

## EC type-examination certificate UK/0126/0065 Revision 1

issued by:

**The National Measurement Office  
Notified Body Number 0126**

In accordance with the requirements of the Measuring Instruments (Liquid Fuel delivered from Road Tankers) Regulations 2006 (SI 2006/1259) and the Measuring Instruments (Non-Prescribed Instruments) Regulations 2006 which implement, in the United Kingdom, Council Directive 2004/22/EC, this EC type-examination certificate has been issued to:

**Toptech Systems NV  
Nateus Business Park  
Nieuwe weg 1 - Haven 1053  
2070 Zwijndrecht (Antwerp)  
Belgium**

in respect of an interruptible measuring system for liquids other than water and having the characteristics described below.

Designation : MultiLoad II/(measurement transducer installed)  
Qmin-Qmax : see paragraph 3.1  
Minimum measured quantity : see paragraph 3.1  
Accuracy class : 0.5  
Mechanical environment : M2  
Electromagnetic environment: E2  
Climatic environment : -25 °C to +55 °C open, condensing  
Temperature range of liquid : -10 °C to +50 °C  
Intended for measurement of : liquid petroleum products, bio-fuels and ethanol

The necessary data (principal characteristics, alterations, securing, functioning etc) for identification purposes and conditions (when applicable) are set out in the descriptive annex to this certificate.

This Revision replaces previous versions of this certificate.

**Issue Date: 03 May 2011**  
**Valid Until: 22 February 2020**  
**Reference No: T1154/0001**

  
**Signatory: P R Dixon**  
**for Chief Executive**



**BIS**

**Department for Business  
Innovation & Skills**

# Descriptive Annex

## 1 INTRODUCTION

The instrument is an interruptible meter measuring system for loading or unloading road tankers and comprises the MultiLoad II electronic calculator/indicator (flow computer) and a choice of measurement transducers (meter sensor & transducer) and gas elimination devices as specified below.

## 2 CONFIGURATION OF THE MEASURING SYSTEM

### 2.1 Essential parts

#### 2.1.1 Measurement device

The measurement device comprises the meter sensor and a transducer as listed in section 4.1.

#### 2.1.2 Electronic calculating/indicating device (flowcomputer)

The flow computer is the MultiLoad II, manufactured by Toptech Systems. See Evaluation Certificate TC7311 for details.

#### 2.1.3 Gas elimination device

The gas separators/gas elimination devices are listed in section 4.3.

### 2.2 Conditional parts

#### 2.2.1 Temperature sensor

If a temperature sensor is used, it must be a class A or B PT100 sensor to measure the liquid temperature. The temperature sensor, if fitted, must be installed within 1 metre upstream or downstream of the measuring transducer. The measured liquid temperature can be used by the flow computer to calculate the delivered volume at standard temperature (15°C).

### 2.3 Non-essential parts

- Pump(s), pipe work and connection
- Isolating valves
- Vent-off valves

### **3 CHARACTERISTICS OF THE MEASURING SYSTEM**

#### **3.1 Essential characteristics**

The essential characteristics of the system are stated on page 1 of this certificate.

$Q_{\min} - Q_{\max}$	See table in section 4.1.3 (1)
Maximum working pressure: ( $P_{\max}$ )	10 bar
Minimum delivery (MMQ):	200 L or, 500 L (2)
Type of liquid	Liquids other than water of low viscosity, except liquefied gases, including biofuels and ethanol. The specific liquid viscosities are dependent on the measurement transducer being used, see table 4.1.3.

- (1) any measurement transducer listed in section 4.1.3 may be used in conjunction with a gas separator device listed section 4.3.1 providing the maximum rate of flow is not greater than the maximum rate of flow of any component of the system.
- (2) when using the Stokota BR-150, the MMQ is 500L.

#### **3.2 Conditional characteristics**

##### **3.2.1 Hydraulic circuit**

An example of a possible basic outline of the hydraulic circuit and the essential components are shown in figure 1, before a delivery is started the system shall be free of air.

