Slovenský metrologický ústav
Karloveská 63, 842 55 Bratislava 4,
Slovenská republika

SNAS
Reg. No. 101/P-035

CERTIFIKÁT EÚ SKÚŠKY TYPU

EU – type examination certificate

Číslo dokumentu: **SK 10-MI001-SMU012** **Revízia 10**
Document number: Revízia 10 nahrádza certifikát zo dňa 12. september 2022 *Revision 10*
Revision 10 replaces the certificate issued by September 12,2022

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 1923900, Israel

Druh meradla:
Type of instrument:
Vodomer (MI-001)
Water meter (MI-001

Označenie typu:
Type designation:
Q

Základné požiadavky:
Essential requirements:
príloha č. 1 a príloha č. 3 Vodomery (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:
17. júna 2030
June 17, 2030

Notifikovaná osoba:
Notified body:
Slovenský metrologický ústav **1781**
Slovak Institute of Metrology *1781*

Dátum vydania:
Date of issue:
23. maja 2023
May 23, 2023

Základné charakteristiky, popis meradla a podmienky schválenia sú uvedené v prílohe, ktorá je súčasťou tohto certifikátu. Certifikát vrátane prílohy má spolu 11 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 11 pages.

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Viliam Mazúr
zástupca notifikovanej osoby
representative of notified body

Poznámka: Tento certifikát EÚ skúšky typu môže byť rozmnožovaný len celý a nezmenený. Bez podpisu a odtlačku pečiatky je neplatný.
Note: This EU-type examination certificate shall not be reproduced except in full. Certificates without signature and stamp are not valid.

Place of production:

1. **Arad Dalia Ltd.,**
   Kibbutz Dalia 1923900, Israel
2. **Arad Metering Technologies Wuhan Co., Ltd.,**
   Room 1613-1617, Buynow building, No. 10, Luoyulu Road, Hongshan District Wuhan City, Hubei Province, China

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 Technical specification 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 for cold water - Q

Meter is made in following subgroups:

Type of meter	Temperature class	Class	Nominal Diameter
Q	T50	M1[1]) C[2]) E1[1])	DN15, DN20

[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

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3 Description of measuring instrument

Meter name: Multi-Jet magnetic water meter for cold water

Type marking: Q

Description of operating principle instrument design:

Multi-Jet magnetic vane-wheel water meter for cold water with sealed dry magnetic register and permanent flowrates of 1,6 m^3/h and 2,5 m^3/h have been designed to measure actual volume of clean cold potable water flowing in a completely filled up closed pipeline. The water meter for cold water 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 directly 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 is a brass casting or version with low lead concentration 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. Version of water meter with NPSM threads is not designed for using in European Union. 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.

Picture No.1 Multi-Jet magnetic water meter

Picture No.2 Multi-Jet magnetic water meter with GK register

3.1 Description of subgroups

Marking: DN15, DN20

3P Register	3G Register	GK-3G Register	LoRa Digital (LR-D)	GK-LR Register
Q15 Q_3=1.6	Q15 Q_3=1.6	Q20 Q_3=2.5 R50	Q20 Q_3=2.5 R80	Q20 Q_3=2.5, R50
Q15 Q_3=2.5	Q15 Q_3=2.5			Q20 Q_3=2.5, R80
Q20 Q_3=1.6	Q20 Q_3=1.6			
Q20 Q_3=2.5	Q20 Q_3=2.5			

The meter can be equipped with following devices:

- 3G - Meters emitting a RF signal for remote reading purposes, which was not part of this certification;
- mechanical register with option electrical output EV, which was not part of this certification;
- LoRa (LR) radio module, which was not part of this certification.

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 wane 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 m^3 for size DN15 and DN20 and minimum resolution of the reading is 0,05 dm^3. 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.

3.3.1 GK Register:

GK (Glat Kosher) register is a mechanical register which incorporates an electronic reading and transition for remote reading (Picture No. 3). The register is installed on the meters and using a magnetic coupler, converts the rotation of the in meter element to the rotation of the digit wheels which in turn shows the amount of water consumed. This operation is being done only by the mechanical stage of the register and does not involve any electronic component. Also, the electric stage does not come in contact with the mechanical stage and there is no magnetic influence on the cylinders rotation due to the electronic position reading. For data transmission, the register includes a transmitter board, antenna and sensing element. The element is mounted next to each digit wheel and while transmitting, reads the position of the digit wheel and transferring this data to the transmitter board.

The register differs from other Arad's registers by not requiring a continues electronic reading or accurate data transmission. It is able to perform an electronic reading in a pre-defined schedule which enables a complete electronic shut down during Saturdays and holidays. This allows the register to keep with the highest level of "kashrut" certificate.
Electric stage of the register was not part of this certification.

