



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



Reg. No. 101/P-035

CERTIFIKÁT EÚ SKÚŠKY TYPU

EU – type examination certificate

Číslo dokumentu:

SK 20-MI001-SMU064

Document number:

Revízia 5 nahrádza certifikát zo dňa 12. december 2022

Revision 5 replaces the certificate issued by December 12, 2022

Revízia 5

Revision 5

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:

Sonata

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:

21. október 2030

October 21, 2030

Notifikovaná osoba:

Notified body:

Slovenský metrologický ústav 1781

Slovak Institute of Metrology 1781

Dátum vydania:

Date of issue:


30. januára 2023

January 30, 2023

Základné charakteristiky, popis meradla a podmienky schválenia sú uvedené v prílohe, ktorá je súčasťou tohto certifikátu. Certifikát vrátane prílohy má spolu 15 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 15 pages.




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. Certificate without signature and stamp is not valid.

History of the Certificate

Issue of the Certificate	Date	Modification
SK 20-MI001-SMU064, Revision 0	October 21, 2020	Initial certificate
SK 20-MI001-SMU064, Revision 1	January 14, 2021	Add DN20 Q ₃ =6,3 R500 & R800 Δp40
SK 20-MI001-SMU064, Revision 2	September 15, 2021	Add Sonata Brass body (hybrid)
SK 20-MI001-SMU064, Revision 3	July 25, 2022	Software update
SK 20-MI001-SMU064, Revision 4	December 12, 2022	Software, installation data update
SK 20-MI001-SMU064, Revision 5	January 30, 2023	Software update

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

Ultrasonic water meter – Sonata

Meter is made in following subgroups:

Type of meter	Temperature class	Class	Nominal Diameter
Sonata	T50	M1 ¹⁾ O ²⁾ E1 ¹⁾	DN15, DN20, DN25, DN32

3 Description of measuring instrument

Meter name: Sonata residential ultrasonic water meter

Type marking: DN15, DN20, DN25, DN32

Description of operating principle instrument design:

The Sonata instruments are ultrasonic water meters which use the Transit time method. This method is based on the physical phenomena where the speed of an ultrasonic wave propagation is equal to the sum of the speed of the flow and the speed of sound of the media at rest. By measuring the time of the wave propagation of both the upstream and downstream the flow, it is possible to obtain the fluid's velocity along the acoustical beam.

The meter does not include mechanical or moving parts, and is mainly consist of hollow tube body with couple of sensors and electronic measuring unit, when the PCB and software are prevented by polyurethane from water damage, according to IP68. The body of water meter could be with regular design or with reinforced design.

The meters may be fitted with two types of LCD displays showed on Picture No.1 and Picture No.2. The meters are powered via an integral lithium battery type C (3.6V).

Water meters could be installing for mounting on pipelines in every possible position. The water meter is designed to measure reverse flow.

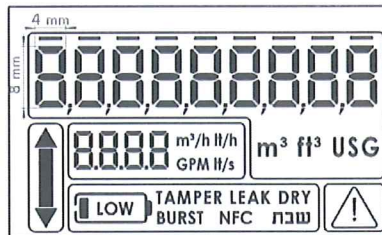
Software Security - The software complies with Welmec Guide 7.2 (2022), Type P, Risk Class C with 2 Extensions L and S. Its version number identifies the software, which shall be 5.01 or 5.3 or 5.30 or 5.60. The difference between Sonata products need to support HW types (mainly pins mapping). No changes in the metrological library.









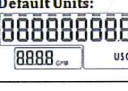
All the meters can be pre-equipped for option of having a signal for remote reading purposes - automated computerized system (wireless metering system) for controlling of metering of delivered water quantity, which was not part of this certification.



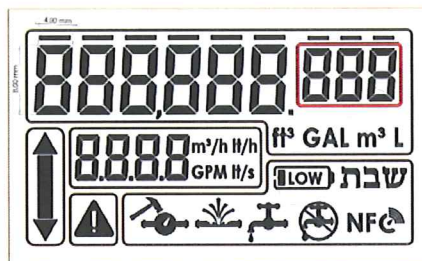
¹ according to Government Ordinance of the Slovak Republic, Annex No. 1



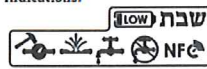







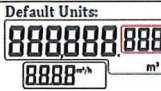
² according to EN ISO 4064-1:2017 and OIML R 49-2:2013



