



Australian Government
**National Measurement
Institute**

Bradfield Road, West Lindfield NSW 2070

Cancellation
Certificate of Approval No 5/6B/92A

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

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

Micro Motion Model CMF200 Mass Flowmetering System

submitted by Emerson Process Management Australia P/L
471 Mountain Highway
Bayswater VIC 3153

has been cancelled in respect of new instruments as from 1 May 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 a series of loops and flourishes, positioned to the right of the signature text.



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

Micro Motion Model CMF200 Mass Flowmetering System

submitted by Emerson Process Management Australia P/L
471 Mountain Highway
Bayswater VIC 3153.

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 approval has been granted with reference to document NMI R 117-1, Measuring Systems for Liquids Other than Water, dated July 2004.

CONDITIONS OF APPROVAL

This approval becomes subject to review on 1 January 2010, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked with approval number 'NSC 5/6B/92A' 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 National Measurement Institute (NMI) 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 document NMI P 106.

The National Measurement Institute 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 17 December 2004

- A Micro Motion model CMF200 bulk mass flowmetering system for liquids other than liquefied products and milk.

Variants: approved 17 December 2004

1. Using certain Micro Motion flow sensors as listed in Table 1.
2. With the RFT9739 transmitter configured to provide a frequency/pulse output proportional to the volume throughput at observed temperature.

Technical Schedule No 5/6B/92A describes the pattern and variants 1 & 2.

Variants: approved 25 September 2006

3. With a Micro Motion model flow sensor.
4. With a Micro Motion model MVD™ 700 core processor.
5. With certain Micro Motion MVD™ series flow transmitter.

Technical Schedule No 5/6B/92A Variation No 1 describes variants 3 to 5.

FILING ADVICE

Certificate of Approval No 5/6B/92A dated 19 April 2005 is superseded by this Certificate, and may be destroyed. The documentation for this approval now comprises:

Certificate of Approval No 5/6B/92A dated 26 October 2006
Technical Schedule No 5/6B/92A dated 19 April 2005 (incl. Table 1 &
Test Procedure)
Technical Schedule No 5/6B/92A Variation No 1 dated 26 October 2006
Figures 1 to 4 dated 19 April 2005
Figures 5 and 6 dated 26 October 2006

Signed by a person authorised by the Chief Metrologist
to exercise his powers under Regulation 60 of the
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TECHNICAL SCHEDULE No 5/6B/92A

Pattern: Micro Motion Model CMF200 Mass Flowmetering System

Submittor: Emerson Process Management
471 Mountain Highway
Bayswater VIC 3153

1. Description of Pattern

A Micro Motion model CMF200 bulk mass flowmetering system for liquids other than liquefied products and milk.

1.1 Field of Operation

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

- Minimum measured quantity, M_{min} 500 kg
- Maximum flow rate, Q_{max} 1463 kg/min
- Minimum flow rate, Q_{min} 146 kg/min
- Maximum pressure of the liquid, P_{min} 3800 kPa
- Minimum pressure of the liquid, P_{min} (Above liquid vapour pressure)
- Dynamic viscosity at 20°C 0.4 to 100 mPa.s
- Ambient temperature range -25 to 55°C
- Accuracy class 0.5
- Power supply (nominal) 240 V AC

1.2 The Flowmetering System (Figure 1)

(i) Supply Tank

To ensure air does not enter the pipework, the supply tank incorporates a device for detecting low liquid level.

(ii) Pump

A positive displacement, centrifugal or submersible turbine type pump may be used to provide flow through one or more flowmeters. The pump is fitted in a positive suction head (flooded suction) installation, i.e. below the liquid level in the supply tank (Figure 1). For all combination of usage, the pump(s) shall be of sufficient capacity to ensure that each flowmeter can operate within its approved flow rate range.

(iii) Non-return Valve

A non-return valve is fitted at least between the pump and the flowmeter to prevent the reverse flow of the liquid and keep the flowmeter full of liquid at all times.

