

National Standards Commission



Certificate of Approval

No 5/6B/78A

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

Liquid Controls Model MSA-75-C-1 Bulk Flowmetering System

submitted by Emco Wheaton (Australia) Pty Ltd
145 Heidelberg Road
Northcote VIC 3130.

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.

This Certificate is issued upon completion of reviews of NSC approvals Nos 5/6B/14, 5/6B/22, 5/6B/23, 5/6B/24, 5/6B/25, 5/6B/43, 5/6B/44, 5/6B/56, 5/6B/58, P5/6B/60, 5/6B/64, 5/6B/75, 5/6B/78, 5/6D/14, 5/6D/15, 5/6D/25, 5/6H/12 and 5/6H/13.

CONDITIONS OF APPROVAL

This approval is subject to review on or after 1/8/98.
This approval expires in respect of new instruments on 1/8/99.

Instruments purporting to comply with this approval shall be marked NSC No 5/6B/78A and only by persons authorised by the submittor.

It is the submitter'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.

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

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0/A.

Special: (for Provisional variant 6)

This approval is subject to review on or after 1/8/94.

This approval expires in respect of new instruments on 1/8/95.

Instruments purporting to comply with this approval shall be marked NSC No P5/6B/78A and only by persons authorised by the submitter.

This approval allows instruments to be used with herbicides or pesticides. Prior written approval from the Commission is required for use with other liquids.

The submitter is to provide the Commission with copies of the results of all verification/certification tests.

In the event of suitable results not being received, this approval may be withdrawn.

DESCRIPTIVE ADVICE

Pattern: approved 27/7/93

- . A bulk flowmetering system using a Liquid Controls model MSA-75-C-1 flowmeter which is approved for use with liquid hydrocarbons having a kinematic viscosity between 0.5 and 12.5 mm²/s.

Variants: approved 27/7/93

1. As a loading-rack flowmetering system.
2. As a modular flowmetering system.
3. As a drum-filling flowmetering system.

Variants: approved 27/7/93

4. As a bulk flowmetering system using other Liquid Controls flowmeters.
5. For use with liquid hydrocarbons having a kinematic viscosity between 12.5 and 1450 mm²/s.

Variant: provisionally approved 27/7/93

6. For use with certain non-hydrocarbon liquids having a kinematic viscosity between 0.5 and 1450 mm²/s.

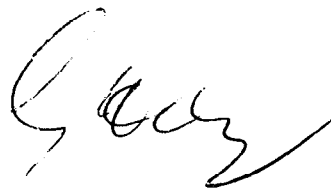
Technical Schedule No 5/6B/78A describes the pattern and variants 1 to 6.

FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No 5/6B/78A dated 1/10/93
Technical Schedule No 5/6B/78A dated 1/10/93 (incl. Table 1 and Test
Procedure)
Figures 1 to 6 dated 1/10/93

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/78A

Pattern: Liquid Controls Model MSA-75-C-1 Bulk Flowmetering System.

Submittor: Emco Wheaton (Australia) Pty Ltd
145 Heidelberg Road
Northcote VIC 3130.

1. Description of Pattern

A bulk flowmetering system using a Liquid Controls model MSA-75-C-1 flowmeter which is approved for use with liquid hydrocarbons having a kinematic viscosity range between 0.5 and 12.5 mm²/s.

The system is approved with maximum and minimum flow rates of 2650 L/min and 530 L/min respectively and only when used with the pressure at the meter above 130 kPa. The minimum quantity is 1000 litres.

1.1 Pipeline Flowmetering System (Figure 1)

The system includes the components listed below.

(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 Liquid Controls model MSA-75-C-1 flowmeter (Figure 2). 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 1624 series or 7887 series zero start indicator.
- (b) A Veeder-Root 7085 series or 7890 series zero-start indicator (Figure 2) with ticket printer.
- (c) A Liquid Controls D41** series or a Veeder-Root 7889 series preset counter with a Liquid Controls preset-counter-operated outlet-control valve; a pressure relief pipe may be fitted between the valve and the gas purger/strainer. The preset counter is marked PRESET INDICATION NOT IN USE FOR TRADE.

