

# National Standards Commission



## Certificate of Approval No 5/6B/75

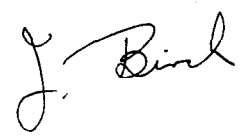
Issued under Regulation 9  
of the  
National Measurement (Patterns of Instruments) Regulations

This is to certify that an approval for use for trade has been granted in respect of the

Liquid Controls Model MS-120 CX-1 Bulk Flowmetering System

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

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.



CONDITIONS OF APPROVAL

This approval (other than for Provisional variant 1) is subject to review on or after 1/6/92.

This approval (other than for Provisional variant 1) expires in respect of new instruments on 1/6/93.

Instruments purporting to comply with this approval shall be marked NSC No 5/6B/75 and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the drawings and specifications 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.

Special: (for provisional variant 1)

The approval of provisional variant 1 expired in respect of new instruments on 1/6/89; the following Conditions refer to instruments installed before that date.

Instruments purporting to comply with the provisional variant shall be marked NSC No P5/6B/75 and only by persons authorised by the submittor.

Instruments installed under this approval are to be tested at six-monthly intervals. Such tests are to be arranged by the submittor and supervised by the State Weights and Measures Authority; the results are to be sent to the Commission.

In the event of unsatisfactory performance or of suitable test results not being received by the Commission, this approval may be withdrawn.

DESCRIPTIVE ADVICE

Pattern: approved 12/5/87

- . A Liquid Controls model MS-120 CX-1 bulk flowmetering system.

Variant: provisionally approved 12/5/87 - expired 1/6/89

1. With a maximum flow rate of 3600 L/min.

Technical Schedule No 5/6B/75 describes the pattern and provisional variant 1.

Variant: provisionally approved 28/6/88 - approved 22/11/89

2. With a model MS30-N-1 flowmeter.

Technical Schedule No 5/6B/75 Variation No 1 describes variant 2.

Variant: approved 22/11/89

3. With a model M30-G-2 flowmeter.

Technical Schedule No 5/6B/75 Variation No 2 describes variant 3.

FILING ADVICE

Certificate of Approval No 5/6B/75 dated 7/10/88 is superseded by this Certificate and may be destroyed.

Notification of Change

The Provisional status of Variant 2 has now been removed, and the reference to "Provisional" in Technical Schedule No 5/6B/75 Variation No 1 dated 7/10/88 should be deleted.

The documentation for this approval now comprises:

- Certificate of Approval No 5/6B/75 dated 6/4/90
- Technical Schedule No 5/6B/75 dated 16/10/87
- Technical Schedule No 5/6B/75 Variation No 1 dated 7/10/88
- Technical Schedule No 5/6B/75 Variation No 2 dated 6/4/90
- Test Procedure No 5/6B/75 dated 16/10/87
- Figures 1 to 3 dated 16/10/87



# NATIONAL STANDARDS COMMISSION

5/6B/75  
16/10/87

## TECHNICAL SCHEDULE No 5/6B/75

Pattern: Liquid Controls Model MS-120 CX-1 Bulk Flowmetering System

Submittor: Emco Wheaton (Australia) Pty Ltd  
145 Heidelberg Road  
Northcote Victoria 3070.

### 1. Description of Pattern

A bulk flowmetering system using a Liquid Controls model MS-120 CX-1 flowmeter (Figure 1) which is approved for use with liquids having a viscosity range of 0.4 to 10 mPa.s at maximum and minimum flow rates of 2200 L/min and 600 L/min, respectively.

