



EU-TYPE EXAMINATION CERTIFICATE

Number: TCM 142/20 - 5777

Addition 1

This addition replaces all previous versions of this certificate in full wording.

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In accordance: with 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 (implemented in Czech Republic by Government Order No. 120/2016 Coll.).

Manufacturer: Arad Ltd.
Kibbutz Dalia
PC: 1923900
Israel

For: water meter - multi jet, dry mechanical dial or electronic dial
Type: Tavor

Accuracy class: 2
Temperature class: T50

Valid until: 16 December 2030

Document No: 0511-CS-A033-20

Description: Essential characteristics, approved conditions and special conditions, if any, are described in this certificate.

Date of issue: 1 July 2021

Certificate approved by:




RNDr. Pavel Klenovský

1 Characteristics of instrument

The water meters type TAVOR are designed to measure, memorise and display the volume at metering conditions of water passing through the measurement transducer in the sense of the Directive 2014/32/EU of the European Parliament and of the Council of the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments (implemented in Czech Republic by Government Order No. 120/2016 Coll.), as amended.

The water meters type TAVOR are multi jet rotary vane wheel water meters with super dry mechanical indicating device or the electronic indicating device.

The water meters type TAVOR consist of a composite body with connecting screw threads, an inlet strainer and adjusting screw, a rubber gasket; a wet measuring unit with a plastic distributor with tangential holes and a stainless steel shaft, a rotary turbine, a rubber O-ring and a plastic ring closing the wet part, a magnetic coupling (wet and dry side) and a magnetic shield, a dry mechanical indicating device type 3G with pointers and numbered drums, two rings connecting body and a plastic head ring with a plastic cover by using three screws or a dry mechanical indicating device type 3P with pointers and numbered drums, a sealing ring connecting body and a plastic head ring with a plastic cover by using sealing ribs. The adjustment is realized by adjusting screw.

The mechanical indicating device is formed by numbered rollers with six drums and three pointers. There are two types of the indicating device: 3P and 3G. The device type 3P can be equipped by inductive sensor. The device type 3G can be equipped by radio technology. These devices are not part of certification.

The electronic indicating device type LR has a communication interface without button/s. The communication is only one-directional (LoRa) for sending measurement data to the outside. The version and checksum (CRC-32) of legally relevant software are shown on the display each 10 minutes.

The water meters type TAVOR shall be installed to operate in horizontal position only with the indicating device positioned at the top.

2 Main characteristics

Basic technical data of water meters type TAVOR with mechanical indicating device types 3P and 3G:

Basic technical data of water meters type TAVOR with mechanical indicating device types 3P and 3G:									
Manufacturer:	Arad Ltd.								
Model number:	Tavor (3P, 3G)								
Nominal diameter:	15			20					
Type details:									
Q_1 [m³/h]:	0.025	0.031	0.050	0.025	0.031	0.050	0.040	0.050	0.080
Q_2 [m³/h]:	0.040	0.050	0.080	0.040	0.050	0.080	0.064	0.080	0.128
Q_3 [m3/h]:	2.5			2.5			4.0		
Q_4 [m³/h]:	3.13			3.13			5.0		
Q_3/Q_1 :	100	80	50	100	80	50	100	80	50
Q_2/Q_1 :	1.6								
Q_4/Q_3 :	1.25								
Measuring principle:	multijet with dry dial								
Accuracy class:	2								
Maximum permissible error for the lower flowrate zone (MPE _l):	±5 %								
Maximum permissible error for the upper flowrate zone (MPE _u):	±2 % for water having a temperature ≤ 30 °C ±3 % for water having a temperature > 30 °C								
Temperature class:	T50								
Water pressure class:	MAP16								
Pressure loss class:	ΔP63								
Maximum admissible temperature [°C]:	50								
Maximum admissible pressure [MPa]:	1.6								
Orientation limitation:	H↑ (horizontal with the indicating device at the top)								

Indicating range [m³]:	99 999	
Resolution of the indicating device [m³]:	0.00005	
Resolution of the device for rapid testing [imp/L]:	229.04	171.63
EUT testing requirements (OIML R 49-2:2013, 8.1.8):		
Category:	Positive displacement meters and turbine water meters	
Case:	A	
Installation details:		
Connection type (screw thread):	G ¾ B	G 1 B
The installation sensitivity class:	U0D0	
Minimum straight length of inlet pipe [mm]:	0	
Minimum straight length of outlet pipe [mm]:	0	
Flow conditioner (details if required):	No	
Mounting:	in line meter	
Orientation:	H↑ (horizontal with the indicating device at the top)	
Other relevant information:	plastic body	
Length [mm]:	165; 170; 190	190
Information specified by the manufacturer (information in the table below are not certified)		
Environmental class:	B	
Mechanical class:	M1	
Electromagnetic environment:	-	
Connection type NPSM:	¾ NPSM	1 NPSM