Picture No. 3 GK register

3.3.2 LR Register**:**

The electronic register (LR8/LR9) is a fully electronic counter with no moving mechanical parts. This Register is based on a TMR (Tunnelling Magneto-Resistance) Sensor that response to changes in a magnetic field that makes the Register for gathering the magnetic measurements from the meter and "translating" them to an accurate measurement of water volume.

A TMR sensor detects the impeller generating an analogue signal. This signal is digitalized and introduced to the microcontroller. The microcontroller calculates the volume and the flow rate according to the parameters loaded in the microcontroller memory. The device is capable to detect the magnet direction showing a forward or backward arrow in display. The Register Display shows the total accumulated volume, flow value, flow Direction and system information such as active alerts, FW version, AMR setup.

The Register is built from stainless steel chamber, borosilicate glass and rubber seal; the product is vacuum-sealed with permanent mechanical closer; the electronics of the product is fully protected from any external factor and includes internal shock absorber.

The Register takes the power from a non-rechargeable lithium battery directly connected to the circuit PCB.

Above the metering capabilities, this Register support RF interface based on "LoRa" RF Technology for advanced AMI functionality. The radio interface provide the ability to report the metering information up to the client Application. The entire radio front end including the antenna is part of the register; no extra component is needed to activate the radio interface.

The counter design does not allow for resetting or changing any of the metrological indications by the Client / End user. Access to this sensitive information can be done by Production process and it is protected in Non-Volatile memory handling.

3.4 Principle of operation

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

A number of drawings of technical documentation is listed in the following table:

Drawing No.	Description
11225109/03	Q 1/2 N1.5 m3 EEC
21080919/00	Plastic seal screw assy
21380209/01	Regulator screw 1/2
25441909/07	Strainer 17 C H F
27631909/01	Plastic lid Q
23124609/01	Protection ring Q
26710709/07	Lid pin
23141509/02	Locking ring Q
25283509/00	Register cover Q
34124709/01	Body Q 1/2 165x17
23730729/02	Vane wheel Q assy
20600155/11	O-ring PARKER 2-036 55 SHORE 1.78x60.05; Part No. 20603209/00
20600155-11	O-ring PARKER 2-145 ID-64.77 W-2.62; Part No. 20603709/11
21603409/01	Measuring chamber Q 1.5 PS 5X5
23146909/00	Slip positioning ring Q
23441709/01	Pressure board Q
53148309/00	Register Q N1.5 m3 EEC
20605055-04	O-ring Parker 2-146 NSF61 ID-66 34W 2.6; Part No. 20606409/00
24572709/01	Round plastic seal
11325109/01	Q -3G 1/2 N1.5 m3 EEC
23141409/02	Locking ring Q – 3G

Drawing No.	Description
24572709/02	Round plastic seal
24616009/00	Adaptor Q – 3G
25287009/02	Register cover Q – 3G
27632009/00	Plastic lid Q W/O marking
34120709/A	Body Q 1/2 165x17 India
54318209/A	Measuring unit Q N1,5 Metal shaft
54318259/00	Measuring unit Q N1.5 short metal shaft sapphire & bearing
34120759/00	Body Q 1/2 165x17 n-r valve blue
25289019/00	Register cover Q 3p assy
25287019/00	Register cover Q-3G assy
24572709/02	Round plastic seal
24572233/01	Plastic seal ARAD SPML L=200
11226355MID	Q15-Q15-3G Q3=1.6 R50 MID
11226655MID/00	Q20 Q3=1.6 R50, Q3=2.5 R50, R80
25289009/04	Register cover Q 3p
34133159/00	Body Q 20 190x17 Low Lead Painted Blue RAL5010
34133859/00	Body Q 5/8 190/17 NPSM painted blue RAL5010
54318219/A	Measuring unit Q N1.5 Metal Shaft GFN2
11130309/02	Q20 Q3=2.5 R50 m3 LR
11130509/04	Q20 Q3=2.5 R50 m3 3G GK
11225909/01	Q15 2.5m3 NPSM METAL SHAFT AYA
11330709/03	Q 3/4 DN20 BSP Q3-2.5 R50 m3 LR GK
11330209	Q20 Q3=2.5 R80 m3 GK-LR

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All drawings, schemes and technical documentations used during the conformity assessment are saved in documents No. NO-081/09, NO-246/13, NO-388/18, NO-423/19, NO-428/19, NO-452/20, NO-456/20, NO-550/22, NO-557/22 and NO-588/23.