(iv) Gas Elimination Device

A gas elimination device need not be fitted as the flowmetering system is designed to keep the pipework full of liquid at all times, and on the occasion that small amounts of vapour may form in the pipework, the mass of this vapour will be insignificant compared to the mass of liquid.

(v) Measurement Transducer

The measurement transducer (Figure 2) comprises the Micro Motion model CMF200 (#) flow sensor interfaced to a Micro Motion model RFT9739E4# microprocessor-based transmitter designed to provide pulse output signal proportional to the mass throughput. The transmitter is connected to a 240 V AC power supply.

The transmitter may be fitted with an LCD display (model RFT9739D4#) however this display is not approved for trade use.

For verification purposes, provision is made for inserting a thermometer and connecting a pressure gauge to measure the temperature and pressure of the liquid at the flowmeter.

(#) The numbers listed above are basic model numbers only – the full model number may have a variety of additional alphanumeric characters, which designate non-metrological features.

(vi) Calculator/indicator

A Contrec model 1010A calculator/indicator as described in the documentation of approval S313A is used, or any other compatible approved calculator/indicator interfaced to the RFT9739 transmitter for indicating the mass throughput.

The interface is such that when the voltage supply to the transmitter is interrupted, the calculator/indicator stops the delivery.

(vii) Transfer Device

A transfer device, which defines the start and stop of the quantity measured, is installed downstream of the mass flowmeter. The transfer device is in the form of a positive shut-off component such as a manually or automatically-operated shut-off valve (e.g. a Daniel model V788B control valve).

The transfer device may also be designed to control the flow rate within the specified flow rate range of the flowmeter.

1.3 Sealing and Verification/Certification Provision

Provision is made for sealing the cover of the transmitter which contains the calibration functions of the instrument.

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

1.4 Markings

Each measuring system shall bear the following information, placed together either on the indicating device or on a data plate:

Pattern approval mark	NMI 5/6B/92A	
Manufacturer's identification mark or trade mark	
Meter model	
Serial number of the instrument	
Year of manufacture	
Maximum flow rate, Q_{max} kg/min	
Minimum flow rate, Q_{min} kg/min	
Maximum pressure of the liquid, P_{max} kPa	
Type of the liquid for which the system is verified	(#)
Environmental class	class C	

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

The minimum measured quantity (M_{min}) is clearly visible on the indicating device, e.g. "Minimum Delivery 500 kg", or alternatively the calculator/indicator is programmed for deliveries equal to or greater than the stated minimum delivery.

2. Description of Variants

2.1 Variant 1

A bulk flowmetering system using any Micro Motion flow sensor listed in Table 1.

TABLE 1

Sensor Model	Size (mm)	Mass Flow Rate (kg/min)		Minimum Delivery (*) (kg)
CMF050 (#)	10	18	180	50
CMF100 (#)	25	45	453	100
CMF200 (#)	40	146	1463	500
CMF300 (#)	80	340	3400	1000

(*) For minimum measured quantities (M_{min}) less than 200 kg, the scale interval of the calculator/indicator is 0.1 kg; for deliveries greater than 200 kg the scale graduation is 1 kg.

(#) The numbers listed above are basic model numbers only – the full model number may have a variety of additional alphanumeric characters, which designate non-metrological features.

2.2 Variant 2

With the RFT9739 transmitter configured to provide a frequency/pulse output proportional to the volume throughput at observed temperature. Instruments are approved for systems with a liquid temperature range of 0 to 45°C.

When interfaced to an approved compatible calculator/indicator, for example the Contrec 1010A, the instrument may be set to display the volume at either the observed temperature, or the volume conversion device of the calculator/indicator is enabled to display the volume at 15°C. In the latter case the display facia is clearly marked "Volume at 15°C" or similar wording.

TEST PROCEDURE

Instruments should be tested in accordance any relevant tests specified in the 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:

- ±0.3% for calibration adjustment of the meter; and
- ±0.5% for in service tolerance of the measuring system.

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

The meter is required to be verified/certified with the liquid that the meter is metering.