No.	Annunciate	Description	Annotation
1	Volume accumulator include 9 large digits		The upper bar marks the digits send to the AMR
2	Icons	1. Alarms indications:  2. Flow direction:  3. No measurement: 	Alarms released: 1. Low Battery  2. NFC  3. LEAK- subjected to pilots results
3	Units	1. Volume:  2. Flow: 	Default Units: 

Picture No.1 Sonata LCD display Type 1



No.	Annunciate	Description	Annotation
1	Volume accumulator include 6 large digits +3 small digits	 Configuration in Test Mode 0.0001 M³3 (0.1 liter): 	In Test Mode the Sonata could displayed resolution of 0.1 and 0.01 Liter. In this case the dot replaced with hyphen.
2	Icons	1. Indications:  2. Flow direction:  3. No measurement: 	Implemented: 1. Low Battery  2. NFC  3. 3G 
3	Units	3. Volume:  4. Flow: 	Default Units: 

Picture No.2 Sonata LCD display Type 2



Picture No.3 Sonata water meter



Picture No.4 Sonata Brass body (Hybrid)

3.1 Description of subgroups

Marking: Sonata DN15/DN20/DN25/DN32

The meter can be equipped with the following devices (was not part of this certification):

- Dialog 3G/4G (Allegro) - Meters emitting a RF signal for remote reading purposes
- CAT-M – Communication via RF
- Encoder and Pulse out (SSR) – Wired communication, which transmit volume, alerts and ID.
- W-Mbus/OMS – RF translation of data, according to protocol request
- LoRa, NB-IoT - RF translation of data, according to protocol request

3.2 Measuring insert

The measuring unit group consists of the sealed capsule of measuring electronic unit, and the measuring tube with piezoelectric sensors.

3.3 Indicating device

The capacity of the counter is 999999,999 m³ for size DN15 up to DN32 and minimum resolution of the reading is 0,1 and 0,01 Litre (In this case the dot replaced with hyphen). The measuring units, as the body as well, made of heavy composite materials and protect damage, contamination and humidity (according to IP68). Black digits marked on digital drums or black pointers indicate cubic meters or their multiples whereas red digits pointers or small digits indicate submultiples of cubic meters.

3.4 Principle of operation

The potable water enters the meter from the inlet of the meter with initial speed. Sensors have sent ultrasonic pulses during water flow, and pulse velocity depend of water flow speed. Knowing the impulse velocity in stagnant water, a mathematical equation is solved, as a result of which, the flow velocity is established. The velocity, volume and the other information is recurred on LCD display.

3.5 Technical documentation

A number of drawings of technical documentations are listed in the following table:

Drawing No.	Description
11550055 /00	SONATA 1 1 ⁴ 260X32 BSP Z shape assy MID
LoRa module	Add LoRa module and other future IoT modules which will be supported by Sonata
Reinforced body	Sonata DN25 ISO Fortified Body - 240519
31144120 /D	Body SONATA 1_2 170X15 BSP Z shape
31145020 /06	Body SONATA 3_4 190X20 BSP Z shape
31148120 /04	Body SONATA 1 260X25 BSP Z shape
31180002 /C	Body SONATA 1.25 260X32 BSP Z shape
28460001 /C	Mirror bushing 1 ² 170 Z shape SONATA
28406020 /01	Mirror bushing 3_4 Z shape SONATA
28406130 /01	Mirror bushing 1 BSP Z shape SONATA
11511355 /00	SONATA 3 ⁴ BSP Z shape MID
23999993 /04	Face plate SONATA ROW MID STD
Sonata-brochure	Marketing and installation manual for Sonata model
Sonata-pulse-output-brochure	Marketing and installation manual for Sonata model with pulse output
31180011 /B	Body 0.5" 110mm 3_4 - 3_4 Threads
31180014 /A	Body 0.5" 115mm 3_4 - 3_4 Threads
31180016 /B	Body 0.75" 130mm 1x1 Threads
28460005 /B	Mirror Bushing 1 ² 110mm ASSY
28460003 /A	Mirror Bushing 1 ² 115mm ASSY
28460006 /B	Mirror bushing 3 ⁴ 130mm ASSY
11530118SI	Sonata 3 ⁴ ,1 Overmold Brass BSP (Wetted Part List) for SI 5452
11530128	SONATA LORA BRASS DN20 130 BSP

All drawings, schemes and technical documentations used during the conformity assessment are saved in document No. NO-467/20, NO-478/20, NO-520/21, NO-553/22, NO-567/22 and NO-570/23.