#### **3.3 Non-essential characteristics**

**3.3.1** The measuring instrument is utilised as top loading or bottom loading.

**3.3.2** The shape of the name plate.

**3.3.3** Optional (additive) injection points may be present. If present they are located upstream of the measurement sensor.

**3.3.4** Some parts of the system may be used as a common part for multiple measuring instruments. For example the pump can be used to feed multiple instruments.

## **4 MAIN COMPONENTS/PARTS OF THE MEASURING INSTRUMENT**

### **4.1 Measurement device**

The measurement transducers have the following essential parts:

#### **4.1.1 FMC Model: Prime4 (including encoder)**

Measuring chamber: This is a rotary positive displacement type. The measuring chamber consists of a cylindrical housing with an inner rotor having two evenly spaced blades which rotate as liquid flows through the meter (the Rotor revolves on Tungsten carbide bearings); the motion of the blades is controlled with a special cam. Measuring chambers of volume are formed between the two blades, the rotor, the housing and the top cover.

Electronic pulser/Encoder: The exciter gear, integral part of the rotor, converts rotation of the rotor into electrical pulses together with a pulse pickup located in a well on the side of the meter cover.

#### **4.1.2 FMC(Smith) models L(H)S-42 or SE42 or E3, (L)SF60 or F4 or VF60 & S35 & S45 & (L)ST160 or T40**

Measuring chamber: This is a rotary positive displacement type. The measuring chamber consists of a cylindrical housing with an inner rotor having two evenly spaced blades which rotate as liquid flows through the meter (the Rotor revolves on ball bearings); the motion of the blades is controlled with a special cam. Measuring chambers of volume are formed between the two blades, the rotor, the housing and the top cover.

90° drive gear: On the output shaft of the rotor a drive gear can be mounted. An adjustment device is not present in this drive gear.

The FMC(Smith) measurement transducers may be used with any of the electronic pulsers/encoders approved within this certificate or any other approved pulser, including:

- Internal pulser of Prime 4
- Eltomatic type 01/09
- Eltomatic type 01/08

**4.1.3** The essential characteristics of the measurement transducers are:

<b>Model designation</b>	<b>Flow rate range</b>	<b>Viscosity</b>
	$Q_{\min} - Q_{\max}$ (L/min)	mPa.s
L(H)S-42 /SE42 / (E3)	150 - 1900	0.3 - 17 8 - 350 25 -1000 500-10000
Prime 4	190 - 3400	0.3- 17 3.5 - 120 8 - 350 100 -1000 500 - 10000
(L)ST 160/(T40)	50 - 1600	0.3 - 17 25 – 1000 500 - 10000
S35	150 - 1900	0.3 - 17 8 - 350 25 -1000 500-10000
S45	200 - 3000	0.3 - 17 8 - 350 25 – 1000 500-10000
(L)SF60 / F4 / VF60	200 - 3000	0.3 - 17 8 - 350 25 – 1000 500-10000

Non essential parts of the measurement transducer:

- An optional filter can be mounted at the inlet.

## **4.2 Gas Separator device**

These can be of following makes and have following essential parts.

NOTE : If one or more degasser(s) is/are shared across multiple measurement instruments, one needs to verify that either the pump(s) to feed the installation cannot exceed the max flow of the degasser(s) used, or that the total maximum flow the measuring systems are capable of flowing does not exceed the maximum flow of the degasser(s) used.

### **4.2.1 FMC, type VDR**

The inlet and outlet of the body (cylinder) are tangentially constructed. This forces the

liquid into a rotational movement. This centrifugal movement in conjunction with a decrease in flow velocity and pressure causes air and gas to be segregated from the liquid and released subsequently through the automatic operated float valve(s). This valve(s) is placed on top of the air separator body.