The mass flowmeter may be verified gravimetrically by comparing the indicated mass (conventional weight in air) against the weight of the contents delivered into a container on a certified weighing instrument. Alternatively, the mass flowmeter may verified volumetrically by manually converting the measured volume to mass, using the measured density of the liquid and the appropriate Tables to obtain the conversion factors for thermal expansion and compressibility of the measured volume of liquid.

Mass flowmetering systems indicating volume at operating conditions can be verified volumetrically by converting both the measured volume and the volume indicated by the flowmetering system to a volume at reference temperature (15°C) and reference pressure (101.325 kPa absolute pressure).

Mass flowmetering systems indicating volume at 15°C must be verified in two stages. The first stage is to verify the accuracy of the volume measured by the flowmetering system with the calculator/indicator displaying volume at operating temperature (refer to configuration of the calculator/indicator) and the second stage is to check that the calculator/indicator is correctly converting the metered volume to a volume at 15°C.

TECHNICAL SCHEDULE No 5/6B/92A

VARIATION No 1

Pattern: Micro Motion Model CMF200 Mass Flowmetering System

Submittor: Emerson Process Management Australia P/L
471 Mountain Highway
Bayswater VIC 3153

1. Description of Variants

1.1 Variant 3

The pattern or variants used with a Micro Motion model CMF400 (#) flow sensor (Figure 5).

Sensor Model	Size (mm)	Mass Flow Rate (kg/min)	Minimum Delivery (kg)
CMF400 (#)	100	680 6800	500

(#) The number listed above is the basic model number only – the full model number may have a variety of additional alphanumeric characters, which designate non-metrological features.

Note: When used with the model MVD™ 700 core processor (variant 4) and the models 1700, 2500, 2700, 3500 or 3700 flow transmitters (variant 5) the pattern and variants are suitable for accuracy class 0.3 continuous flow applications.

1.2 Variant 4

With a Micro Motion model MVD™ 700 core processor using Micro Motion version 2.5 software and providing the following functions:

- Read–write access to the digital communication interface of all configurations.
- Stores the Flow Cal Factor (FCF) in non-volatile memory.
- Stores the density calibration factors (K1, D1, K2, and FD) in non-volatile memory.
- Automatically corrects for temperature effects on the sensors measurement tubes, using the readout of the sensor's internal temperature transmitter.
- Provides a calibration procedure for setting the mechanical zero and stores the result in non-volatile memory.
- Stores damping factors for mass flow, volume flow, density, pressure and temperature.

- Stores slug flow (density) limits and slug flow duration in non-volatile memory.
- This approval does NOT include performing API calculations within the core processor.

1.3 Variant 5

With Micro Motion models MVD™ 1700, 2500, 2700, 3500 or 3700 flow transmitters (Figure 6) using Micro Motion version 4.2 software.

These flow transmitters convert digital data received from the MVD™ 700 core processor (variant 4) into various signal formats.

The MVD™ 700 may be a separate unit or may be integral with the models MVD™ 1700 and MVD™ 2700 flow transmitters.

The flow transmitter models are identified by a series of alphanumeric codes which represent various configuration options, with option code 'W' being required for custody transfer applications.

TEST PROCEDURE

Instruments should be tested in accordance the Test Procedure included in Technical Schedule 5/6B/92A dated 19 April 2005.

Maximum Permissible Errors

For accuracy class 0.3:

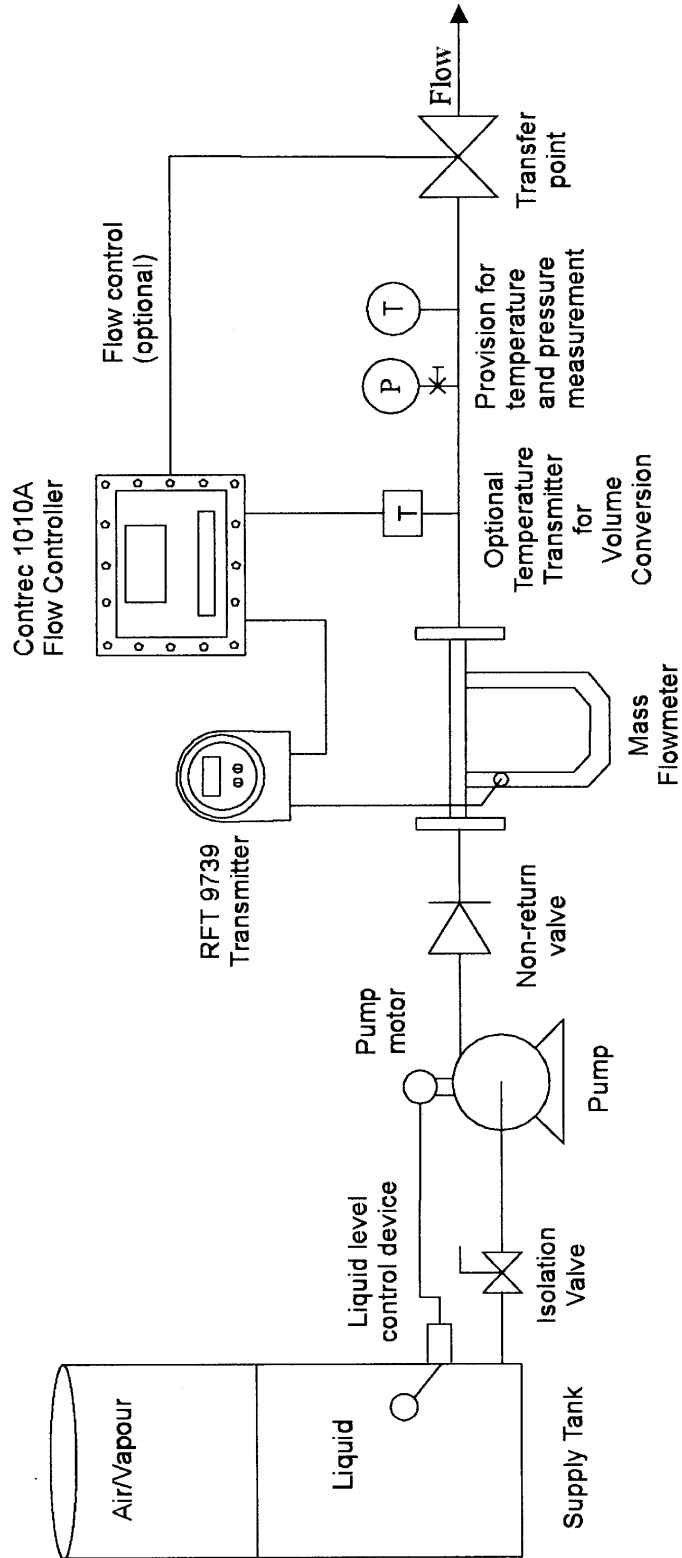
The maximum permissible errors are:

- ±0.2% for calibration adjustment of the meter; and
- ±0.3% for in service tolerance of the measuring system.

Software version numbers may be displayed by performing the following:

- Activate SCROLL and SELECT simultaneously.
- Scroll until 'OFF-LINE MAINT' is displayed then press SELECT.
- 'VER' will then be displayed.
- Press SELECT to display transmitter software version number.
- Press SCROLL and the core processor software version will be displayed.
- Press SCROLL and 'EXIT' will be displayed.
- Press SCROLL to exit and 'EXIT' will be displayed again.
- Press SCROLL once more to exit.

