



Australian Government
National Measurement
Institute

Bradfield Road, West Lindfield NSW 2070

Notification of Change
Certificate of Approval No 5/6B/88A
Change No 1

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

The following changes are made to the approval documentation for the

Actaris Model Type 4D-MT Bulk Flowmetering System

submitted by Hurl Nu-Way Pty Ltd
14 Aristoc Road
Glen Waverley VIC 3150.

In Certificate of Approval No 5/6B/88A dated 6 November 2003;

1. The Condition of Approval referring to the review of the approval should be amended to read:
"This approval becomes subject to review on 1 June **2013**,
and then every 5 years thereafter."
2. The FILING ADVICE should be amended by adding the following:
"Notification of Change No 1 dated 27 July 2010"

Signed by a person authorised by the Chief Metrologist
to exercise his powers under Regulation 60 of the
National Measurement Regulations 1999.

A handwritten signature in black ink, consisting of stylized cursive letters, likely representing the Chief Metrologist.



Australian Government

National Standards Commission

12 Lyonpark Road, North Ryde NSW 2113 Australia

Certificate of Approval

No 5/6B/88A

Issued under Regulation 60
of the
National Measurement Regulations 1999

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

Actaris Model Type 4-MT Bulk Flowmetering System

submitted by Hurl Nu-Way Pty Ltd
14 Aristoc Road
Glen Waverly VIC 3150.

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 a review of NSC approval No 5/6B/88.

CONDITIONS OF APPROVAL

This approval becomes subject to review on 1 June 2008, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked NSC No 5/6B/88A and only by persons authorised by the submitter.

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 NSC P 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.

DESCRIPTIVE ADVICE

Pattern: approved 15 May 2003

- A liquid-measuring system using a Actaris model Type 4-MT, 50 mm positive displacement flowmeter. The flowmeter may also be known as a Schlumberger or Neptune instrument of the same model.

Variant: approved 15 May 2003

1. With an Actaris/Schlumberger/Neptune model Type 4 flowmeter.

Technical Schedule No 5/6B/88A describes the pattern and variant 1.

FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No 5/6B/88A dated 6 November 2003
Technical Schedule No 5/6B/88A dated 6 November 2003 (incl. Test Procedure)
Figures 1 to 3 dated 6 November 2003

Signed by a person authorised under Regulation 60 of the National Measurement Regulations 1999 to exercise the powers and functions of the Commission under this Regulation.



TECHNICAL SCHEDULE No 5/6B/88A

Pattern: Actaris Model Type 4-MT Bulk Flowmetering System

Submittor: Hurll Nu-Way Pty Ltd
14 Aristoc Road
Glen Waverly VIC 3150

1. Description of Pattern

A liquid-measuring system using a Actaris model Type 4-MT, 50 mm positive displacement flowmeter approved for bulk metering of liquid petroleum products within the stated field of operation. The flowmeter is adjusted to be correct for the liquid for which it is to be verified/certified as marked on the data plate. The flowmeter may also be known as a Schlumberger or Neptune instrument of the same model.

1.1 Field of Operation

The field of operation of the measuring system is determined by the following characteristics:

- Minimum measured quantity, V_{min} 200 L
- Maximum flow rate, Q_{max} 800 L/min
- Minimum flow rate, Q_{min} 80 L/min
- Maximum pressure of the liquid, P_{max} 1030 kPa
- Dynamic viscosity range at 20°C 0.4 to 20 mPa.s
- Maximum temperature of the liquid, T_{max} 50°C
- Minimum temperature of the liquid, T_{min} -10°C
- Operating air temperature range -25°C to 55°C
- Accuracy class 0.5

1.2 Vehicle-mounted Flowmetering System

(i) Tank

The supply tank may incorporate a device for detecting when the liquid level in the supply tank is low.

(ii) Pump

The pump is fitted in a positive suction head (flooded suction) installation, i.e. below the liquid level in the supply tank (Figure 1). A positive displacement type or centrifugal type pump may be used.

(iii) Non-return Valve

A non-return valve is fitted between the pump and the flowmeter to prevent reverse flow of the liquid.

(iv) Gas Elimination Device

The gas elimination device consists of an Actaris model P/No: 400085-001 gas eliminator (Figure 2) with integral strainer. The gas elimination device is approved on the condition that the pump is operated under a positive suction head.

