90 - 4



Typical Modular Flowmetering System

FIGURE 5/6B/90 - 5



Satam Model ZC.17.80/80 Flowmeter