4 Basic technical characteristics

Type marking		Q	
Nominal diameter DN	mm	15	20
Indicating range	m^3	10^5	
Resolution of the reading	m^3	0,00005	
Maximum admissible pressure	-	MAP10	
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 C for fixed meters installed outdoor	
Electromagnetic environments	-	E1	

4.1 Additional technical characteristics

IP Code	IP 68
Weight	0,9 kg (1,1kg with AMR)

5 Basic metrological characteristics

The maximum permissible error (accuracy class):

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

$\pm$ 2 % ($Q_2 \leq Q \leq Q_4$) for water temperature (from 0,1 to 30) °C

$\pm$ 3 % ($Q_2 \leq Q \leq Q_4$) for water temperature greater than 30 °C

Nominal Diameter	**DN**	**mm**	**15**	**15**	**20**	**20**	**20**
Minimum flowrate	Q_1	m^3/h	0,032	0,05	0,032	0,05	0,0313
Transitional flowrate	Q_2	m^3/h	0,0512	0,08	0,0512	0,08	0,05
Permanent flowrate	Q_3	m^3/h	1,6	2,5	1,6	2,5	
Overload flowrate	Q_4	m^3/h	2	3,125	2	3,125	
Measuring range R	Q_3/Q_1	-	50				80
Ratio	Q_2/Q_1	-	1,6				

6 Results of conformity assessment

The results of tests, assessments and evaluations given in the evaluation report No. NO-588/23/B/ER dated May 19, 2023 gives sufficient evidence, that the technical design of the measuring instrument – Multi-Jet magnetic water meter type Q 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 and with the requirements determined in EN ISO 4064-1:2017, respectively OIML R49-1:2013, 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, 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 Multi-Jet meter
d) Measuring unit (m^3)
e) Numerical value of Q_3 in m^3/h (Q_3 x,x) and ratio Q_3/Q_1 (Rxxx)
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 (MAP xx)
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 Δp63 (Δp XX)

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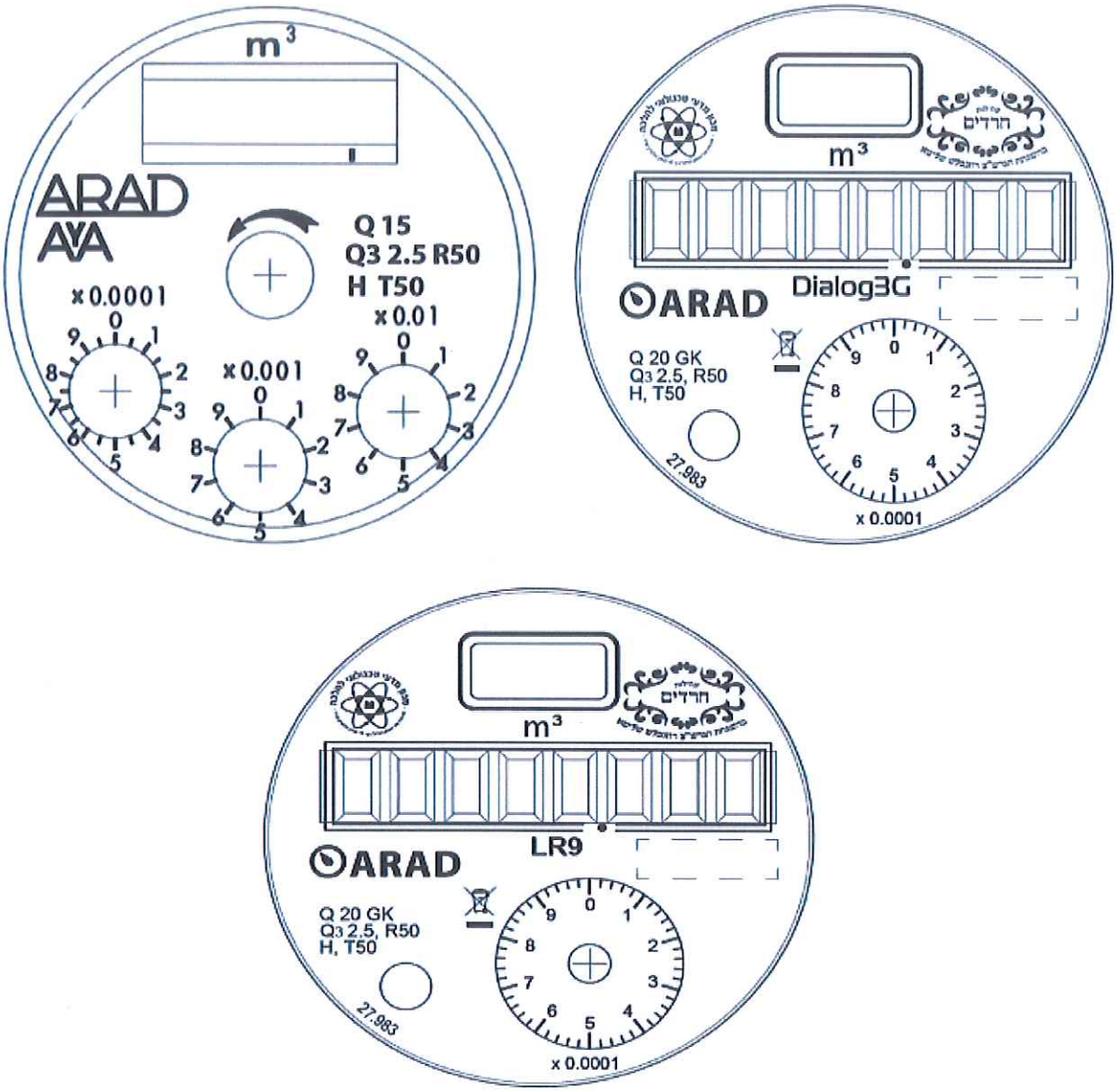
m) Flow profile sensitivity classes (Ux Dx)