FIGURE 5/6B/92A - 1



Typical Micro Motion Model CMF Mass Flowmetering System

5/6B/92A
19 April 2005

FIGURE 5/6B/92A – 2



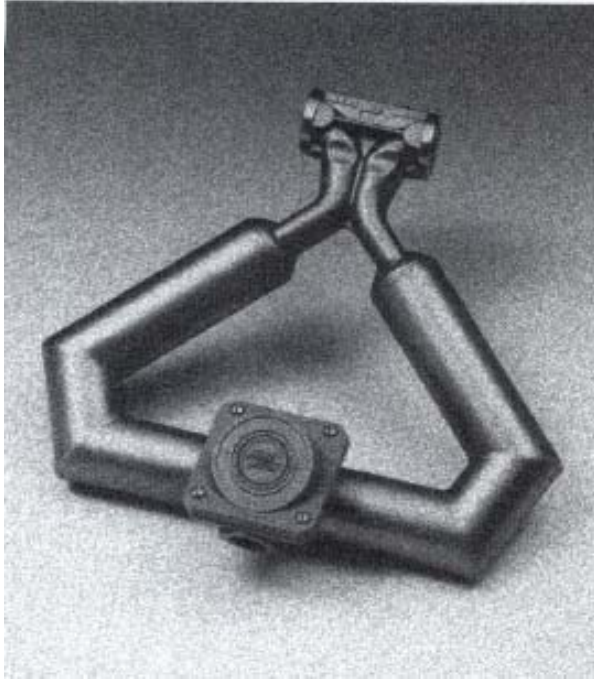
Micro Motion Model CMF200 Flow Sensor

FIGURE 5/6B/92A – 3

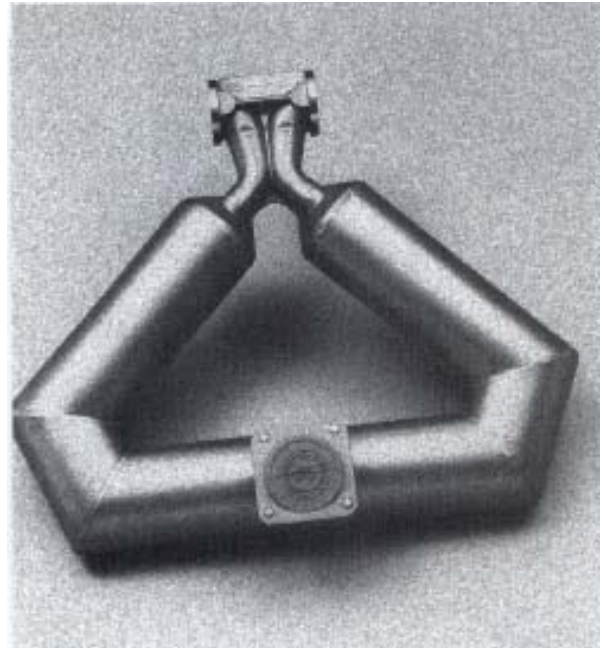


Micro Motion Models RFT9739D4# and RFT9739E4# Transmitters

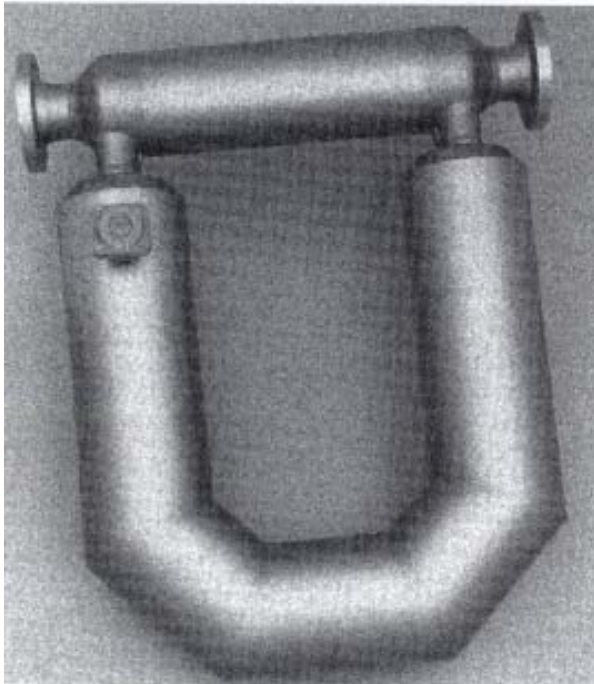
FIGURE 5/6B/92A - 4



Model CMF050



Model CMF100



Model CMF300

Other Approved Micro Motion Flow Sensors

FIGURE 5/6B/92A – 5



Micro Motion Model CMF400 Flow Sensor

FIGURE 5/6B/92A – 6



Model MVD™ 2700



Models MVD™ 3500/3700

Micro Motion MVD™ Series Flow Transmitters