The 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 of preventing gas entering the system.

The gas elimination device prevents flow through the meter when air or gas is detected. Once the air/gas is vented to the vapour space in the supply tank or to atmosphere, the system becomes full of liquid, and the gas elimination device will then allow liquid to flow through the meter.

(v) Measurement Transducer

The measurement transducer is an Actaris Type 4-MT, 50 mm positive displacement flowmeter (Figure 2) with a cyclic volume of 1.04877 L/rev. The meter may also be known as a Schlumberger or Neptune instrument of the same model.

The meter consists of a housing in which a rotor (piston) turns in a synchronised relationship sweeping a known volume of liquid through the measuring chamber. The rotor is supported at one end by a bearing plate through which the shaft protrudes to a gear train that provides a result proportional to volume throughput.

For use with an Acme model EPU 200 pulse generator (as described in the documentation of NSC approval No S189B) the meter is fitted with compatible gearing.

A thermowell is provided downstream of the meter, and provision is made for measuring the pressure at the meter.

(vi) Calculator/Indicator

The measurement transducer is fitted with an Actaris model 841 zero start indicator (Figure 3). The indicator may also be known as a Schlumberger or Neptune instrument of the same model.

An Actaris model 842 pre-set indicator serves to deliver a pre-set volume of liquid by means of an Actaris pre-set indicator mechanically linked to a two-stage (double trip) control valve. The required quantity is displayed on the pre-set indicator and is set by using four push buttons. The maximum pre-set volume is 99990 L. During the metering operation the display of the pre-set counter progressively returns to zero. A mechanical linkage within the pre-set indicator closes the pre-set valve to complete the delivery. The Actaris pre-set control valve, which may also be operated manually, is installed immediately downstream of the meter.

The pre-set counter is only approved for facilitating the delivery and is marked 'PRE-SET INDICATION NOT IN USE FOR TRADE'.

The calculator/indicator may be replaced with any other Commission-approved compatible calculator/indicator that can be fitted to the meter output shaft without modifying meter components.

(vii) Transfer Device

The transfer device is either in the form of a shut-off valve, a nozzle or a dry-break coupling at the end of a rigid pipe or a flexible hose or hose reel. The shut-off valve may be operated either manually or automatically using the Actaris pre-set mechanism. An optional flow control valve may be fitted between the transfer point and the meter.

If a hose is used, the nozzle has an anti-drain valve installed either in the nozzle or immediately before it; the nozzle is the transfer device. The pipe work between the gas elimination device and the transfer point is kept full of liquid during the measurement and shutdown periods.

1.3 Verification/Certification Provision

Provision is made for the application of a verification/certification mark.

1.4 Sealing Provision

Provision is made for sealing the following components:

- (a) The covers of the meter housing;
- (b) The calibrating mechanism; and
- (c) The indicating mechanism and pre-set mechanism (if fitted).

1.5 Markings and Notices

Each measuring system shall bear the following information, placed together either on the indicating device or one or more data plates:

Pattern approval mark	NSC No 5/6B/88A
Manufacturer's identification mark or trade mark
Meter model
Serial number of the instrument
Year of manufacture
Maximum flow rate, Q_{max} L/min
Minimum flow rate, Q_{min} L/min
Maximum pressure, P_{max} kPa
Environmental class	class I
Type of liquid for which the system is verified (*)

(*) This may be located separately, e.g. on a metal tag sealed to the instrument.

Notices as specified elsewhere in this Technical Schedule.

The minimum measured quantity (V_{min}) is clearly visible on the indicating device, e.g. "Minimum Delivery 200 L".

2. Description of Variant 1

Using an Actaris model Type 4, 38 mm positive displacement flowmeter with a cyclic volume of 0.41457 L/rev for use with liquid hydrocarbons having a dynamic viscosity between 0.4 and 20 mPa.s, for a flow rate range of 33 to 330 L/min. The minimum measured quantity is 100 L. The flowmeter may also be known as a Schlumberger or Neptune instrument of the same model.

May also be used with liquid hydrocarbons having a dynamic viscosity range

between 20 and 1000 mPa.s, for a flow rate range of 45 to 100 L/min. In these applications the gas elimination device may be dispensed with, however provision is made to prevent air entering the pipework, for example by incorporating a device that stops measurements when low liquid level in the supply tank is detected.

