



CERTIFIKÁT EÚ SKÚŠKY TYPU

EU – type examination certificate

Číslo dokumentu:
Document number:

SK 20-MI001-SMU065

Revízia 0
Revision 0

V súlade s:
In accordance with:

prílohou č. 2, Modul B nariadenia vlády Slovenskej republiky č. 145/2016 Z. z. o sprístupňovaní meradiel na trhu v znení nariadenia vlády SR č. 328/2019 Z. z., ktorým sa preberá smernica Európskeho parlamentu a Rady 2014/32/EU o harmonizácii právnych predpisov členských štátov týkajúcich sa sprístupnenia meradiel na trhu
Annex II, Module B to Government Ordinance of the Slovak Republic No. 145/2016 Coll. Relating to the making available on the market of measuring instruments as amended by Government Ordinance of the Slovak Republic No. 328/2019 Coll., which implemented the Directive 2014/32/EU of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments

Žiadateľ/Výrobca:
Issued to (Manufacturer):

Arad Dalia Ltd.
Kibbutz Dalia 19239, Israel

Druh meradla:
Type of instrument:

Vodomer (MI-001)
Water meter (MI-001)

Označenie typu:
Type designation:

Carmel

Základné požiadavky:
Essential requirements:

príloha č. 1 a príloha č. 3 Vodometry (MI-001) k nariadeniu vlády SR č. 145/2016 Z. z. v znení nariadenia vlády SR č. 328/2019 Z. z.
Annex No. I and Annex No. III Water meters (MI-001) to Government Ordinance of the Slovak Republic No. 145/2016 Coll. as amended by Government Ordinance of the Slovak Republic No. 328/2019 Coll.

Platnosť do:
Valid until:

20. november 2030
November 20, 2030

Notifikovaná osoba:
Notified body:


Slovenský metrologický ústav 1781
Slovak Institute of Metrology 1781

Dátum vydania:
Date of issue:

20. november 2020
November 20, 2020

Základné charakteristiky, popis meradla a podmienky schválenia sú uvedené v prílohe, ktorá je súčasťou tohto certifikátu. Certifikát vrátane prílohy má spolu 9 strán.
Essential characteristics, instrument description and approval conditions are set out in the appendix hereto, which forms the part of the certificate. The certificate including the appendix contains 9 pages.




Viliam Mazúr
zástupca notifikovanej osoby
representative of notified body

History of the Certificate

Issue of the Certificate	Date	Modification
SK 20-MI001-SMU065, Revision 0	November 20, 2020	Initial certificate

1 Instructions and standards used within assessment

1.1 Generally binding instructions

Meter type was examined in terms of request for given type provisions Government Ordinance of the Slovak Republic No. 145/2016 Coll. relating to the making available on the market of measuring instruments as amended by Government Ordinance of the Slovak Republic No. 328/2019 Coll., which implemented the Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments as later amended (next Government Ordinance).

Requirements are set out in Annex No. 1 and Annex No. 3 Water Meters (MI-001) to Government Ordinance of SR No. 145/2016 Coll. as amended by Government Ordinance of the Slovak Republic No. 328/2019 Coll.

1.2 Harmonised standards and normative documents used

- OIML R 49-1:2006 Water meters intended for the metering of cold potable water and hot water. Part 1: Metrological and technical requirements
- OIML R 49-2:2004 Water meters intended for the metering of cold potable water and hot water. Part 2: Test methods
- EN 14154-1:2005+A2:2011 Water meters - Part 1: General requirements
- EN 14154-2:2005+A2:2011 Water meters - Part 2: Installation and conditions of use
- EN 14154-3:2005+A2:2011 Water meters - Part 3: Test methods and equipment

1.3 Other instructions used:

- OIML R 49-1:2013 Water meters intended for the metering of cold potable water and hot water. Part 1: Metrological and technical requirements
- OIML R 49-2:2013 Water meters intended for the metering of cold potable water and hot water. Part 2: Test methods
- OIML R 49-3:2013 Water meters intended for the metering of cold potable water and hot water. Part 3: Test report format
- EN ISO 4064-1: 2017 Water meters for cold potable water and hot water. Part 1: Metrological and technical requirements
- EN ISO 4064-2: 2017 Water meters for cold potable water and hot water. Part 2: Test methods
- EN ISO 4064-3: 2014 Water meters for cold potable water and hot water. Part 3: Test report format
- EN ISO 4064-5: 2017 Water meters for cold potable water and hot water. Part 5: Installation requirements



