EC type-examination certificate

Number **T10318** revision 4
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 **LPG measuring system** on road tankers

Manufacturer	: Emerson
Type	: MMI-MID 005
Minimum – maximum flow rate (Q_{min} - Q_{max})	: See § 0 of the description
Minimum measured quantity	: See § 0 of the description
Accuracy class	: 1.0
Environment classes	: M3 / E3
Temperature range liquid	: -10 °C / +50 °C
Temperature range ambient	: -25 °C / +55 °C
Intended for the measurement of	: LPG

Further properties are described in the annexes:
- Description T10318 revision 4;
- Documentation folder T10318-3.

Valid until: 17 December 2020

Remarks:
- The measuring system is approved for measuring mass and actual volume.
- This revision replaces the previous versions, with exception of the documentation folder.

Issuing Authority: **NMi Certin B.V., Notified Body number 0122**
17 December 2015

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INSPECTION RvA I 122

1 General information on the measuring system

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

1.1 Essential Parts

Producer	Type	Evaluation Certificate / Parts certificate / EEC pattern approval	Remarks
Measurement transducer			
Micro Motion	F100; F200	TC7050	
Core Processor			
Micro Motion	MVD700 MVD800	TC7057	
When a flow transmitter 5700 with integral core processor is used the core processors MVD700 or MVD800 are not applied.			
Flow transmitter			
Micro Motion	MVD2700 MVD 3000 series	TC7057	
Micro Motion	5700	TC8519	
The flow transmitters that are known from TC7057 and the flow transmitter 5700 with remote core processor are optional when a flow computer is part of the installation. When the flow transmitter 5700 with integral core processor is used a flow computer is optional.			
Flow computer			
A flow computer may be optional.			
S.A.M.P.I. s.p.a., Italy	TE550	TC7171	
Air separator			
Sampi / LC Europe / LC Inc.	42100; A8180; A8200; A8340	FI 96 47101; D95 5.245.02	Optional for back pressure valve configuration, mandatory for differential pressure valve configuration.
Pressure transmitter			
Rosemount	3051S	TC7457	

1.2 **Essential Characteristics**

In addition to the characteristics as is stated on page 1 of this EC type-examination certificate T10318, the following characteristics apply:

- Minimum – Maximum flow rate (Q_{min} – Q_{max}):
  - The Q_{min} of the measuring system shall not be smaller than the largest Q_{min} of the components making up the measuring system.
  - The Q_{max} of the measuring system shall not be larger than the smallest Q_{max} of the components making up the measuring system.
  - The ratio Q_{max}:Q_{min} shall be at least 5:1.
- 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 largest display scale interval
  - 100 times the printed scale interval
- Maximum pressure
  The maximum operating pressure of the system depends on the configuration.
  For pressure compensation, see the Evaluation Certificate TC7050.
- Approved units of measurement are mass and/or actual volume (= volume at process conditions)

The system (from tank to transfer point) is always filled with liquid before and after a delivery. The design of the measuring system shall ensure that the product in the meter remains in liquid phase during the measurements.

1.3 **Essential Shapes**

1.3.1 Configuration

- The essential parts stated in 1.1 can be applied in each desired combination as long as there is no conflict with the concerning Evaluation Certificates and as long the following limitation is respected:
  - The TE550 flow computer can only be used in combination with an integrated MVD2700 flow transmitter or with a transmitter type 5700.
- Two measuring system configurations are applied:
  - Based on back pressure valve without air separator;
  - Based on differential pressure valve with air separator.

  Examples of these configurations are given in the documentation no. 10318/9-01.

1.3.2 Inscriptions.

- Name plate
  On the measuring system, clearly visible, at least the following is inscribed:
  - The CE marking and the supplementary metrological marking;
  - This EC type-examination certificate number: T10318;
  - Manufacturers name or trade mark;
  - Designation;
  - Year of manufacture and a serial number;
  - Accuracy class;
  - Minimum and maximum flow rate;
  - Maximum pressure;
  - Name(s) of nature(s) of the product(s) to be measured;
  - Mechanical and electromagnetic environment classes;
  - Ambient temperature range;

- Liquid temperature range.

An example of the name plate is given in the documentation no. 10318/0-02.

- Further inscriptions:
  - The inscription "Minimum Measured Quantity …" in the vicinity of the display of the calculating and indicating device and/or on the nameplate;
  - The inscriptions on the measurement sensor as mentioned in Evaluation certificate number TC7050 or TC8519;
  - The inscriptions on the electronic calculating and indicating device as mentioned in Evaluation certificate number TC7057;
  - The inscriptions on the flow computer as mentioned in Evaluation certificate TC7171;
  - The inscription on the pressure transmitter as mentioned in Parts certificate TC7457;
  - The inscriptions on the air separator as mentioned in EEC pattern approval FI 96 47101/ D95 5.245.02.