(**) Approved models have a 30, 40, 50 or 60 suffix.
- (d) A rigid extension drive from the meter to the indicator and ticket printer.
- (e) 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 Markings

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

Manufacturer's name or mark	
Meter model	
Serial number	
NSC approval number	5/6B/78A
Maximum flow rate L/min
Minimum flow rate L/min
Nominal flow rate	(when flow rate is within ±5% of nominal) L/min
Minimum quantity L
Type of liquid for which the meter is verified
Maximum operating pressure kPa

In addition, preset counters (other than those complying with clause **2.3 Variant 3**) shall be marked PRESET INDICATION NOT IN USE FOR TRADE.

1.3 Sealing and Verification/Certification Provision

Provision is made for sealing the calibration device of the meter.

Provision is made for a verification/certification mark to be applied.

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

As a drum-filling flowmetering system (Figure 5) which is similar to the pipeline and loading-rack systems except for the following:

- (i) The system uses either a Liquid Controls model M-5 (*) flowmeter (Figure 6) which is approved for use at maximum and minimum flow rates of 230 L/min and 46 L/min respectively, or a Liquid Controls model M-7 (*) flowmeter which is approved for use at maximum and minimum flow rates of 380 L/min and 76 L/min respectively.

NOTE: (*) Abbreviated model number - refer to Table 1 and its footnotes.

- (ii) The meter is fitted with a Liquid Controls A2600 series preset control valve, a modified Veeder-Root 7887 or 7889 series preset counter and an outlet control valve with integral anti-drain valve. The valve may be closed manually or by the counter. A pressure relief pipe may be fitted between the valve and the gas purger/strainer.

The indicator is approved to repeat fixed deliveries of either 60, 200 or 205 litres, and is marked PRESET FOR BATCHES '# LITRES or BATCHES '# LITRES (where '#' equals one of the approved preset quantities). **Only the model M-5 flowmeter shall be used for batches of 60 litres.**

Unlike the pattern, the preset counter of this variant need NOT be marked PRESET INDICATION NOT IN USE FOR TRADE.

- (iii) The system is arranged such that the meter operates at a constant flow rate ($\pm 5\%$ of nominal) within the maximum and minimum flow rate range.
- (iv) The outlet is either a drum-filling spear or a hose. If a spear is used, it is arranged to fully drain after each delivery so that the control valve is the transfer device. If a hose is used, it is fitted with a Commission-approved nozzle which has an anti-drain valve installed either in the nozzle or immediately before it, and having a retaining pressure of not less than 55 kPa; the nozzle is the transfer device.

2.4 Variant 4

A bulk flowmetering system using any Liquid Controls flowmeter listed in Table 1. Only models M-5 (*) and M-7 (*) are approved for drum-filling systems.

TABLE 1

Meter Model	Flow Rate (L/min)		Minimum Quantity (L)
	Maximum	Minimum	
M-5 (*)	230	46	50
M-7 (*)	380	76	100
M-10 (*)	550	110	200
M-15 (*)	760	152	200
M-25 (*)	950	190	200
M-30 (*)	1325	265	300
M-40 (*)	1700	340	500
M-60 (*)	2275	455	1000
M-75 (*)	2650	530	1000
M-80 (*)	3025	605	1000
M-120 (*)	3785	757	1000

NOTE: (*) The meter models listed in Table 1 are the basic model numbers only - the full model numbers may have a variety of additional alphanumeric characters, e.g. the full model number of the pattern is MSA-75-C-1, where:

- 'M' designates meter.
- 'S' designates steel case; "blank" if other than steel.
- 'A' designates working pressure; may be 'AA', 'A', 'B', 'C' or "blank".
- '75' designates the capacity of the meter; other capacities are listed in Table 1.
- 'C' designates accessory combinations fitted to the meter, e.g. preset valve, air eliminator, printer, etc; may be any character 'A' to 'Z'.
- '1' designates the material of the measuring element; may be from '1' to '37'.

2.5 Variant 5

For use with liquids having a kinematic viscosity range between 12.5 and 1450 mm²/s.