2 Type marking
Multi-Jet magnetic water meter - Carmel

Meter is made in following subgroups:

Type of meter	Temperature class	Classes	Nominal Diameter
Carmel	T50	M1 ¹⁾ O ²⁾ E1 ¹⁾	DN15, DN20

3 Description of measuring instrument

Meter name: Multi-Jet magnetic water meter

Type marking: Carmel

Description of operating principle instrument design:

Multi-Jet magnetic vane-wheel water meter with sealed dry magnetic register and permanent flowrates of 1,6 m³/h and 2,5 m³/h have been designed to measure actual volume of clean cold potable water flowing in a completely filled up closed pipeline. The water meter is composed of a body, of the measuring mechanism and the counter. Water flowing through a meter sets the vane-wheel in a rotary motion that is transferred through magnetic gravity to the counting mechanism.

The meter is mainly composed of the body group and measuring unit group.

The body group consists of the body, the cap, the lid, adjusting device and the inlet strainer. The glass cover can protect the register against the external damages, and the lid provides the further protection to the register. The adjusting device built in the body is used to calibrate the meter. The body of the water meter could be low lead concentration brass casting or with composite body or with brass casting, with inlet and outlet screw parts.

Water meters have been fitted for mounting on pipelines in horizontal positions. Accidental occurrence of a reverse flow does not affect metrological characteristics provided for a normal flow.

All the meters can be pre-equipped for option of having a signal for remote reading purposes - automated computerized system (wireless metering system) for controlling of metering of delivered water quantity which was not part of this certification.

¹ according to Government Ordinance of the Slovak Republic, Annex No. 1

² according to EN ISO 4064-1:2017 and OIML R 49-2:2013





Picture No.1 Carmel water meter

3.1 Description of subgroups

Marking: Carmel 15, Carmel 20

The meter can be equipped by following devices:

- Dialog 3G - Meters emitting a RF signal for remote reading purposes which was not part of this certification
- 3P – Arad mechanical register (3 points)
- ER – Arad's electronic register;
- GK / LoRa Glatt – "kosher" register which is not transmitted data on Shabbat.
- LoRa (LR) Digital register
- EV Output- Arad mechanical register (3 points)- IP68

3.2 Measuring insert

The measuring unit group consists of the sealed register, the measuring chamber, the vane wheel assembly and the pressure plate. It is a key group for the accuracy performance of the meter. The magnetic gear on the top of vane wheel shaft transmits the movement of the turbine to the clockwork and register

3.3 Indicating device

The capacity of the counter is 99 999 m³ for size DN15 and DN20 and minimum resolution of the reading is 0,05 dm³. The register lens (glass, IP 68) is made of borosilicate glass on request to give the register protection against the impact damage and contamination.

The counter design does not allow for resetting of meter indications.

Counter pointers rotate clockwise. Indicated digital values increase as the drums with digits marked on them move upwards. An indication increase by one digit is complete when a digit in a lower decade change from 9 to 0. In a decade of the lowest values digital indications change continuously. Black digits marked on digital drums or black pointers indicate cubic meters or

their multiples whereas red digits or pointers indicate submultiples of cubic meters.

The pointers move round scales marked with proper multipliers and placed on an indicating dial.

3.4 Principle of operations

The potable water enters the meter from the inlet of the meter and distributed by the lower orifices that equally spaced on the circumference of the measuring chamber, the Multi-Jet distributed strike the vane wheel at the tip of the vane blades to make it rotation, the measured water by the vane wheel flows out from the top orifices on the measuring chamber. The rotation of the vane wheel (proportional to the velocity of water flow) is transmitted directly to the sealed register, the register totalizes the rotation of the vane wheel and indicates the water volume passing through the meter. The water meter is dedicated to measure the flow and the delivered cold water quantity.

3.5 Technical documentation

Drawings of technical documentations are listed in the following list:

Drawing number	Description
11130109/01	Carmel 20 3 ⁴ Q3-1.6 3G GK MID
11130155MID/02	Carmel 20 3 ⁴ Q3-1.6_2.5 3G GK m3 MID
11150055MID/01	Carmel 15 1 ² (20 3 ⁴) Q3-1.6_2.5 m3 3p MID
11170050/00	Carmel 20 3 ⁴ Q3-1.6 ER m3 MID
23631909/05	Dial plate Carmel 20 Q3-1.6 R50 m3 3p SI 39.6
23631919/01	Dial plate Carmel 20 3G Q3-1.6 m3 3p MID 39.6
23632009/05	20_Dial plate Carmel 15 Q3-1.6 m3 3p MID 39.6
23632019/06	Dial plate Carmel 15 3G Q3-1.6 m3 3p MID 39.6
23907715/03	Dial plate Carmel 20 3 ⁴ Q3-1.6 ER m3 MID
Carmel_Brochure	Marketing and installation manual for Carmel model

All drawings, schemes and technical documentations used during the conformity assessment are saved in document No. NO-476/20.