1.4 **Conditional parts**

- Flow control valve
- Differential valve:
  The spring setting of the differential valve shall be such that the flow meter back pressure is at least 1 bar higher than the reference vapour pressure. The spring setting shall be sealed after its adjustment.
- Preset valve (optional).
  The preset valve is stopping the delivery in case the preset of the mass or the volume has been reached. The valve is fitted downstream of the measurement transducer; this valve may also function as a block valve.
- Manually or automatically operated valves in the vapour/liquid line (optional).
  These valves shall be in open position during delivery.
- Printer
  A printer is connected to the flow computer and is used for printing the reports (deliveries), events and alarms.
  - Fiscal Printing:
    - The printer can be of any brand and type under the condition that it is equipped with a paper out detection and that the communication with the printer is safe guarded; see Evaluation Certificate TC7057 for meeting these requirements;

    and/or
    - Virtual Printer Manager, make Spirit IT, Evaluation Certificate TC7172
  - Non-Fiscal Printing:
    The printer can be of any brand and type and is labelled "Not for custody transfer purposes".

1.5 **Conditional characteristics**

Before a delivery is started, the system shall be free of air.

1.6 **Conditional shapes**

The construction shall be such that no air pockets remain after the air is released by the vent-off valves.

1.7 **Non essential parts**

- Pump, pipe work and connections.
- Valve(s)
- drain valve(s)

2 Seals

The following items of the measuring system are sealed:

- Nameplate of the frame of the measurement system. Removal of the nameplate without destroying it or without breaking a seal shall not be possible;
- For sealing of the measurement sensor, see Evaluation certificate no. TC7050;
- For sealing of the electronic calculating and indicating device, see Evaluation certificate no. TC7057;
- For sealing of the flow computer, see Evaluation certificate TC7171;
- For sealing of the air separator, see EEC pattern approval FI 96 47101 / D95 5.245.02;
- For sealing of the pressure transmitter see Parts certificate TC7457.

3 Conditions for Conformity Assessment

The initial verification of the measuring instrument shall include at least the following steps:

1. Essential parts covered by an Evaluation certificate or Part certificate shall be constructed and set-up according the applicable Evaluation/Part certificate.
2. Verification of the correct parameter settings of the flow transmitter
3. The zero flow value of the measurement is checked via one of the following options:

   a) Field Verification Zero (FVZ):

   Field Verification Zero indicates the average mass flow rate over the last 3 minutes with mass flow cut-off to zero and flow direction as " bi-directional" . FVZ is available via local display or from Diagnostic Information Screen with ProLink. Record FVZ including temperature, density measurement and pressure measurement, if present.

   b) Averaging of Live Zero:

   If software Prolink is connected, the register “live zero” is subject of interest ; this “live zero” includes a non-adjustable damping of 12.8 seconds.
   The zero flow is determined by writing down all values over a 3 minutes period and taking the average. This value is the base for calculating the zero flow effect on Qmin. Record the zero flow result including Micro Motion temperature, density measurement and pressure measurement, if present.

   c) Increasing totals over 3 minutes:

   Set low flow cut off parameter to “zero” and flow-direction parameter to “bi-directional”. Monitor the increase of the mass totals over exact 3 minutes and multiply this result with 20 to find kg/h or divide by 3 to find kg/min. Write down the zero flow result including Micro Motion temperature and density measurement and pressure measurement, if present. Set both parameters back to original value.

   The average, observed zero mass flow value from a, b or c is the base for calculating the zero flow effect on Q_{min}.
   The maximum found value of the zero-flow is mentioned in the table below:

Accuracy Class	1.0
Max. zero-flow as percentage of the Q_{min} of the measuring system	0.4

4. The measurement accuracy of the measuring instrument is verified.
   This is done:
   - Directly on site of installation by comparing the measurement result with a calibrated master (e.g. master meter; weighing bridge);
   - The uncertainty of the proving means should not exceed one third of the metering system MPE.

   or
   - In a test lab on a liquid with similar properties (density and viscosity) as the liquid to be measured.

   The result of this investigation is a test report, which states the results and the correct settings of all parameters which are directly involved in the measurement (as a result of this investigation they may have to be changed in respect of the original factory settings).

   Note: Steps 2, 3 and 4 can also be used for subsequent verifications.

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