n) The temperature class where it differs from T30

o) Environmental classification

p) Output signal of impulse transducer



Picture No. 4 Dial plate examples

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

Multi-Jet magnetic water meter for cold potable water which is 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 EN ISO 4064-2:2017 and water at temperature 20 °C ± 5 °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 $0{,}9Q_3 \leq Q \leq Q_3$

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

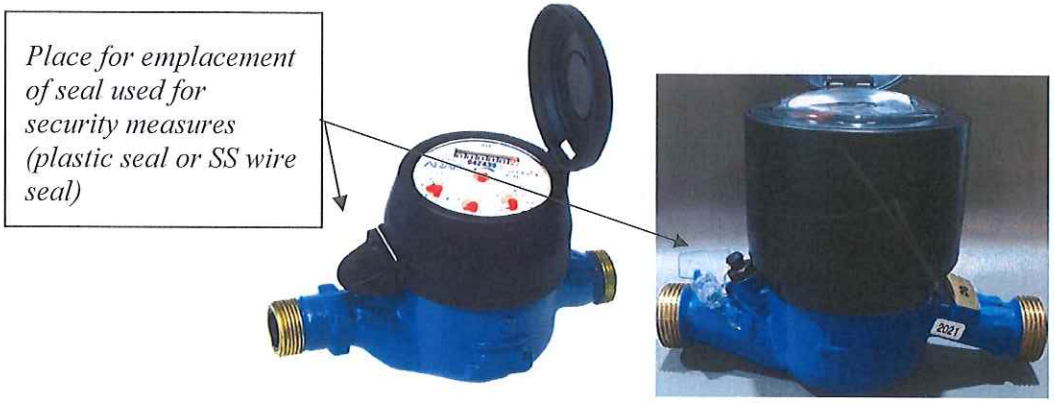
9.1 Identification

The 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 on the item 7 of this Annex. The number given to the EU-type examination certificate is to be put at each piece of the measuring instrument. Emplacement of the conformity mark is followed by § 15 of the Governmental ordinance.

9.2 Sealing of the measuring instrument

The 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 or SS wire seal) (Picture No. 5)



Picture No.5 Emplacement of the seal for security measures (tampering prevention)

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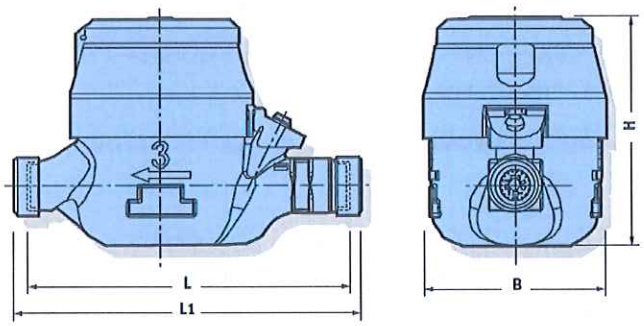
10 Requirements for installation, especially conditions of usage

10.1 Installation data

Nominal diameter	DN15	DN20	DN20 GK-3G	DN20 LR-D	DN20 GK-LR
Construction length [mm] - *L*	165	190	190	190	190
Length with couplings [mm] - L_1	260	285	285	285	285
Width [mm] - *B*	85	85	98	98	98
Hight [mm] - *H*	107	107	140	130	140
Weight [kg]	0,9*	1,5*	1,3	1,3	1,3
Weight with couplings [kg]	1,2*	1,7*	1,44	1,44	1,44

*Weight for 3G meters1,2



Picture No.6 Installation dimensions

10.2 Installation requirements

A Multi-Jet magnetic water meter is introduced into the operation by a worker having a certificate for this activity performance. The Multi-Jet magnetic meter is possible to put into use after a construction in line with this report and in line with a 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

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