#### 1.1 Pipeline Flowmetering System (Figure 2)

The system comprises:

- i) A supply tank, including vehicle-mounted tanks.
- ii) 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) 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) A Liquid Controls model MS-120 CX-1 flowmeter with a model FS-6 strainer and model A-8170 gas purger (Figures 1 and 3). Provision is made for a pressure gauge to be connected downstream of the meter.
- v) A combination of the following assemblies:
  - (a) A Veeder-Root VR788700 zero start indicator with or without (c).
  - (b) A Veeder-Root VR789000 indicator/printer with or without (c).
  - (c) Liquid Controls model D-5020 TVC/FG or D-5010 TVC/VG mechanical temperature compensator (Figure 1) approved for use with liquids of density 0.5 to 1.0 kg/L at 15°C, at temperatures between 0°C and 45°C.
  - (d) Any compatible Commission-approved pulse generator and electronic bulk flowmeter indicator.
- vi) An outlet control valve located downstream of the meter with no intermediate outlet.

A flow rate control valve may be fitted.

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 - pattern	5/6B/75
- provisional variant	P5/6B/75
Maximum flow rate	... L/min
Minimum flow rate	... L/min
Nominal flow rate (when flow rate is within + 5% of nominal)	... L/min
Minimum delivery	
Type of liquid for which the meter is verified.	

1.3 Sealing and Verification Provision

Provision is made for sealing the indicator or indicator/ticket printer, and the calibrator. Provision is also made for a verification mark to be applied.

2. Description of Provisional Variant 1

The pattern with a maximum flow rate of 3600 L/min.



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### TEST PROCEDURE No 5/6B/75

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

The maximum permissible errors at verification for instruments without a temperature compensator (or with the temperature compensator deactivated) are given in Document 118.

The maximum permissible errors at verification for instruments with the temperature compensator activated are:

$$\pm 0.5\% + 0.02\% \text{ per } ^\circ\text{C difference from } 15^\circ\text{C}.$$

#### 1. Test Delivery

If the test delivery is less than ten times the minimum delivery, the reading error of the indicator or the rounding error of the ticket printer is minimised by completing the delivery at a graduation line.

#### 2. Low Liquid-level Device Test

If a device is fitted to prevent the level of liquid in the supply tank falling to the level of the centrifugal pump, at least one delivery should occur during which the device stops the delivery; it will be necessary to refill the supply tank to finish the delivery.

The effect on the measurement of the quantity delivered should not exceed 1% of the minimum delivery.

NOTE: This test should only be done where it could be expected that the device may operate during a normal day's operation.

#### 3. Minimum Delivery

The minimum quantity to be delivered is the sum of:

- (i) 20 times the scale interval, if fitted with an analogue indicator, or  
100 times the scale interval, if fitted with a digital indicator, or  
100 times the scale interval, if fitted with a zero start indicator/  
printer, or  
200 times the scale interval, if fitted with an accumulative printer or  
indicator, or

The largest of the appropriate minimum quantities as listed above, if more than one indicator and/or printer (analogue or digital) is fitted.

**PLUS**

- (ii) 100 times the gas purging error. This should be determined where there is a possibility of a supply tank emptying.

4. Meter Tests

For instruments without a temperature compensator (or with the temperature compensator deactivated):

- (i) Carry out at least three runs at the normal flow rate at which the meter is used.
- (ii) Repeat the above test at the minimum flow rate.

For instruments with the temperature compensator activated:

Repeat the above tests and calculate the equivalent volume that would have been delivered at 15°C using the temperature indicated at the meter and the ASTM-IP Petroleum Measurement Tables, for the density of the liquid for which the temperature compensator is set.

Additionally, for Provisional Variant 1;

The following information shall be recorded and sent to the Commission along with the results of all tests carried out at verification:

- (a) NSC approval number
- (b) Installation address
- (c) Meter model and serial numbers
- (d) Identification of the meter assembly in terms of the pattern and variant described in the Technical Schedule
- (e) Totaliser reading at the beginning of testing
- (f) Type of liquid
- (g) Temperature of liquid entering the meter
- (h) Flow rates



# NATIONAL STANDARDS COMMISSION

5/6B/75  
7/10/88

## TECHNICAL SCHEDULE No 5/6B/75

### VARIATION No 1

Pattern: Liquid Controls Model MS-120 CX-1 Bulk Flowmetering System.

