National Standards Commission

Provisional Certificate of Approval

No P5/6B/83

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

Smith Model S-100 Mass Flowmetering System

submitted by Email Electronics
88-94 Canterbury Road
Kilsyth VIC 3167.

CONDITIONS OF APPROVAL

This approval is subject to review on or after 1/8/93.
This approval expires in respect of new instruments on 1/8/94.

Instruments purporting to comply with this approval shall be marked NSC No P5/6B/83 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 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.

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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:

The submittor is to inform the Commission of each instrument prior to it being submitted to a Trade Measurement Authority for verification.

Instruments are to be tested at six-monthly intervals after the initial verification test. Such tests are to be arranged by the submittor and supervised by a Trade Measurement 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of unsatisfactory performance or of suitable test results not being received by the Commission, this approval may be withdrawn.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: provisionally approved 3/7/92

- A bulk flowmetering system using a Smith model S-100 mass flowmeter which is approved for use with liquids having a kinematic viscosity range of 0.5 to 200 mm^2/s.

Technical Schedule No 5/6B/83 describes the pattern.

FILING ADVICE

The documentation for this approval comprises:

Provisional Certificate of Approval No P5/6B/83 dated 19/1/93
Technical Schedule No 5/6B/83 dated 19/1/93 (incl. Test Procedure)
Figures 1 and 2 dated 19/1/93

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/83

Pattern: Smith Model S-100 Mass Flowmetering System.

Submittor: Email Electronics Pty Ltd
88-94 Canterbury Road
Kilsyth VIC 3167.

1. Description of Pattern

A bulk flowmetering system using a Smith model S-100 mass flowmeter which is approved for use with liquids having a kinematic viscosity range of 0.5 to 200 mm^2/s. The system shall be used with a compatible Commission-approved electronic indicator with multi-point variable flow rate linearisation facilities, and within the flow rate range of 25 to 250 kg/min. The flowmetering system shall be a suction head installation (i.e. flooded suction), and may be mounted in a pipeline.

1.1 The Flowmetering System (Figure 1)

The system comprises:

(i) A supply tank.

(ii) A pump of either positive displacement or centrifugal type, which 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. Provision is made for a pressure gauge to be connected downstream of the meter.

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 means of preventing vapour or air entering the system, either by the provision of a low liquid level switching device, or a gas detector.

(v) A Smith model S-100 mass flowmeter being a flow sensor comprising of two S-tubes in an hermetically-sealed housing (Figure 2).

(vi) A Smith model SR remote electronic unit (Figure 2).

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(vii) A Smith Accuload series flowmetering system controller (as described in the documentation of NSC approval No S178A) or another compatible Commission-approved (rate/total/status) electronic flow indicator incorporating multi-point variable flow rate linearisation facilities. The indicator must display in units of mass.

(viii) An outlet control valve located downstream of the meter with no intermediate outlet.

A flow rate control valve may be fitted.

1.2 Description of Metering Components

1.2.1 Meter (Flow Sensor)

The Smith model S-100 mass meter (Figure 2) determines flow by measuring the effects of Coriolis forces on a pair of 'S' shaped tubes, which are vibrated at their resonant frequency by electromagnetic drivers. Relative motion between the two tubes is detected by two reluctance type motion sensors located equidistant upstream and downstream of the centre of the tubes which produce a sine wave output.

1.2.2 Remote Electronic Unit

The Smith model SR remote electronic unit (Figure 2) supplies input power to the magnetic drivers and processes signals from the motion sensors into pulse and analog outputs, proportional to mass flow rate.

The remote electronic unit and the flow sensor, form the mass flow meter.

1.3 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/83
Maximum flow rate		250 kg/min
Minimum flow rate		25 kg/min
Nominal flow rate	(when flow rate is within ±5% of nominal)	..... kg/min
Minimum quantity		50 kg
Type of liquid for which the meter is verified		.....