**4.2.2 Stokota, type BR150**

The inlet and the outlet of the body (cylinder) are tangentially constructed. This forces the liquid into a rotational movement. This centrifugal movement in conjunction with a decrease in flow velocity and pressure causes air and gas to be segregated from the liquid and released subsequently through the automatic operated float valve(s). This valve(s) is placed on top of the air separator body.

**4.2.3 S.A.M.P.I. Spa, EGS\_1 & EGS\_2.**

As described in Evaluation Certificate TC 7329.

**4.2.4 Bopp & Reuther Messtechnik GmbH, type ZGA**

The gas separator is made of a welded pressure vessel with an integrated automatic float-deaeration device. The liquid enters tangentially at the upper port, resulting in a swirling flow inside the gas separator. This swirling motion is sustained by the tangential outgoing liquid at the outlet port. The distribution of pressure in the swirling flow causes any air or gas to escape via the ventilating valve. The direction of flow is indicated by an arrow on the inlet port. The sight glass is used to monitor the float and the liquid.

**4.2.5** The devices have following essential characteristics:

Model Designation	Q Max (L/min)	Bore size Inlet/Outlet Flange (Std. Available)
VDR 10	1000	2", 2½", 3"
VDR 20	2000	2", 3", 4"
VDR 25	2500	3", 4", 6"
VDR 30	3000	4", 6"
VDR 40	4000	4", 6"
VDR 60	6000	6", 8"
VDR 70	7000	6", 8"
VDR 100	10000	8", 10"
VDR 130	13000	8", 10"
VDR 180	18000	10", 12"
VDR 240	24000	10", 12", 16"
VDR 350	35000	12", 16"
BR 150	2200	3", 4"
EGS_1	3300	2", 3", 4"
EGS_2	1700	2", 3", 4"

Model Designation	Q Max (L/min)	Container capacity (L)	Effective volume (L)
ZGA 25	100	29	10
ZGA 25	100	29	10
ZGA 50	300	45	25
ZGA 65	700	120	60
ZGA 80	1200	180	95
ZGA 100	1200	180	95
ZGA 100	2000	300	180
ZGA 100	3000	470	295
ZGA 150	3000	470	295
ZGA 150	5000	1000	675
ZGA 200	5000	1000	675
ZGA 250	5000	1000	675
ZGA 200	10000	2200	1500
ZGA 250	10000	2200	1500
ZGA 300	10000	2200	1500
ZGA 300	12000	2700	1900
ZGA 300	20000 <sup>1)</sup>	5000	2800
ZGA 400	20000 <sup>1)</sup>	5000	2800
ZGA 300	25000 <sup>1)</sup>	7000	5000
ZGA 400	25000 <sup>1)</sup>	7000	5000

<sup>1)</sup> with 2 deaeration devices

#### 4.2.6 Optional and non essential parts of air separators:

- Strainer before the inlet of the air separator
- The separated air/gas is released into the air or into a vapour recovery line

## 5 APPROVAL CONDITIONS

### 5.1 The certificate is issued subject to the following conditions on inscriptions

- Manufacturers mark or name
- Accuracy class
- Maximum operating pressure
- Liquid type(s)
- Operating temperature range
- Minimum Measured Quantity<sup>(1)</sup>
- Flow rate range
- Serial number
- Certificate number

- 'CE' marking
  - Supplementary metrology marking
  - Notified body identification number
- (1) MMQ stands for Minimum Measured Quantity. The inscription "MMQ ...L" in the neighbourhood of the display of the flow computer and/or on the nameplate.

## **5.2 Location of seals and verification marks**

Components that may not be dismantled or adjusted by the user will be secured by either a wire and seal or tamper evident label and securing mark. The securing mark may be either:

- a mark of the manufacturer and/or manufacturer's representative, or
- an official mark of a verification officer or Notified body

## **5.3 The following items shall be secured:**

- nameplate to the measuring instrument (incl. CE marking). Removal shall be impossible without damaging it or without breaking a seal.
- the measurement sensor against removal :
- electronic pulser against removal
- measurement chambers against opening
- the gas extractor against removal
- the mechanical connections between the meter sensor and the pulser (if applicable)
- the flow computer as described in Evaluation Certificate TC7311.
- the temperature sensor used as part of the volume conversion functionality against removal

## **6 RECOMMENDED TESTS**

The meter measuring system should be tested at a minimum of two substantially different rates of flow between the maximum and minimum rates of flow.