Submitter: Emco Wheaton (Australia) Pty Ltd  
145 Heidelberg Road  
Northcote Victoria 3070.

#### 1. Description of Provisional Variant 2

A bulk flowmetering system using a Liquid Controls model MS30-N-1 flowmeter which is approved for use with liquids having a viscosity range of 0.4 mPa.s to 10 mPa.s at maximum and minimum flow rates of 1325 L/min and 266 L/min, respectively.





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## TECHNICAL SCHEDULE No 5/6B/75

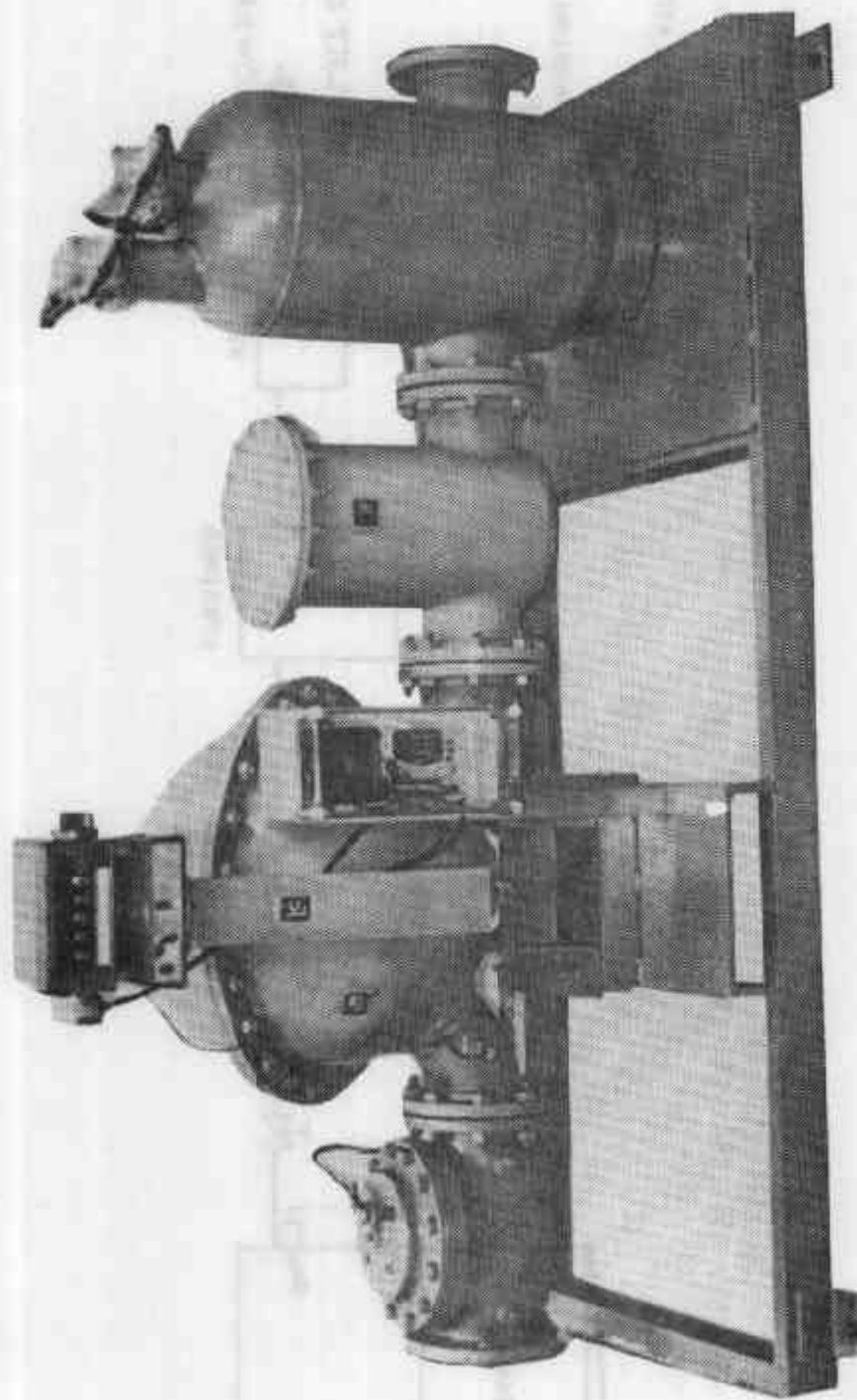
