EC type-examination certificate

Number **T10071** revision 10
Project number 14200115

Issued by	NMi Certin B.V., designated and notified by the Netherlands to perform tasks with respect to conformity modules mentioned in article 9 of Directive 2004/22/EC, after having established that the Measuring instrument meets the applicable requirements of Directive 2004/22/EC, to:
Manufacturer	Emerson Process Management Flow B.V. Neonstraat 1 6718 WX Ede The Netherlands
Measuring instrument	An interruptible or non interruptible **measuring instrument for liquids other than water**

Manufacturer	: Emerson
Type	: MMI-MID 001
Minimum – maximum flow rate (Q_{min} - Q_{max})	: See § 1.2 of the description
Accuracy class	: 0.3; 0.5; 1.0; 1.5; 2.5 See § 2 of the description
Environment classes	: Depending on the composition of the measuring instrument. See § 2 of the description
Temperature range liquid	: See § 1.2 of the description
Temperature range ambient	: See § 1.2 of the description
Intended for the measurement of	: Oil and oil products, alcohol, potable liquids, chemicals, liquefied gasses under pressure and cryogenic liquids. See § 1.2 of the description for the approved density range.

Further properties are described in the annexes:
- Description T10071 revision 10;
- Documentation folder T10071-4.

Valid until: 25 April 2017

Remarks
- The measuring instrument is approved for measuring mass, density at metering conditions, density at base conditions, volume at metering conditions and volume at base conditions.
- The measuring instrument can be fixed or movable.
- This revision replaces the previous versions, with exception of the documentation folder.

Issuing Authority: **NMi Certin B.V., Notified Body number 0122**
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INSPECTION
RvA I 122

1 General information on the measuring instrument

Properties of the measuring instrument, whether mentioned or not, shall not be in conflict with the Legislation.

1.1 Essential Parts

1.1.1 Measurement sensor

- Make Micro Motion, various types. See Evaluation certificate TC7056 for details.
- Make Micro Motion, various types. See Evaluation certificate TC7050 for details.

1.1.2 Core Processor

- Micro Motion, type MVD700 or MVD800. See Evaluation certificate TC7057 for details. When a flow transmitter 5700 with integral core processor is used the core processors MVD700 or MVD800 are not applied.

1.1.3 Flow transmitter

- Make Micro Motion, various types. See Evaluation certificate TC7057 for details. This flow transmitter is optional when a flow computer is part of the installation.
- Make Micro Motion, type 5700, with remote core processor. See Evaluation certificate TC8519 for details. Optional when a flow computer is part of the installation.
- Make Micro Motion, type 5700, with integral core processor. See Evaluation certificate TC8519 for details.
  When this flow transmitter type 5700 with integral core processor is used a flow computer is optional.

1.1.4 Flow computer

A flow computer may be optional.

Producer	Type	Evaluation certificate / Further details	Remarks
Emerson Process Management Flow B.V.	FloBoss S600 and S600+	TC7470	
Emerson Process Management Remote Automation Solutions	FloBoss S600 and S600+	TC8218	
	DL8000	TC7661	
OMNI Flow Computers, Inc.	OMNI 3000 OMNI 6000	TC7375	
Contrec Enraf	Contrec 1010	TC7348	
Meci	CDN12	LNE-15088	
FMC	Accuload III	TC7301	
FMC	microLoad	TC7302	
S.A.M.P.I. s.p.a., Italy	TE550	TC7171	
Spirit IT	Flow-X	TC7570	

1.1.5 Data storage / printer (optional):
- Make Spirit IT, type Virtual Printer Manager, Evaluation Certificate TC7172
- Make Dohmann, type Logbuch

The data storage stores all measurement data coming from the flow transmitters. In case of dispute, this stored data is decisive.
The Logbuch data storage is a PC based (MS DOS operating system) unit, intended to be placed in a 19-inch rack. The data is securely stored on a hard disk. Data transmission is via serial FDW protocol. Power supply is 230 V AC, consumption 22 VA.

The approved software versions are:
- Version 1.xx[1] with checksums 057F[2] / 082D[3] and 18C7[4].
- Version 2.xx[1] with checksums 057F[2] / 082D[3] and 1B93[4].