3.6 Peripheral devices and interfaces

The Sonata supports the following AMR communication modules:

Communication type	Communication via	Transmitted data
3G / 4G (Arad Proprietary)	RF	Volume, Alerts, ID
CAT-M	RF	
Encoder	Wired	Volume, Alerts, ID
Pulse output (SSR)	Wired	Pulse per flow
IoT: <ul style="list-style-type: none"> • W-Mbus/OMS • Sigfox • LoRa 900 & LoRa 86x • NB-IoT 	RF	Volume, flow, Alerts, ID, RTC ... per protocol

4 Basic technical characteristics

Type marking		Sonata			
Nominal diameter DN	mm	15	20	25	32
Indicating range	m ³	10 ⁶			
Resolution of the reading	m ³	0,0001 or 0,00001			
Overall length	mm	110, 115, 130, 170, 190, 260			
Maximum admissible pressure	-	MAP16			
Working pressure range	bar	from 0,3 to 10			
Pressure loss	-	From Δp16 up to Δp40 described in tables below			
Temperature class	-	T50			
Flow profile sensitivity classes	-	U0, D0			
Position	-	Any position			
Climatic and mechanical environments	-	closed spaces /from -25°C to 55°C/mech. class M1, class O for fixed meters installed outdoor			
Electromagnetic environments	-	E1			
Reverse Flow:	-	The meter may or may not measure reverse flow depending on factory set-up - this should be marked on the Data Label			



4.1 Additional technical characteristics

IP Code	IP 68
Weight	0,85-0,93 kg
Power Supply	The electronic card is powered from an integral battery size C (3.6V)
Software	The software complies with Welmec Guide 7.2 (2022), Type P, Risk Class C, Extensions L and S
Software version and checksum	5.01; Checksum DAA35379 for ROW, 3AE0D7BE for WaterTech only. 5.3; Checksum 2ED51C07 5.30; Checksum C45CF8AE 5.60; Checksum 6786263D Sonata displays last 4 characters of checksum only

5 Basic metrological characteristics

The maximum permissible error (accuracy class):

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

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

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

For Sonata with R500:

Nominal Diameter	DN	mm	15	15	20	20	20	25	25	25	32
Minimum flowrate	Q_1	m ³ /h	0,0032	0,005	0,005	0,008	0,0126	0,008	0,0126	0,02	0,02
Transitional flowrate	Q_2	m ³ /h	0,0512	0,008	0,008	0,013	0,02016	0,013	0,02016	0,032	0,032
Permanent flowrate	Q_3	m ³ /h	1,6	2,5	2,5	4	6,3	4	6,3	10	10
Overload flowrate	Q_4	m ³ /h	2	3,125	3,125	5	7,875	5	7,875	12,5	12,5
Measuring range R	Q_3/Q_1	-	500								
Ratio	Q_2/Q_1	-	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6
Pressure loss	-	-	16	16	16	16	40	16	16	40	40

For Sonata with R800:

Nominal Diameter	DN	mm	15	15	20	20	20	25	25	25	32
Minimum flowrate	Q_1	m ³ /h	0,002	0,0031	0,0031	0,005	0,0079	0,005	0,0079	0,013	0,013
Transitional flowrate	Q_2	m ³ /h	0,0032	0,005	0,005	0,008	0,0126	0,008	0,0126	0,02	0,02
Permanent flowrate	Q_3	m ³ /h	1,6	2,5	2,5	4	6,3	4	6,3	10	10
Overload flowrate	Q_4	m ³ /h	2	3,125	3,125	5	7,875	5	7,875	12,5	12,5
Measuring range R	Q_3/Q_1	-	800								
Ratio	Q_2/Q_1	-	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6
Pressure loss	-	-	16	16	16	16	40	16	16	40	40



5.1 Authorized alternatives:

Having the meter with a shortened body and rotated 90° casing.

The overall lengths of the meters are:

DN15 110mm or 115 mm

DN20 130 mm



Picture No. 5 Rotated version for Arad



Picture No. 6 Rotated version for WaterTech



Picture No. 7 Rotated version with Brass body for WaterTech

6 Results of conformity assessment

The results of tests, assessments and evaluations given in the evaluation report No. NO-570/23/B/ER dated January 26, 2023 give sufficient evidence that the technical design of the measuring instrument – ultrasonic water meter - type Sonata 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.