2.6 Variant 6

For use with certain non-hydrocarbon liquids having a kinematic viscosity range between 0.5 and 1450 mm²/s.

NOTE: This approval allows instruments to be used with herbicides or pesticides. Prior written approval from the Commission is required for use with other liquids.

TEST PROCEDURE

Instruments should be tested in accordance with the Inspector's Handbook using the product with which they will be used and which is marked on the data plate. Tests should be conducted in conjunction with any tests specified in the approval documentation for any indicator and/or conversion device, etc. used.

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 $\pm 0.3\%$.

Where an instrument is fitted with a device to convert the registered volume to volume at reference conditions, the maximum permissible error specified above is increased by 0.2%. Reference conditions for petroleum liquids are specified in Australian Standard 2649 - 1983, *Petroleum Liquids and Gases - Measurement - Standard Reference Conditions*.

5/6B/78A
31 August 1995

National Standards Commission



NOTIFICATION OF CHANGE

CERTIFICATE OF APPROVAL No 5/6B/78A

CHANGE No 1

The following changes are made to the approval documentation for the

Liquid Controls Model MSA-75-C-1 Bulk Flowmetering System.

submitted by Emco Wheaton (Australia) Pty Ltd
145 Heidelberg Road
Northcote VIC 3070.

In Certificate of Approval No 5/6B/78A dated 1 October 1993, the Special Condition of Approval referring to the expiry of the approval of Provisional variant 6, should be amended to now read:

"This approval expires in respect of new instruments on 1 February 1996."

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.

A handwritten signature in black ink, appearing to read 'J. Burch'. The signature is written in a cursive style with a large initial 'J'.

National Standards Commission



NOTIFICATION OF CHANGE
CERTIFICATE OF APPROVAL No 5/6B/78A
CHANGE No 2

The following changes are made to the approval documentation for the

Liquid Controls Model MSA-75-C-1 Bulk Flowmetering System.

submitted by Emco Wheaton (Australia) Pty Ltd
145 Heidelberg Road
Northcote VIC 3070.

The Provisional status of Variant 6 has now been removed and Certificate of Approval No 5/6B/78A dated 1 October 1993 should be amended as follows:

1. The **Special Conditions of Approval** for Provisional Variant 6 should be deleted.
2. The **Descriptive Advice** for Variant 6 should be amended to read as follows:

"Variant: provisionally approved 27/7/93
approved 13 April 1996"

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.

