# Evaluation Certificate

Number **TC7364** revision 4
Project number 15200210


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|---|---|
| Issued by | NMi Certin B.V. |
| In accordance with | – WELMEC guide 8.8 "General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments under the MID".<br>– OIML R117-1 Edition 2007 (E) "Dynamic measuring systems for liquids other than water". |
| Producer | VAF Instruments B.V.<br>Vierlinghstraat 24<br>3316 EL Dordrecht<br>The Netherlands |
| Measuring instrument | A **measuring device** (PD meter), intended to be used as a part of a measuring instrument. |

| | | |
|---|---|---|
| Type | : | JZ010; JZ015; JZ025; JZ040; JZ050; JZ080; JZ100; JZ150; JZ200; JZ250; JZ300 [1] |
| Destined for the measurement of | : | Oil and oil products, chemical products and potable liquids<br>See the Description §1.2 |
| $Q_{min}$ – $Q_{max}$ | : | See the Description §1.2 |
| Minimum measured quantity | : | See the Description §1.2 |
| Accuracy class | : | 0,3; 0,5 |
| Environment classes | : | M2 |
| Temperature range liquid | : | -10 °C / +50 °C |
| Temperature range ambient | : | -25 °C / +55 °C |

Further properties and test results are described in the annexes:
– Description TC7364 revision 4;
– Documentation folder TC7364-4.

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|---|---|
| Remarks | This revision replaces the earlier versions, including its documentation folder. |

[1] With Z being a code, indicating the type of material of the meter, see Description §1.2.1.

Issuing Authority **NMi Certin B.V.**
25 June 2015

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# 1 General information on the measuring device

All properties of the measuring device, whether mentioned or not, shall not be in conflict with the legislation.

This Evaluation Certificate is the positive result of the applied voluntary, modular approach, for a component of a measuring instrument, as described in WELMEC guide 8.8.

This Evaluation Certificate is issued based on the previous EEC type approvals as shown in the table below:

| Type | JZ010 | JZ015 | JZ025 | JZ040 | JZ050 | JZ080 | JZ100 | JZ150 | JZ200 |
|---|---|---|---|---|---|---|---|---|---|
| Previous EEC approval no. | E108 | E107 | E101 | E100 | E106 | E104 | E105 | E155 | E219 |

The complete measuring system must be covered by an EC type-examination Certificate.

## 1.1 Essential parts

1.1.1 Measurement sensor
The measurement sensor consists of a housing in which one rotor is mounted. Two pairs of vanes are placed into four slots in the rotor. Each pair of vanes is positioned by a rod and can move in and out of the rotor. The incoming liquid forces the rotor to rotate. See page 2 of document no. 7364/1-02.
For photographs, drawings and dimensions of the measurement sensor see document no. 7364/1-01, 7364/1-02, 7364/2-01, 7364/1-03 and 7364/4-01.

1.1.2 Adjustment device
The measurement sensor is equipped with an adjustment device (see document no. 7364/4-02), which consists of the following characteristics:

- adjustment steps of 0,08% to 0,12%;
- adjustment range 9%.

1.1.3 Pulser (optional)
Optional one of the following pulsers can be applied:

- Eltomatic pulser type 01-08, see documentation no. 7364/1-06;
- Eltomatic pulser type 01-09, see documentation no. 7364/1-07;
- Namur pulser type SJ2-N, see documentation no. 7364/1-08.

1.1.4 Mechanical counter (optional)
One of the following mechanical counters can be used for JZ010 and JZ015:

- VAF Instrument B.V. type JZ015NE;
- VAF Instrument B.V. type N-counter.

The following mechanical reset counter can be used for JZ025 up to and including JZ300:

- Veeder Root, type 0788700-900.

1.1.5 Mechanical printer (optional)
The following mechanical printers can be used:

- Veeder Root, type zero start 0788810-011;
- Veeder Root, type Accumulatief 0788811-501.

1.1.6 Mechanical preset (optional)
The following mechanical preset can be used:

- Veeder Root, type zero start 0788901-703.

1.1.7 Mechanical temperature conversion (optional, only for JZ080)
Works according formula:
$V_0 = V_T * (1 – K_0 * (T – T_0))$

With:

$V_0$ = Volume at reference temperature $T_0$
$V_T$ = Volume at temperature T (meter temperature)
$K_0$ = Expansion coefficient ($T_0$ and $K_0$ are indicated on the conversion device)

Manufacturer: A.O. Smith
Capillary length: Approximately 1 meter

## 1.2 Essential characteristics

1.2.1 Measurement sensor
The following "Z" code applies for the type of material of the measuring sensor:

1 = Steel
3 = Stainless steel
5 = Ductile iron

The measuring sensor has the following characteristics:

| Type | Diameter inlet/outlet [mm] | Cyclic volume [L] | $Q_{min}$ [L/min] | $Q_{max}$ [L/min] | MMQ [L] | $P_{max}$ [bar(g)] | "Z" code material type |
|---|---|---|---|---|---|---|---|
| JZ010 | 10 | 0,010 | 0,008 | 20 | 0,2 | 52 | 1 / 3 |
| JZ015 | 15 | 0,025 | 0,02 | 50 | 0,2 | 52 | 1 / 3 / 5 |
| JZ025 | 25 | 0,166 | 0,06 | 160 | 5 | 20 or 25 | 1 / 3 / 5 |
| JZ040 | 40 | 0,166 | 0,1 | 250 | 5 | 20 or 25 | 1 / 3 / 5 |
| JZ050 | 50 | 0,400 | 0,2 | 500 | 100 | 20 or 25 | 1 / 3 / 5 |
| JZ080 | 80 | 2,941 | 0,8 | 1900 | 100 | 20 or 25 | 1 / 3 / 5 |
| JZ100 | 100 | 5,28 | 1,1 | 2750 | 100 | 20 or 25 | 1 / 3 / 5 |
| JZ150 | 150 | 11,90 | 1,8 | 4600 | 500 | 20 or 25 | 5 |
| JZ200 | 200 | 29,30 | 10 | 8000 | 500 | 12,5 | 5 |
| JZ250 | 250 | 58,6 | 300 | 12500 | 1000 | 12,5 | 5 |
| JZ300 | 300 | 58,6 | 300 | 15000 | 1000 | 12,5 | 5 |

