

National Standards Commission



Certificate of Approval

No 5/6B/85

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

Contrec Model 1005 Flowmetering System

submitted by Contrec Systems Pty Ltd
220 Hall Street
Hawthorn VIC 3123.

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 1/1/98.
This approval expires in respect of new instruments on 1/1/99.

Instruments purporting to comply with this approval shall be marked NSC No 5/6B/85 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.

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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.

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

DESCRIPTIVE ADVICE

Pattern: approved 18/12/92

- A Contrec model 1005 flowmetering system for use at maximum and minimum flow rates of 2270 L/min and 227 L/min, respectively.

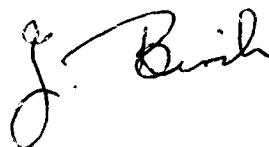
Technical Schedule No 5/6B/85 describes the pattern.

FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No 5/6B/85 dated 20/8/93
Technical Schedule No 5/6B/85 dated 20/8/93 (incl. Test Procedure)
Figures 1 and 2 dated 20/8/93

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/85

Pattern: Contrec Model 1005 Flowmetering System.

Submittor: Contrec Systems Pty Ltd
220 Hall Street
Hawthorn VIC 3123.

1. Description of Pattern

A Contrec model 1005 flowmetering system for use with liquids having a kinematic viscosity range between 0.4 and 5.0 mm²/s at maximum and minimum flow rates of 2270 L/min and 227 L/min respectively.

The pattern is installed in a pipeline in a manner similar to that shown in Figure 1. The system includes 2 flowmeters and a cabinet housing 3 indicators (Figure 2) to display the supply volume, the return volume after vapour has been recovered, and the difference in volume between the meters.

1.1 Flowmeters

The supply and return lines are each fitted with a Smith turbine flowmeter (as described in the documentation of NSC approval No 5/6B/87).

1.2 Indicators (Figure 2)

Two Contrec model 405L indicators (as described in the documentation of NSC approval No S296) display the supply and return flow volumes from the meters, and a Contrec model 411 totalising indicator displays the difference between them. Only the DIFFERENCE display need be visible for normal operation, but if the supply and return displays are also visible they shall be identified. The DIFFERENCE display shows the arithmetic difference between the SUPPLY and RETURN displays. All displays have 6 digits and may indicate in litres or decalitres, but are set to litres for testing purposes.

1.2.1 Specifications

Refer to NSC approval No S296 for the specifications regarding the use of the model 405L indicators.

1.2.2 Totalisation

Either the running total or the accumulated total may be displayed by selecting the TOTAL or ACCUM. TOTAL on the front panel of the DIFFERENCE indicator. An LED will light to indicate which of the two totals has been selected. The accumulated total is in use for trade.

1.2.3 Volume Conversion For Temperature

The SUPPLY and RETURN indicators are each fitted with a volume conversion for temperature facility for use with liquids having a temperature range of 0°C to +40°C and for a range of densities from 700 kg/m³ to 1000 kg/m³, at 15°C.

1.2.4 Linearisation

A multipoint linearisation facility is used to linearise the calibration curve of the meter over a total of 10 points all of which are presettable within the flow rate range of the meters.

1.2.5 Display Check

A display check is initiated whenever power is applied to the indicator.

1.3 Markings

The system shall be marked with the following data, together in the one location:

Manufacturer's name or mark	
Model number	
Serial number	
NSC approval number	5/6B/85
Maximum flow rate (#) L/min
Minimum flow rate (#) L/min
Type of liquid for which the meter is verified
Liquid temperature range	0°C to 40°C
Density for which conversion device is set (*) kg/m ³
Reference temperature	15°C

In addition, the reading face of the DIFFERENCE indicator shall be marked 'Reference temperature 15°C' or 'Litres at 15°C', or similar wording.

(#) For the particular system.

1.4 Verification/Certification Provision

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

1.5 Sealing Provision

Provision is made for sealing the calibration functions by preventing access to the relevant terminals on the terminal block on the rear of the indicators.

TEST PROCEDURE

Tests are to be conducted in accordance with the Inspectors Handbook and the following procedure and maximum permissible errors.

- NOTES:**
- To calibrate the meters, a master meter is preferred to provide a closed system and so avoid errors caused by vaporisation.
 - These tests can only be conducted with the assistance of an authorised technician.
 - Set the SUPPLY and RETURN meters to display in litres.

Test Method (refer Figure 1)

- (a) Connect the master meter to the outlet ports provided on the pipework downstream of the RETURN meter.
- (b) Close the valves to isolate the meters from the vapour recovery unit and open the valve on the bypass loop.
- (c) Turn off the volume conversion for temperature facility.
- (d) Verify the performance of the RETURN meter against the master meter, by carrying out three test runs at each of the maximum and minimum flow rates, and the normal flow rate (if different to the above), of the system.