4 Basic technical characteristics

Type marking		Carmel	
Nominal diameter DN	mm	15	20
Indicating range	m ³	10 ⁵	
Resolution of the reading	m ³	0,00005	
Maximum admissible pressure	-	MAP10, MAP 16 (brass body only)	
Working pressure range	bar	from 0,3 to 10	
Pressure loss	-	Δp 63	
Temperature class	-	T50	
Flow profile sensitivity classes	-	U0 / D0	
Position	-	H	
Climatic and mechanical environments	-	closed spaces / from -10 °C to 55°C / mech. class M1, class O for fixed meters installed outdoor	
Electromagnetic environments	-	E1	
Reverse flow	-	The meter is not designed to measure reverse flow.	

4.1 Additional technical characteristics

	DN 15 composite	DN 20 composite	DN 20 brass body
Weight	0,65 kg	0,7kg	1,38kg
Environmental protection (IP Code)	IP68		

5 Basic metrological characteristics

The maximum permissible error (accuracy class):

$$\pm 5 \% (Q_1 \leq Q < Q_2)$$

$$\pm 2 \% (Q_2 \leq Q \leq Q_4) \text{ for water temperature (from 0,1 to 30) } ^\circ\text{C}$$

$$\pm 3 \% (Q_2 \leq Q \leq Q_4) \text{ for water temperature greater than 30 } ^\circ\text{C}$$

Nominal Diameter	DN	mm	15/20	20	15/20	20	20
Minimum flow rate	Q_1	m ³ /h	0,032	0,05	0,025	0,04	0,031
Transitional flow rate	Q_2	m ³ /h	0,0512	0,08	0,04	0,064	0,5
Permanent flow rate	Q_3	m ³ /h	1,6	2,5	1,6	2,5	2,5
Overload flow rate	Q_4	m ³ /h	2	3,125	2	3,125	3,125
Measuring Range R	Q_3/Q_1	-	50 ³⁾	50 ³⁾	63 ⁴⁾	63 ⁴⁾	80 ⁵⁾
Ratio	Q_2/Q_1	-	1,6				

³ Dialog 3G, 3P, GK, LoRa (LR) registers

⁴ ER, LoRa (LR) register

⁵ GK, Dialog 3G, 3P and ER, LoRa (LR) registers


6 Results of conformity assessment

The results of tests, assessments and evaluations given in the evaluation report No. NO-476/20/B/ER dated November 11, 2020 give sufficient evidence, that the technical design of the measuring instrument – Multi-Jet magnetic water meter type Carmel is in compliance with the technical requirements of the Slovak Republic Governmental Ordinance No. 145/2016 Coll. relating to the making available on the market of measuring instruments as amended by Government Ordinance of the Slovak Republic No. 328/2019 Coll., Annex No. 1 and Annex No. 3 Water Meters (MI-001) and the EN 14154-1:2005+A2:2011, EN 14154-2:2005+A2:2011, EN 14154-3:2005+A2:2011 and OIML R49-1:2006, OIML R49-2:2004 (harmonised standards and normative documents) and other instructions OIML R49-2:2013, EN ISO 4064-1:2017, EN ISO 4064-2:2017 and EN ISO 4064-3:2014 standards, which are relevant for this type of meter.

7 Data placed on the measuring instrument

On the shroud, the dial of the indicating device or on an identification plate of every water meter or in the product documentation minimum the following data should be marked:

- a) Manufacturer's name, registered trade name or registered mark
- b) Postal address of manufacturer at which they can be contacted
- c) Type of the water meter
- d) Measuring unit (m^3)
- e) Numerical value of Q_3 and ratio Q_3/Q_1
- f) Year of production
- g) Production serial number
- h) Number of EU-type examination certificate and conformity mark
- i) The highest admissible pressure if it differs from 1 MPa
- j) Flow direction
- k) The letter V or H, if the meter can only be operated in the vertical or horizontal position
- l) Class of pressure loss if it differs from Δp_{63}
- m) Class of climatic and mechanical environment
- n) Flow profile sensitivity classes
- o) Output signal of impulse transducer
- p) The temperature class where it differs from T30