For JZ025 up to and including JZ200 the minimum ($Q_{min}$) and maximum flow rates ($Q_{max}$) can be chosen between the table above mentioned $Q_{max}$ and $Q_{min}$ and with a maximum ratio of $Q_{max}$:$Q_{min}$ belonging to the following viscosity ranges:

| Viscosity range [mPa·s] | Maximum ratio of $Q_{max}$:$Q_{min}$ |
|---|---|
| 0,5-5 | 20 |
| 5-100 | 50 |
| 100-3000 | 100 |

For JZ250 and JZ300 the minimum ($Q_{min}$) and maximum flow rates ($Q_{max}$) can be chosen between the table above mentioned $Q_{max}$ and $Q_{min}$ and with a maximum ratio of $Q_{max}$:$Q_{min}$ belonging to the following viscosity ranges:

| Viscosity range [mPa·s] | Maximum ratio of $Q_{max}$:$Q_{min}$ |
|---|---|
| 0,5-5 | 20 |
| 5-3000 | 35 |

1.2.2 Mechanical counters

1.2.2.1 Mechanical counter for JZ010 and JZ015

All mechanical counters have the following characteristics:

- Maximum indication 99999.9 L (6 elements);
- Scale interval 0,001 L, graduated every 0,01 L;
- Full revolution of the first element 0,1 L;
- Non resettable.

1.2.2.2 Mechanical counter for JZ025 up to and including JZ300

All mechanical counters have the following characteristics:

- Maximum indication 999.99 $m^3$ (5 elements);
- Scale interval 0,001 $m^3$, graduated every 0,01 $m^3$;
- Full revolution of the first element 0,1 $m^3$;
- Equipped with a zero setting device;
  During the zeroing the display is blinded, after zeroing this blinding is removed.

1.2.3 Mechanical printer

The mechanical printers have the following characteristics:

- Printed scale interval 0,01 $m^3$;
- The delivery is printed in two steps, start value and stop value of the delivery is printed. Each printed value is six or seven digit number;
- The first step of the delivery also zeros the mechanical counter;
  Optionally this step also zeros the printer; in this case the start value on the ticket consists of zeros;
- During the delivery the ticket is secured against removal.

1.2.4 Mechanical preset device

Essential characteristics

- Pre-set scale interval 0,01 $m^3$;
- Maximum pre-set 99,99 $m^3$ (4 elements) or 999,99 $m^3$ (5 elements);
- During the delivery the pre-set indication counts back to zero.

## 1.3 Essential shapes

1.3.1 Inscriptions

On the measurement sensor, clearly visible, at least the following is inscribed:

- the Evaluation Certificate number: TC7364;
- name or trade mark of the manufacturer;
- type;
- serial number;
- $Q_{min}$ and $Q_{max}$;
- maximum pressure $P_{max}$;
- characteristics of the product.

On the volume counter:

- "Minimum Measured Quantity: ..." or "Vmin ..."

Note: The minimum measured quantity is the largest value of:

- The MMQ mentioned for the sensor in paragraph 1.2;
- 100 times the display scale interval;
- 200 times the printed scale interval.

An example of the inscriptions is given in drawing 7364/1-04.

1.3.2 Sealing

See chapter 2.

## 1.4 Non essential characteristics

1.4.1 Mechanical counter for JZ025 up to and including JZ300

All mechanical counters are equipped with a total counter with the following characteristics:

- Maximum indication 99999,99 $m^3$ (7 elements) or 999999,99 $m^3$ (8 elements);
- Scale interval 0,01 $m^3$;
- Not resettable to zero.

## 2 Seals

The following items are sealed:
- The meter body is sealed against opening;
- The adjustment device is sealed.

If the temperature conversion device is present:
- The front and back cover of the conversion device is sealed against opening;
- The temperature probe is sealed against removal.

An example of the sealing is given in drawing 7364/1-05 and 7364/4-03.

## 3 Conditions for Conformity Assessment

- The measuring device must be constructed in accordance with this Evaluation Certificate and the appertaining documentation.

- Other parties may use this Evaluation Certificate only with the written permission of the Producer.

- Before taken into use the measurement sensor shall be calibrated on the product it is going to measure or on a product with similar properties (density and viscosity) at operating temperature and pressure (if possible).
  If the measurement sensor is intended to be used with multiple liquids without adjustments, the sensor shall be calibrated on all applicable liquids without changing the parameters. If a flow computer is used with a correction curve for multiple product applications, the accuracy requirements only have to be met for all products individually. It is up to the Notified Body or authorized body to decide if the calibration with a single or multiple liquid(s) covers the process range on which the measurement sensor is going to be used.

- The calibration can be performed on site or at a test laboratory. In the latter case the relevant parameter settings have to be registered and checked at the initial verification on site.

## 4 Test reports

Performed tests on behalf of this Evaluation Certificate:
- NMi-SO11201080-01 issued by NMi Certin B.V.;
- NMi-12200254-01 issued by NMi Certin B.V.;
- NMi-15200210-01 issued by NMi Certin B.V..