TEST PROCEDURE

Instruments should be tested in accordance with NSC Test Procedure No 13, *Non-driveway Flowmeters* using the type of liquid with which they will be used and which is marked on the instrument. Tests should be conducted in conjunction with any tests specified in the approval documentation for any indicator/controller and/or any conversion device, etc. used.

Maximum Permissible Errors

For accuracy class 0.5

The maximum permissible errors are:

$\pm 0.5\%$ for in-service inspection of the measuring system. (Applicable for deliveries greater than $2 \times V_{min}$); and

$\pm 0.3\%$ for calibration adjustment of the meter. (Applicable for deliveries greater than $3 \times V_{min}$).

Note: It is forbidden to adjust the calibration of the meter to give an error other than as close as practical to zero average error.

Deliveries Equal to Minimum Measured Quantity

The absolute maximum permissible error for deliveries equal to the minimum measured quantity is $\pm(0.01 \times V_{min})$ litres.

Hose Dilation Test

The maximum permissible errors applicable for hose dilation are:

$\pm(0.01 \times V_{min})$ litres for systems without a hose reel; and

$\pm(0.02 \times V_{min})$ litres for systems with a hose reel.

Elimination of Air or Gas

The maximum permissible errors applicable for the elimination of air or gas are:

$\pm 0.5\%$ for liquids having a dynamic viscosity not exceeding 1 mPa.s (e.g. petrol);
and

$\pm 1\%$ for liquids having a dynamic viscosity exceeding 1 mPa.s (e.g. kerosene, distillate)

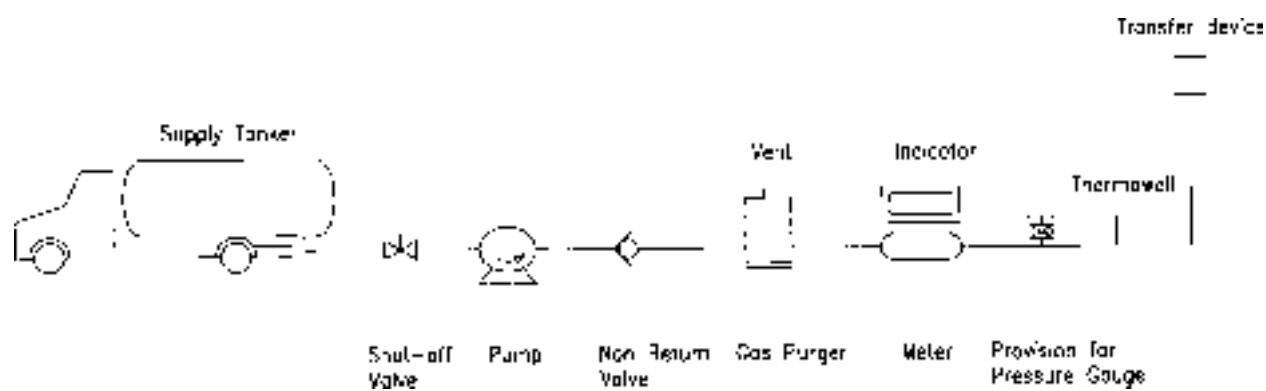
Calibration of the indicator

The following calibration procedure can only be performed if the indicator is consistently reading more or less than the delivered volume:

1. Remove the cover.
2. Lift and turn the gear shifter. The gear shifter consists of a wheel with equally-spaced holes labelled A to H around its perimeter. By lifting and rotating the wheel clockwise the indicator will read more; by lifting and rotating the wheel anticlockwise the indicator will read less.
3. Altering the setting by one hole changes the calibration approximately 0.1 L in 147.18 L.

Note: If the flowmeter is required to be adjusted by more than 1.03%, calibration must be performed by changing the gear ratio in the meter chamber (refer to the manufacturer's manual for the meter).

FIGURE 5/6B/88A – 1



Typical Actaris Vehicle-mounted System

5/6B/88A
6 November 2003

FIGURE 5/6B/88A – 2



Actaris Model Type 4-MT Flowmeter
With an Actaris Model P/No: 400085-001 Gas Eliminator

FIGURE 5/6B/88A – 3



Model 841 Indicator