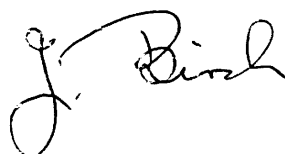
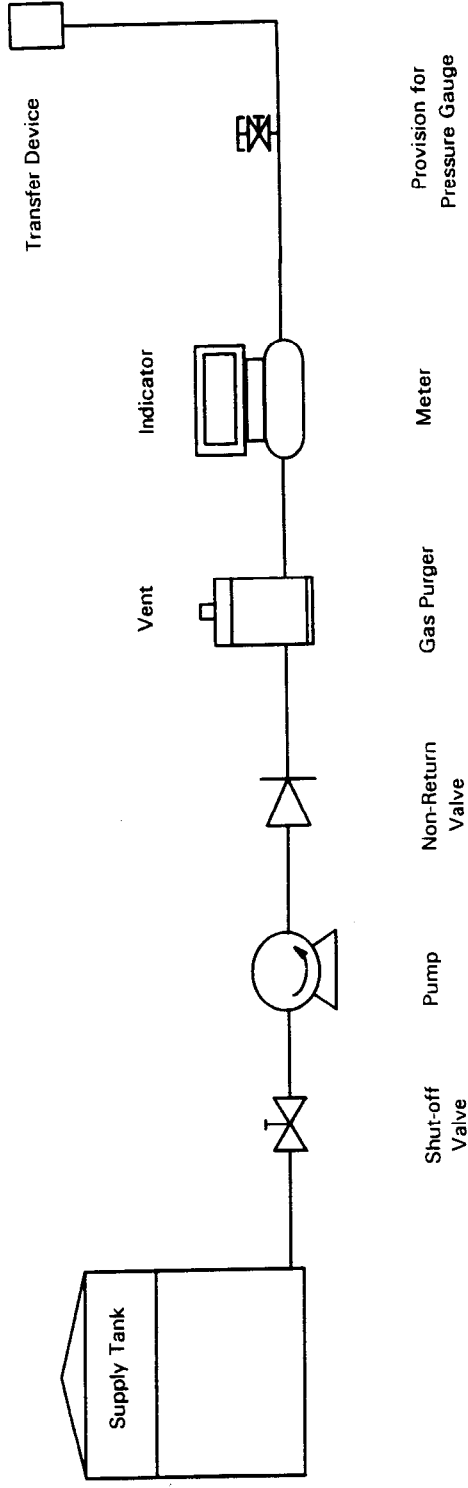
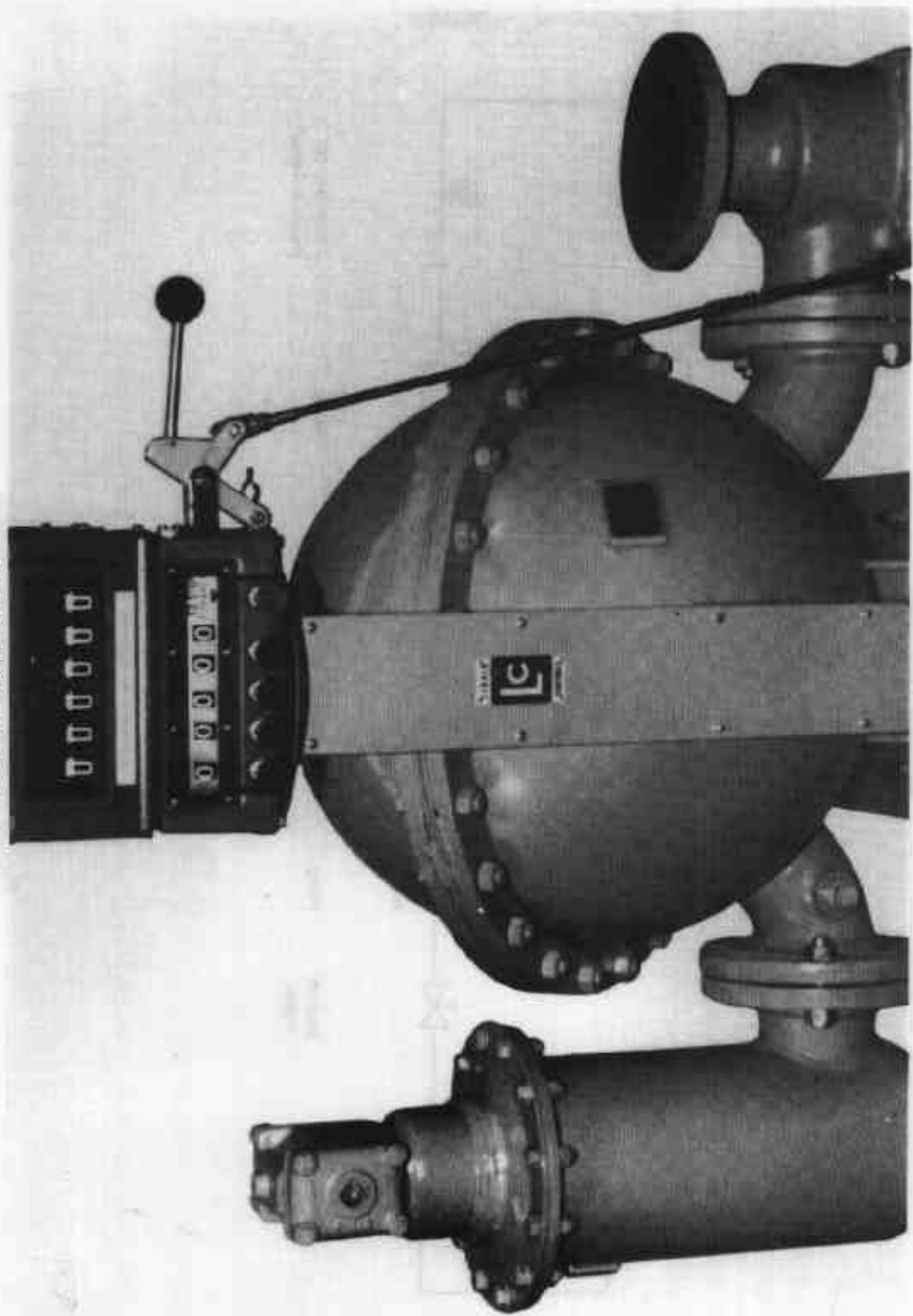