### VARIATION No 2

Pattern: Liquid Controls Model MS-120 CX-1 Bulk Flowmetering System.

Submittor: Emco Wheaton (Australia) Pty Ltd  
145 Heidelberg Road  
Northcote Victoria 3070.

#### 1. Description of Variant 3

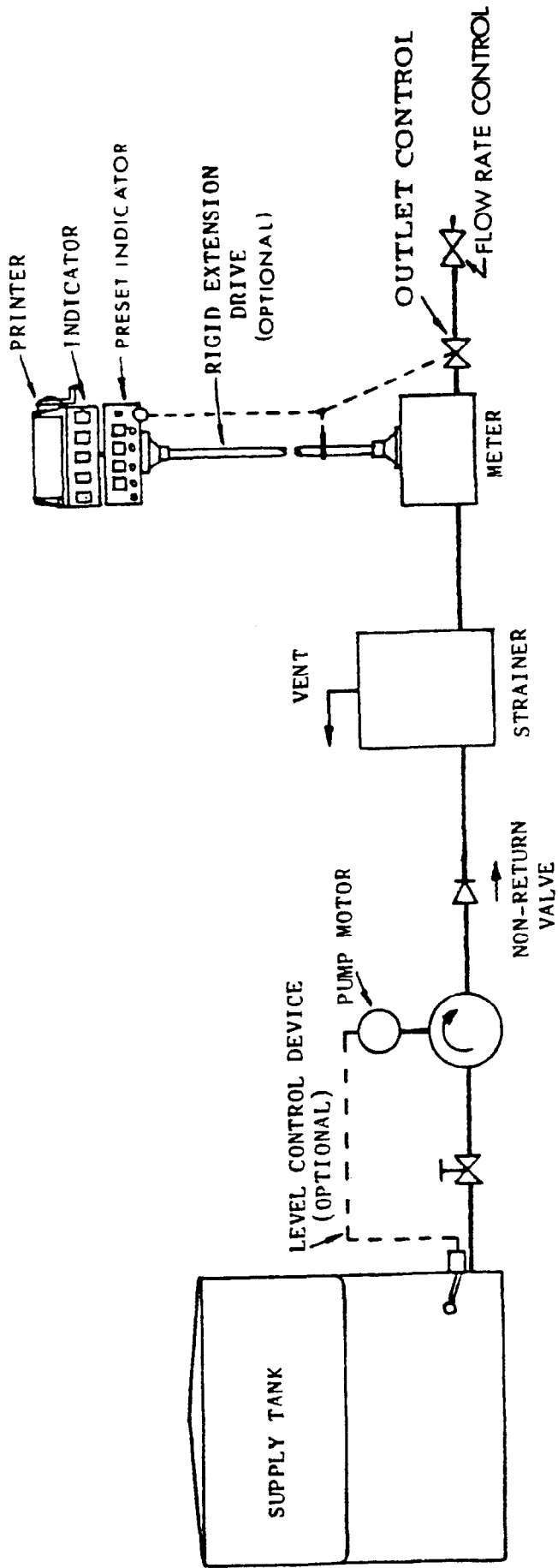
A bulk flowmetering system using a Liquid Controls model M30-G-2 flowmeter which is approved for use with liquids having a kinematic viscosity range between 0.5 and 12.5 mm<sup>2</sup>/s at maximum and minimum flow rates of 1325 L/min and 266 L/min respectively. The minimum delivery is 100 litres.