1.4 Sealing and Verification/Certification Provision

Provision is made for sealing the calibration functions of the instrument. Provision is also made for a verification/certification mark to be applied.

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 ±0.3%.

National Standards Commission

Notification of Change

Provisional Certificate of Approval No P5/6B/83

Change No 1

The following change is made to the approval documentation for the

Smith Model S-100 Mass Flowmetering System

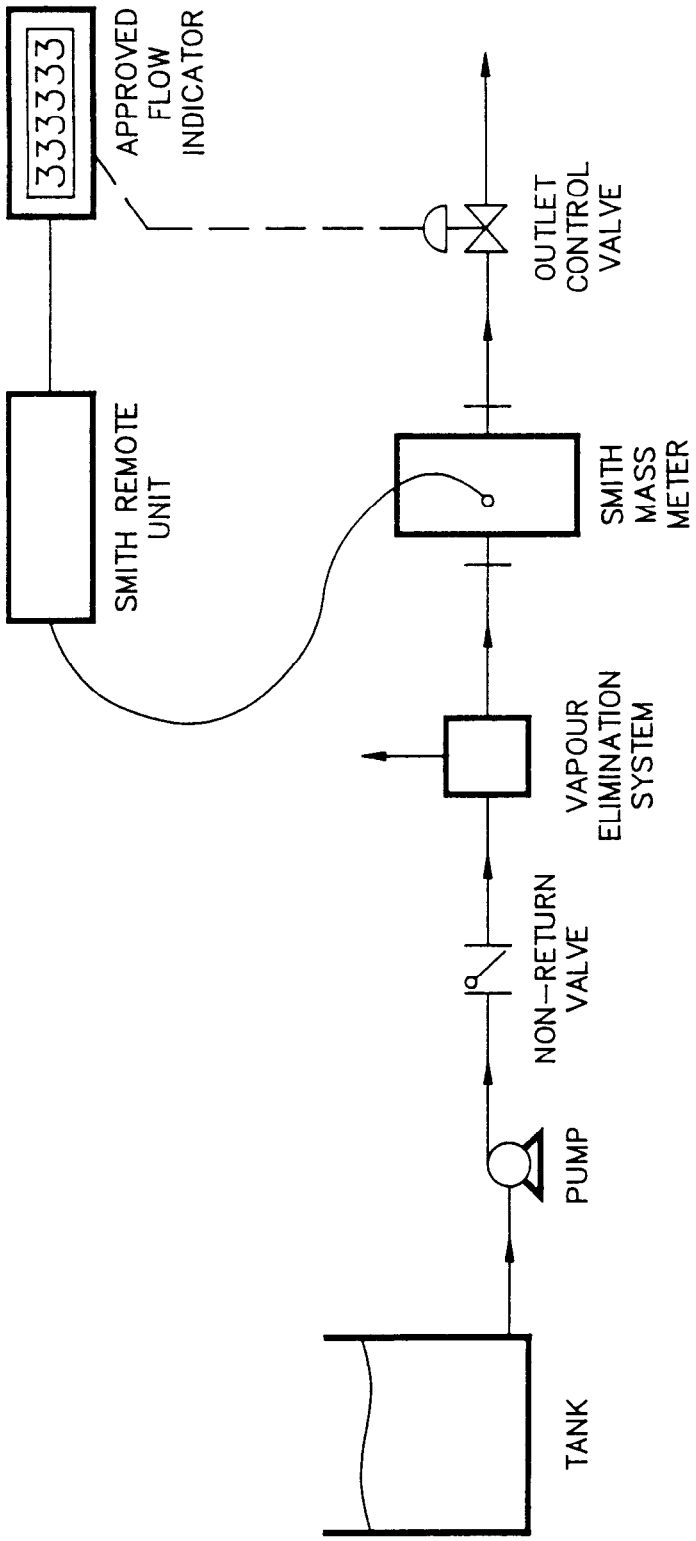
submitted by Email Electronics
88-94 Canterbury Road
Kilsyth VIC 3137.