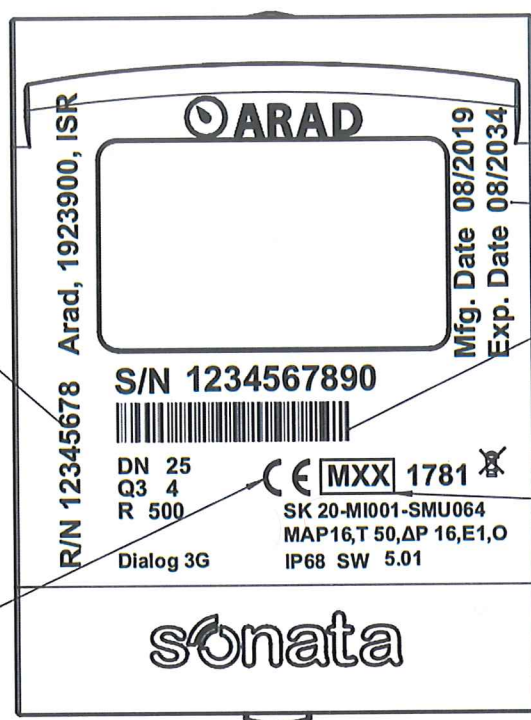
7 Data placed on the measuring instrument

The following data will be placed on the marking labels, on the water meter body and on the water meter cover:

- 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 Ultrasonic water meter
- d) Measuring unit (m^3)
- e) Numerical value of Q_3 in m^3/h ($Q_3 \text{ x,x}$) 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 Δp_{63} ($\Delta p \text{ XX}$)



- m) The installation sensitivity class where it differs from U0/D0 (Ux Dx)
- n) The temperature class where it differs from T30
- o) Environmental classification
- p) Electromagnetic environmental class
- q) For a non-replaceable battery: the latest date by which the meter shall be replaced

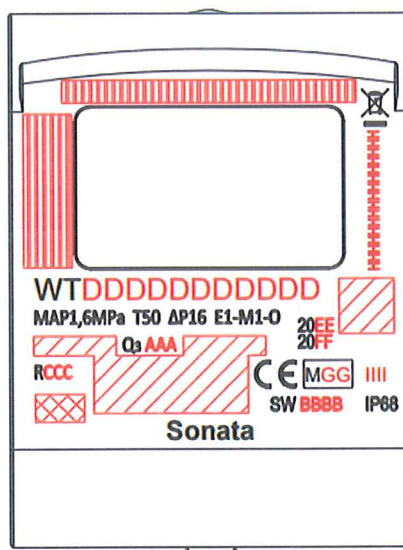


Picture No. 8 Dial marking



Picture No. 9 Dial marking - Rotated version





Picture No. 10 Dial marking for WaterTech- Regular version

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

Sonata water meter for 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 EN ISO 4064-2:2017 and water at temperature $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ (for temperature class T50) and $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and $50\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ (for temperature class T90) at the following flowrates:

- 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.

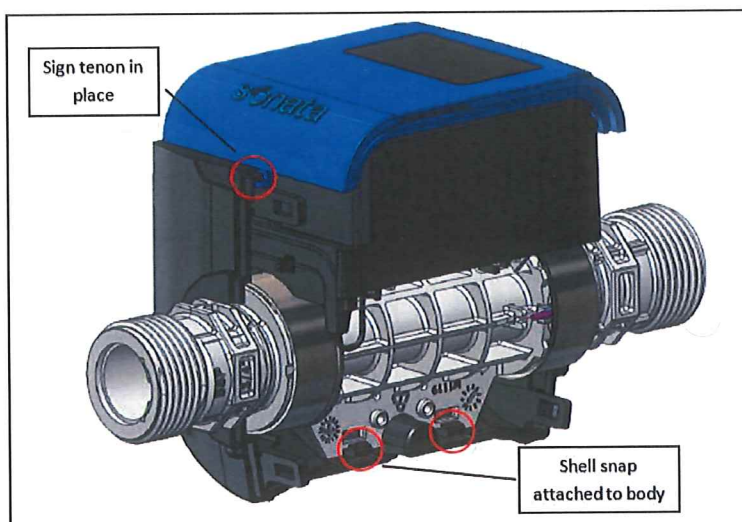
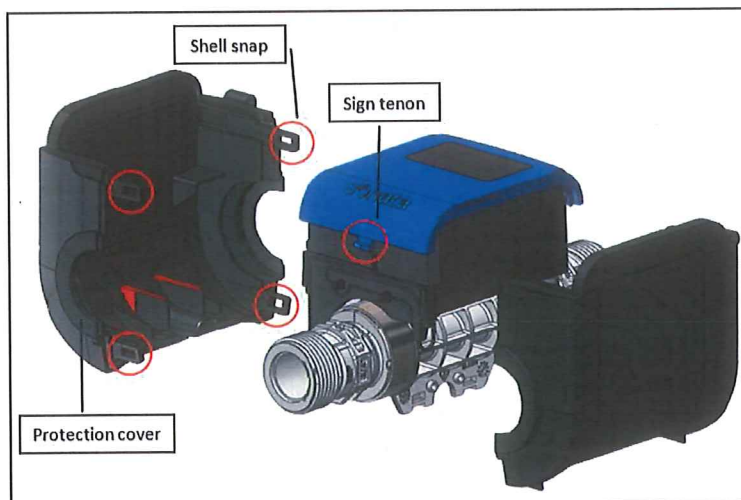
9 Measures asked for providing measuring instrument integrity