The maximum permissible error is $\pm 0.15\%$.

The test quantity shall be not less than (i) 1 minute's flow at the maximum flow rate, (ii) 2000 times the scale interval of the master meter, and (iii) 2000 litres.

- (e) Remove the master meter from the system but continue with the vapour recovery unit isolated from the meters.
- (f) Circulate 10 000 litres of liquid through the SUPPLY and RETURN meters at least three times at each of the three flow rates specified in (d).

Check that the difference between the readings on the SUPPLY and RETURN meters is not greater than 2 litres.

- (g) Turn on the volume conversion device. Insert reference thermometers in the thermometer wells provided. Check that the density of the liquid being measured is within $\pm 2 \text{ kg/m}^3$ of the density at 15°C marked on the system's nameplate.

Carry out at least three test runs of 10 000 litres at the normal flow rate and record the following for both meters:

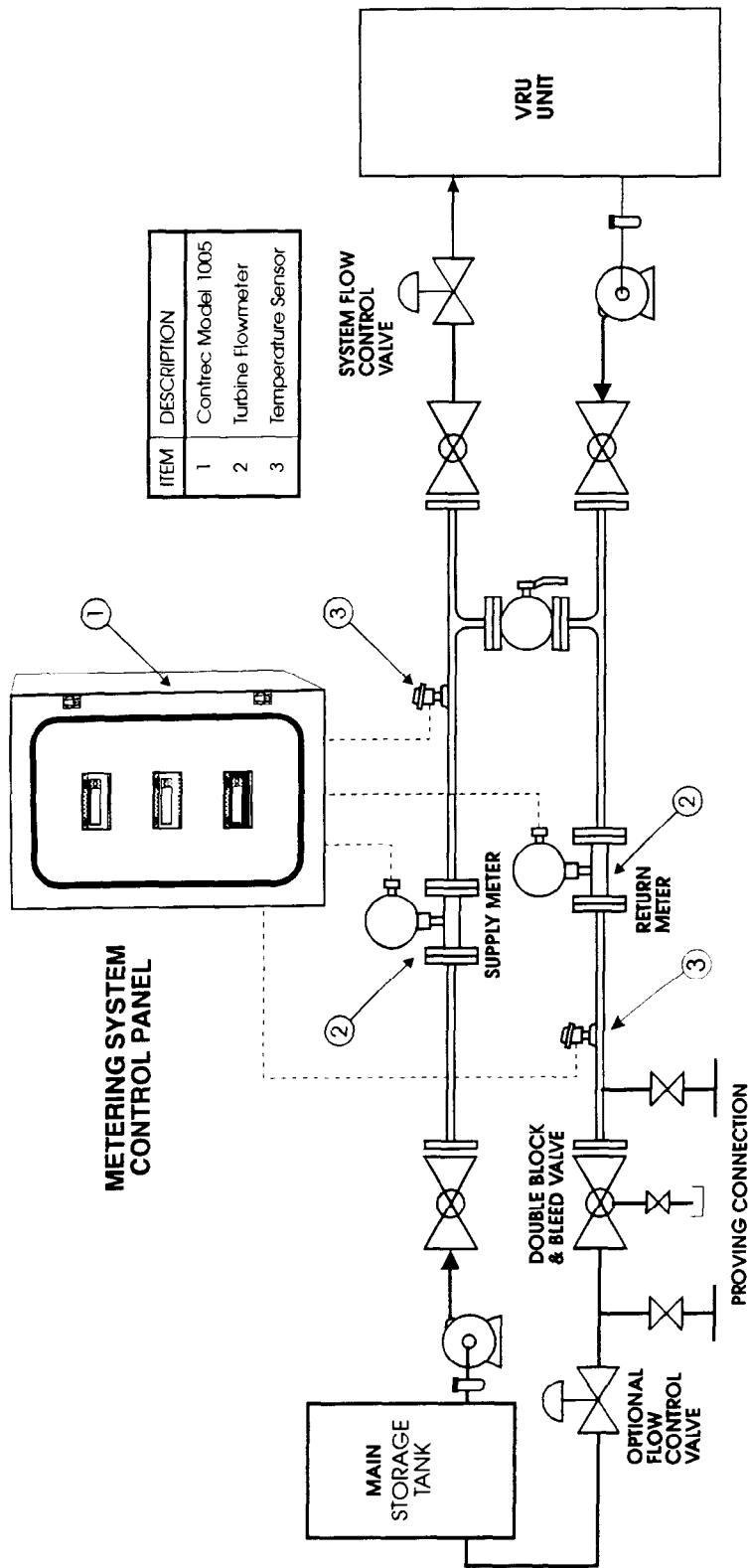
- unconverted volume
- converted volume
- temperature of system
- temperature of reference thermometers

Check the following:

- For each meter, the difference between the converted volume and the unconverted volume times the volume conversion factor is 0.2% or less. The volume conversion factor is obtained from the appropriate ASTM-IP Petroleum Measurement Tables for the density marked on the nameplate and the temperature recorded by the reference thermometer.
- The difference between the readings of the converted volume for each meter is not greater than 10 litres.
- The difference in the temperature indicated by the reference thermometer and the system for each meter is 0.5°C or less.