In Provisional Certificate of Approval No P5/6B/83 and its Technical Schedule both dated 19 January 1993, all references to the submittor should be amended to read;

Diamond Key International Pty Limited
110 Henderson Road
Rowville VIC 3178.

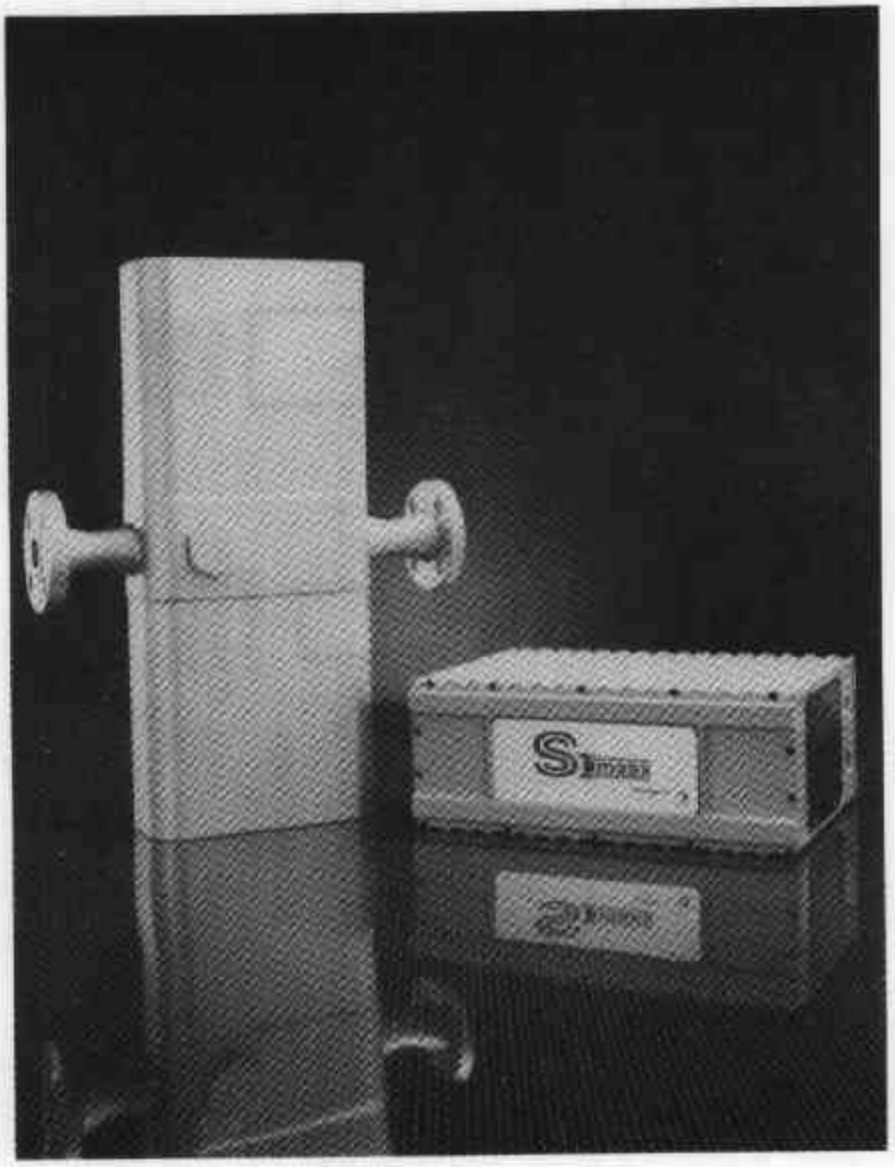
Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

FIGURE 5/6B/83 - 1



Typical Smith Mass Flowmetering System

FIGURE 5/6B/83 - 2



Smith Model S-100 Mass Flowmeter and Model SR Electronic Unit