9.1 Identification

The Sonata water 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 followed by § 15 of the Governmental ordinance.

9.2 Sealing of the measuring instrument

The Sonata 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, Access to the PCB and software is prevented by the polyurethane case; opening the case will result in tamper-evident marks. Any attempt to open the casing will cause it to break.



Picture No. 11 Sealing

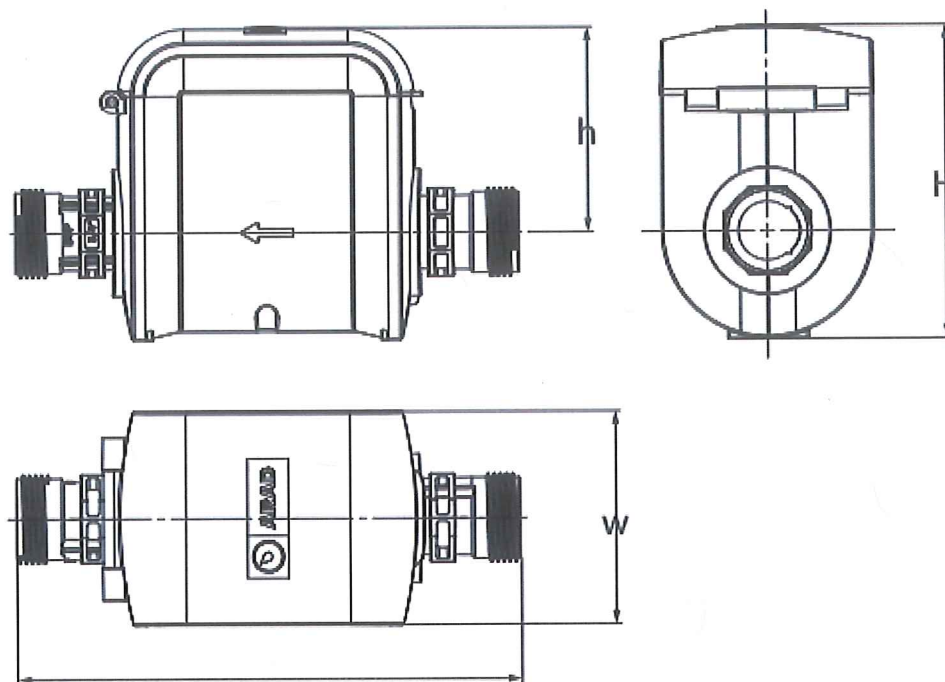


10 Requirements for installation, especially conditions of usage

10.1 Installation data:

Nominal diameter	DN15	DN20	DN20 HYB
Length without couplings [mm] - <i>L</i>	110	130	130
Width [mm] - <i>W</i>	105	105	105
Overall Height [mm] - <i>H</i>	110	110	115
Height above axis [mm] - <i>h</i>	80	80	85
Weight [kg]	0,85	0,9	1,3

Nominal diameter	DN20	DN25	DN32
Length without couplings [mm] - <i>L</i>	190	260	260
Width [mm] - <i>W</i>	80	80	80
Overall Height [mm] - <i>H</i>	121	121	121
Height above axis [mm] - <i>h</i>	82	82	82
Weight [kg]	0,9	0,9	0,93



Picture No.12 Installation dimensions Sonata DN15 and DN32

10.2 Installation requirements

A Sonata water meter is introduced into the operation by a worker having a certificate for this activity performance, The Sonata water meter is possible to be 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