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LC 16-120 Cl-1 Flowmeter, Strainer, etc.

FIGURE 5/6B/75 - 2

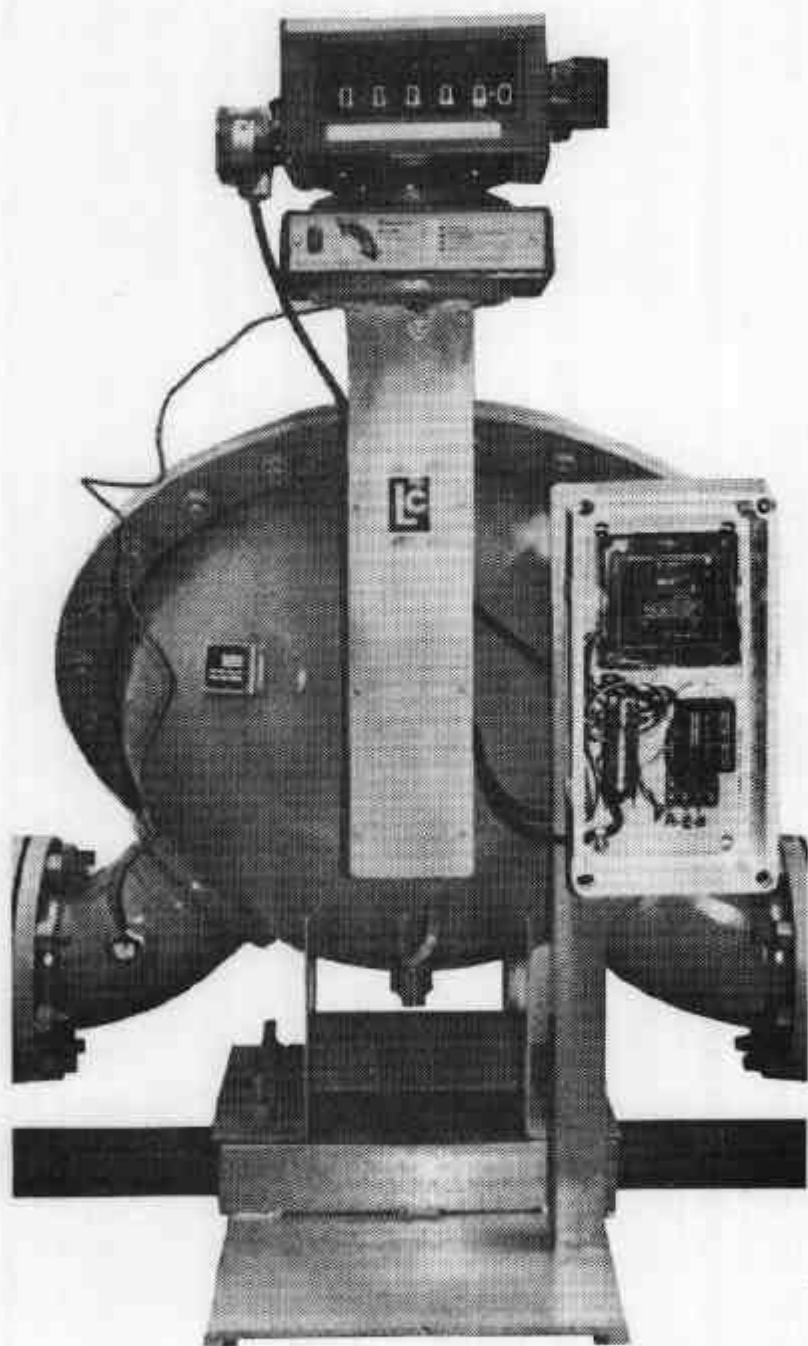


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Pipeline System - Schematic Diagram

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FIGURE 5/68/75 - 3



Showing Indicator and Mechanical Temperature Compensator