FIGURE 5/6B/78A - 1



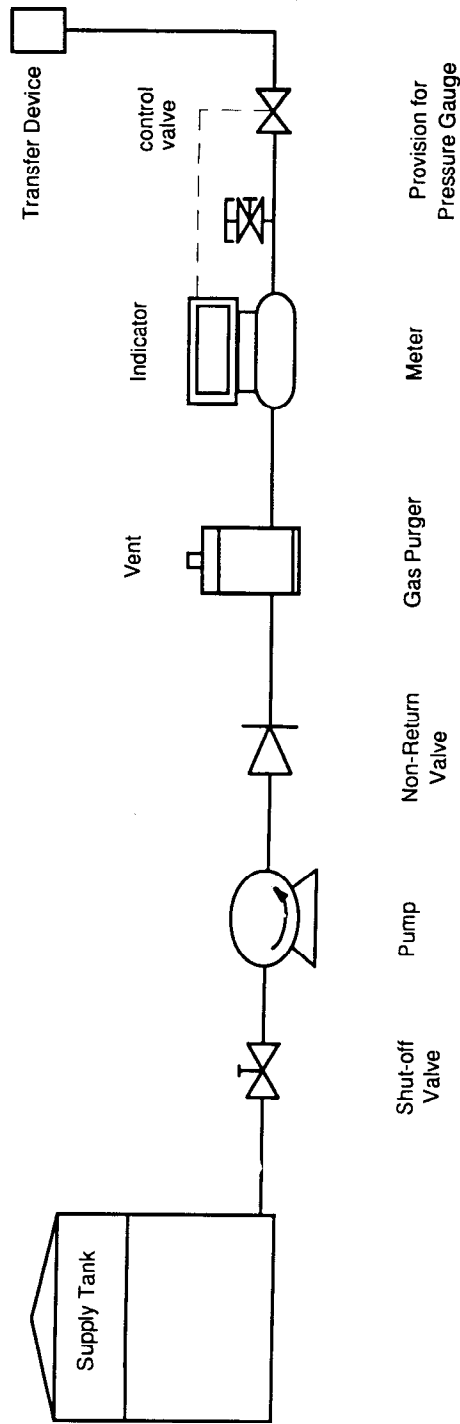
Typical Pipeline Flowmetering System

FIGURE 5/6B/78A - 2



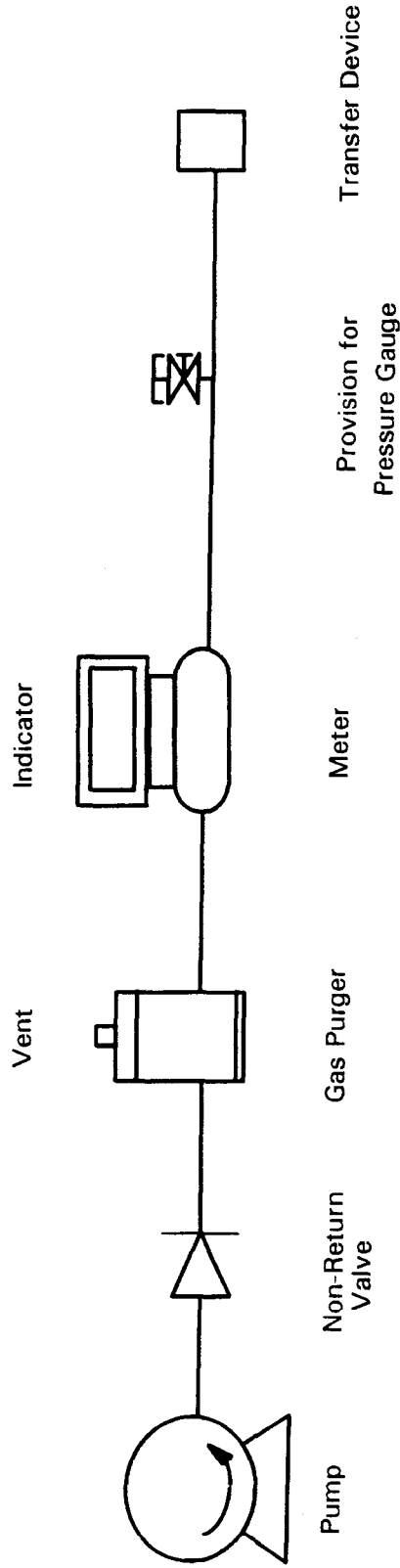