With:
[1] xx representing non-custody transfer software modifications.
[2] Custody transfer checksum
[3] Unit HDD checksum
[4] Unit REC checksum

The software version can be verified by switch off the unit, connect a keyboard and switch on the unit. After the start message enter the command version and press enter. The software version and custody transfer CRC number is shown on the screen (along with other information). After pressing enter, the other checksums (HDD and REC) and the position of the Weights and Measures switch are shown.

1.1.6 Temperature transmitter (optional)
- Make Rosemount, type 3144P Series. See Parts certificate number TC7458 for details.

1.1.7 Pressure transmitter (optional)
- Make Rosemount, type 3051S series. See Parts certificate number TC7457 for details.

1.2 **Essential Characteristics**
- Minimum – Maximum flow rate (Q_{min} – Q_{max}):
  - The Q_{min} of the measuring instrument shall not be smaller than the largest Q_{min} of the components making up the measuring instrument.
  - The Q_{max} of the measuring instrument shall not be larger than:
    - The smallest Q_{max} of the components making up the measuring instrument in case a single meter or meters in series are used.
    - The sum of Q_{max} of each meter in case parallel meters is used in a non-blending application.
  - The ratio Q_{max}:Q_{min} shall be:
    - At least 5: 1 when measuring cryogenic liquids
    - Suitable for use when used on a pipeline or for loading ships
    - At least 4: 1 in all other cases
- Minimum measure quantity (MMQ):
  The MMQ is not smaller that the largest value of:
  - The MMQ mentioned in the Evaluation certificate of the measurement sensor;
  - 100 times the additional effect of the pipe work between measurement sensor and transfer point due to variations in temperature, equal to 10°C for exposed pipes and 2°C for insulated or underground pipes.
  - nnn times the largest display scale interval
  - nnn times the printed scale interval

Where nnn is determined by:

Accuracy Class	nnn	Accuracy Class	nnn
0.3	333	1.5	66
0.5	200	2.5	100
1.0	100		

The MMQ value is rounded up to the nearest value of $1 \cdot 10^n$, $2 \cdot 10^n$ or $5 \cdot 10^n$, with n being any integer or 0.

- Product density range
  See the applicable Evaluation certificate of the measurement sensor for the product density range.
- Meter in series (optional)
  Two meters can be installed in series; one meter acts as the "custody transfer" meter (used for the measurement) and the other meter acts as the "check" meter. A plate on the meters defines which meter is used for what purpose.
- Meters in parallel, (optional).
  Two or more meters can be mounted parallel.
  Please note that:
  - It is not mandatory that all meters operate simultaneously.
  - The meter size can be different.
  - Measures shall be taken to ensure that the minimum and maximum flow rate of each individual meter is not exceeded.
  - If the delivered total of the meters is summated and presented by the flow computer mentioned in paragraph 1.1.4, the whole installation can be considered as one measuring system and only one name plate is present. In all other cases, every individual measurement sensor is to be considered an individual measuring instrument, and the appropriate number of name plates has to be present for each measuring system.
  - When measuring the same product through one transfer point, the delivered amount is the total of all meters and therefore this amount can be mass and/or volume at metering and/or base conditions.
  - When measuring different products via one transfer point (blending application); only the sum of the delivered masses is Custody Transfer approved.
- Transfer points:
  The measuring instrument consists of one or more transfer points;
  The use of multiple transfer points simultaneously (without interlocking) is only allowed if the delivered quantity is destined for the same receiver or supplier. If this condition cannot be guaranteed, interlocking is required and only one transfer point can be used at a time.
- Temperature range ambient and liquid:
  Depends on the used parts forming the measuring instrument; See the Evaluation/ Parts certificates of each component for the approved temperature range.

- When measuring liquefied gases under pressure, it is ensured that the liquid pressure is at least 1 bar higher than the vapour pressure of the liquid. This to ensure that the gas stays in the liquid state throughout the system.