Due regard should be paid to the viscosity of the liquid used for the verification tests to ensure that the permitted limits of error are not likely to be exceeded when other liquids which the system is intended to measure are metered.

## **7 ILLUSTRATIONS/DOCUMENTATION**

- |          |                                    |
|----------|------------------------------------|
| Figure 1 | Hydraulic diagram                  |
| Figure 2 | MultiLoad II                       |
| Figure 3 | Example of Hydraulics Installation |
| Figure 4 | Example of the name plate          |

ISSUE NO.	DATE	DESCRIPTION
UK/0126/0065	23 February 2010	Type examination certificate first issued.
UK/0126/0065 Revision 1	3 May 2011	Revision 1 Issued: Front Page – Update of company Name Section 4.2 Note added Sections 4.2.4 & 4.2.5 - Bopp & Reuther Messtechnik GmbH, type ZGA gas separator added Figure 4 – Name plate updated.

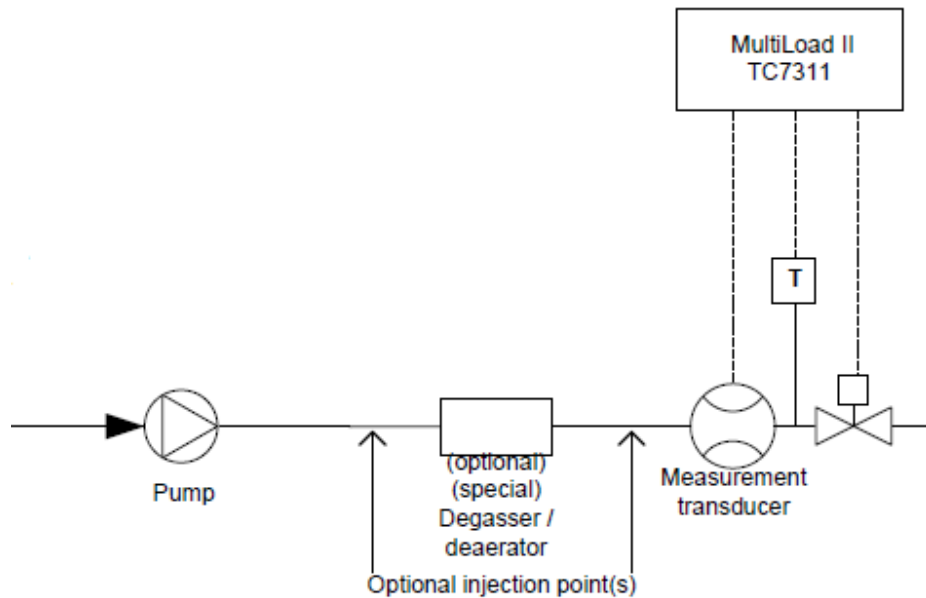


Figure 1 Hydraulic diagram



**Figure 2 MultiLoad II**



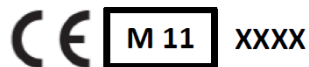
**Figure 3 Example of Hydraulics Installation**



**MEASURING SYSTEM**

Manufacturer:	Toptech Systems NV
Model:	
Manufacturing Year/ Serial n°:	2011 /
EC – type examination certificate:	UK/0126/0065
Liquids measured:	
Accuracy class:	0.5
Viscosity:	mPa.s
Flow rate range:	L/min - L/min
MMQ:	L
Pmax:	bar(g)
Temperature range liquid:	-10°C /+50°C
Temperature range ambient:	-25°C/ +55°C
Environment class:	M2/E2

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**Figure 4 Example of the name plate**