LC Controls Model MSA-75-C-1 Flowmeter

FIGURE 5/6B/78A - 3



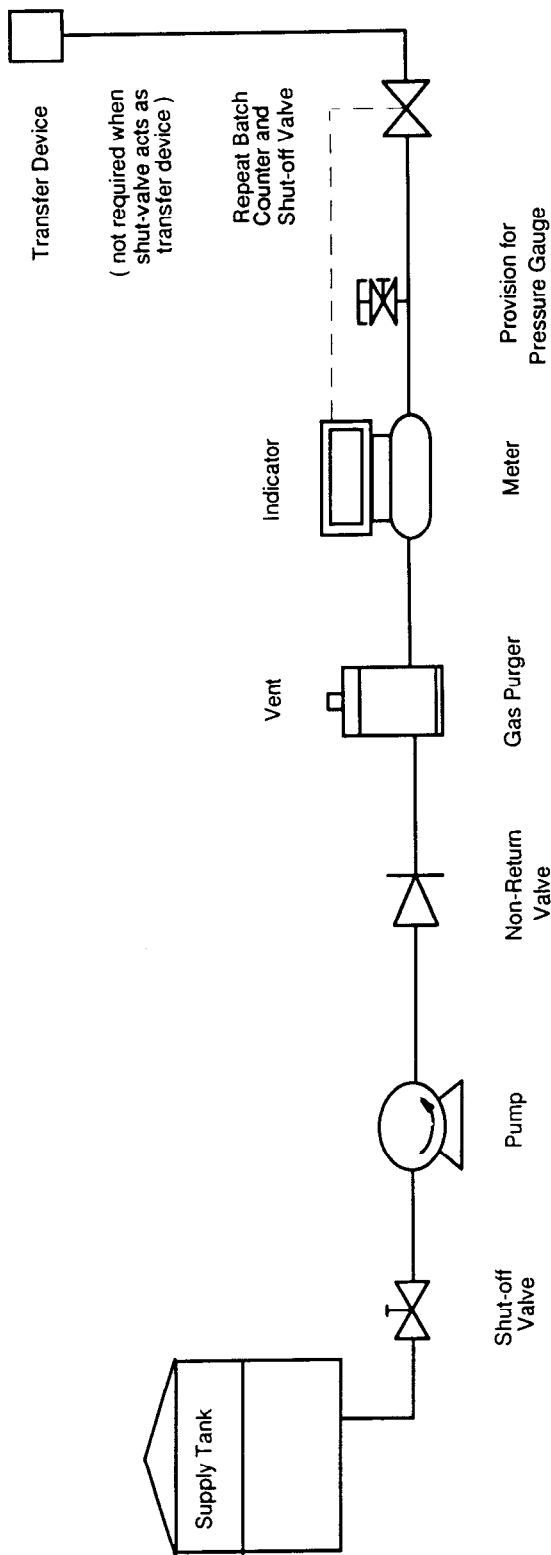
Typical Loading-rack Flowmetering System