1.3 Essential Shapes

1.3.1 Inscriptions.

- Name plate
  On the measuring instrument, clearly visible, at least the following is inscribed:
  - The CE marking and the supplementary metrological marking
  - This EC type-examination certificate number: T10071.
  - Manufacturers name or trade mark
  - Designation
  - Year of manufacture and a serial number
  - Accuracy class
  - Minimum and maximum flow rate (Q_{max} and Q_{min})
  - Maximum pressure (P_{max})
  - Liquid(s) to be measured
  - Temperature range ambient
  - Environmental classes (mechanical and electromagnetic)
- Measurement sensor
  For the inscriptions on the measurement sensor, see the applicable Evaluation certificate.
- Flow transmitter
  For the inscriptions on the flow transmitter, see the applicable Evaluation certificate.
- Flow computer
  For the inscriptions on the flow computer, see the applicable Evaluation or Parts certificate.
- Temperature and pressure transmitter
  For the inscription on the temperature and pressure transmitter, see the applicable Part certificates

1.3.2 Seals

- Name plate
  The nameplate of the measuring instrument is sealed against removal
- Measurement sensor
  For the sealing of the measurement sensor, see the applicable Evaluation certificate.
- Flow transmitter
  For the sealing of the flow transmitter, see the applicable Evaluation certificate.
- Flow computer
  For the sealing of the flow computer, see the applicable Evaluation certificate.
- Temperature and pressure transmitter
  For the sealing of the temperature and pressure transmitter, see the applicable Parts certificates.
- All connections (tapping's) such as blind flanges, valves, etc. located between meter and transfer point.
  Guidelines for measures to take, such as permanent or temporary seals, are given in NMi procedure CPC–PR–01.

1.3.3 Configuration
- For the typical arrangement of the interruptible measuring instrument, see documentation number 10071/3-02 in the Documentation folder.
- For the typical arrangement of the non-interruptible measuring instrument, see documentation number 10071/9-02 in the Documentation folder.

1.4 **Conditional parts**

The measuring system contains also the following conditional parts:
- Temperature sensor (optional).
- Pressure sensor (optional).
- Sample point (optional).
  Installed upstream or downstream of the measurement sensor. In the latter case, see note on the PI&D drawings in the documentation folder.
- Back-up power supply
  Mandatory for non-interruptible systems. Optional for interruptible systems.

1.5 **Conditional characteristics**
- Before a delivery is started, the system shall be free of air.
- By-pass of a sensor (optional)
  See notes on the P&ID documentation numbers 10071/3-02 and 10071/9-02 in the documentation folder, for prescribed conditions for by-passing a sensor.

1.6 **Conditional shapes**
- The construction shall be such that no air pockets remain after the air is released by the vent-off valves.
- Diameter of the valves and piping.

1.7 **Non essential parts**
- Pump, pipe work and connections.
- Block-in valve(s)
- Vent-off valve(s)
- Filter/strainer

2 Conditions for Conformity Assessment

- Verification procedure of the system
  - For the putting into use, the NMi procedure C-SP-HW-281 can be applied. The title of the procedure is “Procedure C-SP-HW-281 for the MID conformity assessment for the Micro Motion Flow meter when used for custody transfer gas application (annex MI-002) and liquid applications (annex MI-005)”.
  - Verify that the stated accuracy class on the nameplate is suitable for the conditions in which the installation is used.
  - Verify that the stated environmental class (mechanical and electrical) on the nameplate match with the stated environmental classes of each component.
  - NMi procedure CPC-PR-01 describes how to handle valves and connections that are situated between meter and transfer point. The title of the procedure is “Integrity requirements for valves/connections between meter and transfer point in an industrial liquid metering system, equipped with Micro Motion Coriolis meter(s), to comply with the essential requirements out of the MID, annex MI-005”.

- Verification procedure of the meter
  For the putting into use, the NMi procedure C-SP-HW-280 can be applied. The title of the procedure is “Procedure C-SP-HW-280 for the MID conformity assessment for the Micro Motion Flow meter when used for custody transfer in gas applications (annex MI-002) and liquid applications (annex MI-005)”.

  The initial verification can be based on:
  - a water calibration, which includes:
    - a zero mass flow setting at the water calibration facility
    - mass flow tests
    - if applicable a density test
  - In the field
    - a zero mass flow setting, if needed
    - a zero mass flow verification
    - if applicable a density verification.

Note: a zero mass flow verification and if applicable a density verification can be used for subsequent verifications.

If the measurement sensor is used bi-directional, the verification in one direction is sufficient.

This procedure is justified because of the fact that tests have proven that the mass accuracy on water is representative for mass accuracy on other liquids.