8 Conditions of conformity assessment of measuring instruments produced with type approval

Multi-Jet magnetic water meter for cold potable water put onto the market in line with the procedure of conformity assessment according to the Annex No.2 (Module D or F) of the Governmental ordinance should be in compliance with the technical description by the item 3 of this report and at test should be in compliance with the requirements determined in OIML R 49-1:2013 and EN ISO 4064-1:2017. Metrological test is performed by testing equipment which should be in compliance with the requirements determined in STN EN 14154-3:2005+A2 and EN ISO 4064-2:2017 and water at temperature $20\text{ °C} \pm 5\text{ °C}$ in following points of flowrate:



- a) Minimum flowrate $Q_1 \leq Q \leq 1,1Q_1$
- b) Transitional flowrate $Q_2 \leq Q \leq 1,1Q_2$
- c) Permanent flowrate $0,9 Q_3 \leq Q \leq Q_3$

A metrological test may only be performed by a producer, or a notified body respectively in line with the conformity assessment procedure according to the Annex No.2 (Module D or F) of the Governmental ordinance respectively.

9 Measures asked for providing measuring instrument integrity

9.1 Identification

The Carmel multi-jet magnetic meter should be in compliance with the description provided on item 3 of this Annex and should be in compliance with the marking specified the item 7 of this Annex. The number given to the EU-type examination certificate is put at each piece of the measuring instrument.

Emplacement of the conformity mark is determined by § 15 of the Governmental ordinance.

9.2 Sealing of the measuring instrument

The Carmel multi-jet magnetic water meter shall be sealed before the conformity assessment according to the Annex No.2 (Module D or F) of the Governmental ordinance sealed by following sealing marks:

Connection of counter shroud and water meter body shall be sealed by seal used for security measures (plastic seal) (Picture No.2)

The measuring assembly is secured by locating the snap fit plastic cover to the meter body. The register is positioned between the plastic cover and the meter body. The plastic cover and meter body have integrally moulded clips and once fitted; unauthorised dismantling is not possible without leaving evidence of tampering.

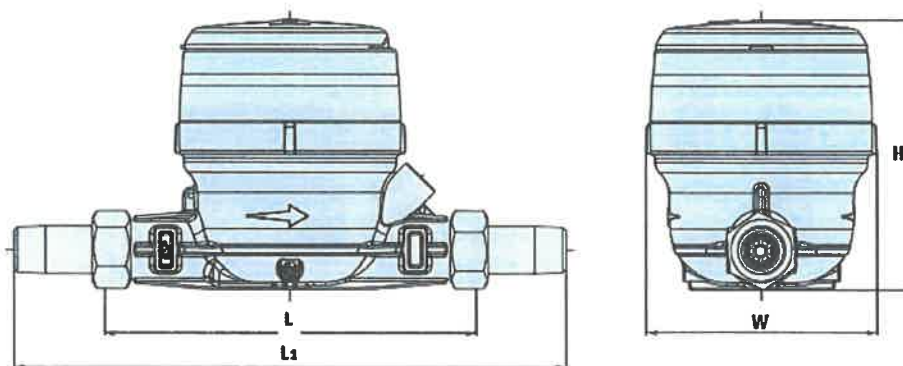


Picture No.2 Emplacement of the seal for security measures (tampering prevention)

10 Requirements for installation, especially conditions of usage

10.1 Installation data

Nominal diameter	DN15	DN20	DN20 Brass
Construction length [mm] - <i>L</i>	165	190	190
Length with couplings [mm] - <i>L₁</i>	260	285	285
Width [mm] - <i>W</i>	105	105	105
Hight [mm] - <i>H</i>	140	140	140
Weight [kg]	0,65	0,7	1,38
Weight with couplings [kg]	0,9	1,0	1,68



Picture No. 3 Installation dimensions

10.2 Installation requirements

A Carmel water meter is introduced into the operation by a worker having a certificate for this activity performance. The Carmel meter is possible to be put into use after a construction in line with this report and in line with the producer instruction by “Instruction of installation and conditions of use of water meters”. A measuring instrument should be installed in direction of water flow arrow marked on the meter body.

10.3 Conditions of use

Within using the measuring instrument, it is needed to be managed by recommendations of a producer by “Instruction of installation and conditions of use of water meters”.

Assessment done by: Ing. Viliam Mazúr