FIGURE 5/6B/78A - 4



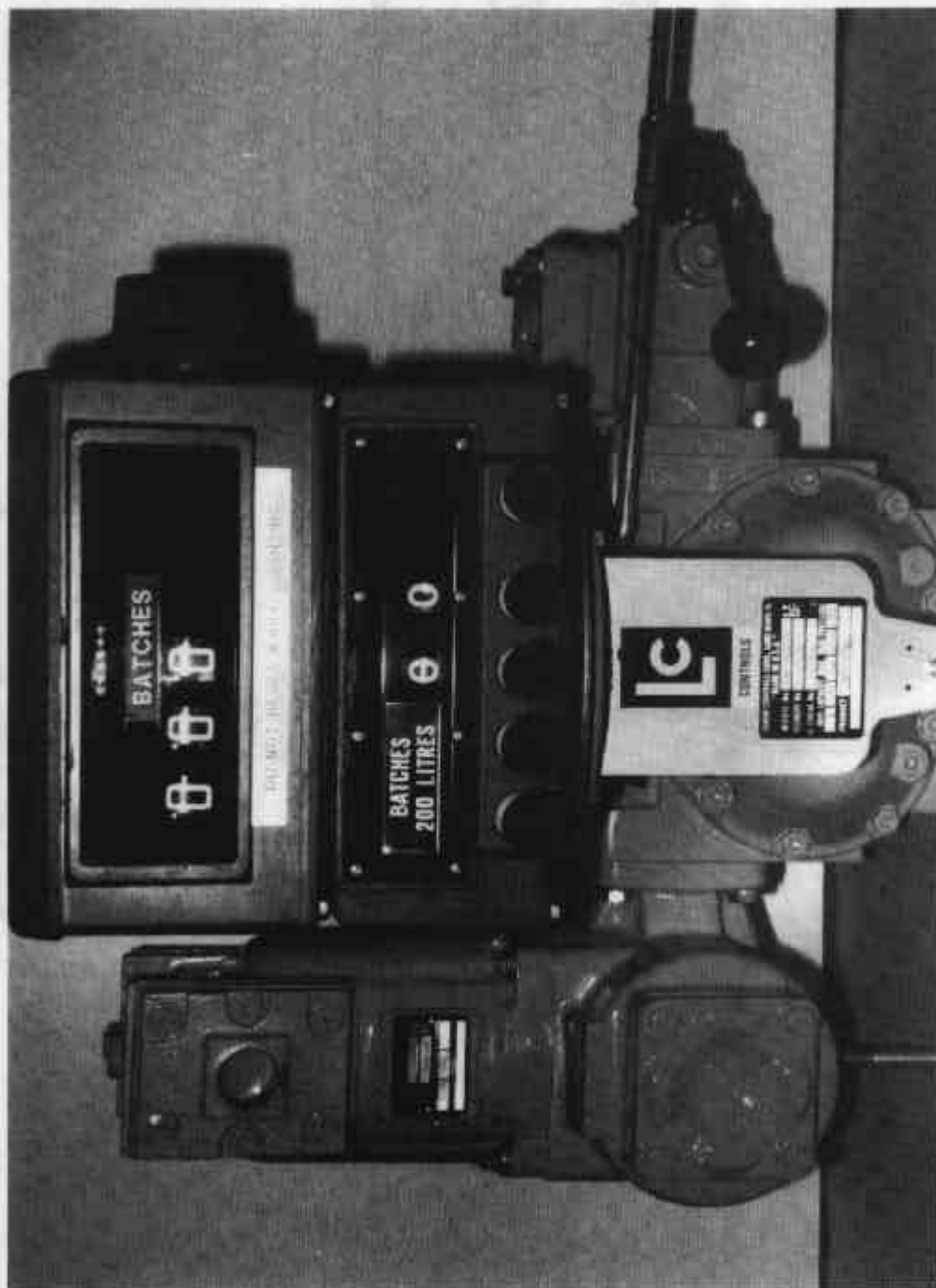
Typical Modular Flowmetering System

FIGURE 5/6B/78A - 5



Typical Drum-filling Flowmetering System

FIGURE 5/6B/78A - 6



Liquid Controls Model M-5 Drum-filling Flowmeter.