- (h) Reset the system to normal operation.

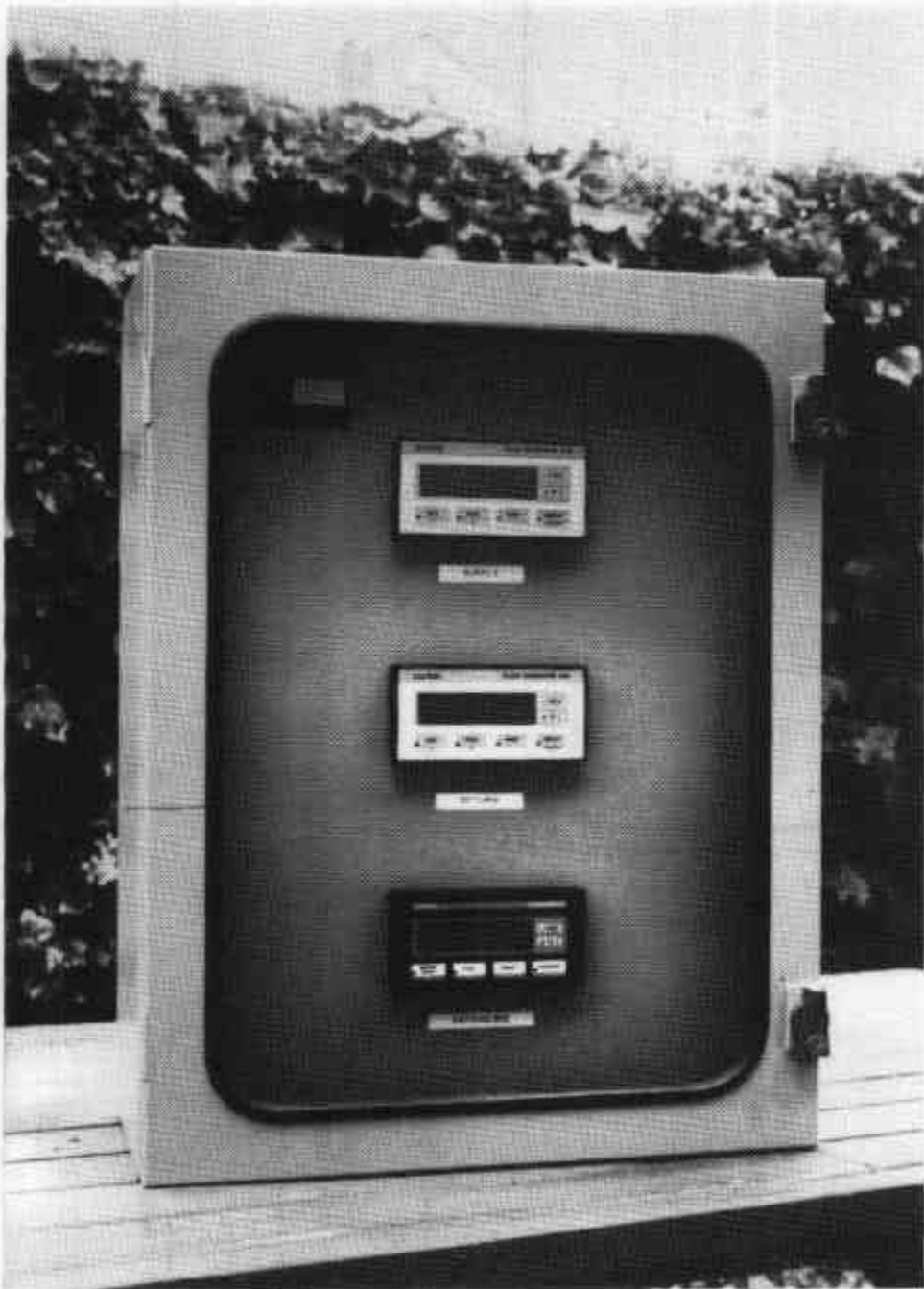
FIGURE 5/6B/85 - 1



Typical Contrec Model 1005 Flowmetering System

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FIGURE 5/6B/85 - 2



Indicator For Model 1005 System