Basic technical data of water meters type TAVOR with electronic indicating device type LR:

Manufacturer:	Arad Ltd.					
Model number:	Tavor (LR)					
Nominal diameter:	20					
Type details:						
Q_1 [m³/h]:	0.025	0.031	0.050	0.040	0.050	0.080
Q_2 [m³/h]:	0.040	0.050	0.080	0.064	0.080	0.128
Q_3 [m3/h]:	2.5			4.0		
Q_4 [m³/h]:	3.13			5.0		
Q_3/Q_1 :	100	80	50	100	80	50
Q_2/Q_1 :	1.6					
Q_4/Q_3 :	1.25					
Measuring principle:	multijet with the electronic dial					
Accuracy class:	2					
Maximum permissible error for the lower flowrate zone (MPE _l):	±5 %					
Maximum permissible error for the upper flowrate zone (MPE _u):	±2 % for water having a temperature ≤ 30 °C ±3 % for water having a temperature > 30 °C					
Temperature class:	T50					
Water pressure class:	MAP16					

<i>Pressure loss class:</i>	ΔP_{63}
<i>Environmental class:</i>	<i>O</i>
<i>Mechanical class:</i>	<i>M1</i>
<i>Electromagnetic environment:</i>	<i>E1</i>
Maximum admissible temperature [°C]:	50
Maximum admissible pressure [MPa]:	1.6
Orientation limitation:	H↑ (horizontal with the indicating device at the top)
<i>Indicating range [m³]:</i>	99 999
<i>Resolution of the indicating device [m³]:</i>	0.00001
<i>Resolution of the device for rapid testing [imp/L]:</i>	-
EUT testing requirements (OIML R 49-2:2013, 8.1.8):	
Category:	Positive displacement meters and turbine water meters
Case:	B
Installation details:	
Connection type (screw thread):	G 1 B
<i>The installation sensitivity class:</i>	<i>U0D0</i>
Minimum straight length of inlet pipe [mm]:	0
Minimum straight length of outlet pipe [mm]:	0
Flow conditioner (details if required):	No
Mounting:	in line meter
Orientation:	H↑ (horizontal with the indicating device at the top)
Other relevant information:	plastic body
<i>Length [mm]:</i>	190
Installation details (electrical):	
Wiring instructions:	-
Mounting arrangement:	-
Orientation limitations:	-
Power supply:	
Type (battery, mains AC, mains DC):	non-replaceable battery DC
U_{\max} (V):	3.6
U_{\min} (V):	2.2
Frequency:	-
Minimum battery life time [years]:	10
Software identification:	
Legally relevant part of software:	
Software version:	2E.28
CRC checksum:	d46A E475
Access to SW version and to CRC	The version and checksum (CRC-32) of legally relevant software are shown on the display each 10minutes.
Other specification of software:	
Specific requirements for embedded software for built-for-purpose measuring instrument (type P)	

Extension II: Water meters	
Information specified by the manufacturer (information in the table below are not certified)	
Connection type NPSM:	1 NPSM

3 Tests

Technical tests of the water meters type TAVOR were performed in compliance with the International Recommendation OIML R 49 Edition 2013 (E) with conformity to ISO 4064, Test Report No. 6015-PT-P0039-20 and No. 6015-PT-P0024-21.

4 Conformity marks and inscription

The water meters type TAVOR shall be clearly and indelibly marked with the following information:

- Water meter type
- Unit of measurement (m^3)
- Numerical value Q_3 in m^3/h ($Q_3 \times \times$) and the ratio Q_3/Q_1 ,
- EU-type examination certificate number
- Manufacturer's name, registered trade name or registered trade mark
- Post address of manufacturer
- Year of manufacture, two last digits of the year of manufacture, or the month and year of manufacture
- Serial number (as near as possible to the indicating device)
- Direction of flow, by means of an arrow (shown on both sides of the body or on one side only provided the direction of flow arrow is easily visible under all circumstances)
- Maximum admissible pressure ($\text{MAP} \times \times$)
- Letter H↑ (horizontal position with the indicating device at the top)
- The temperature class ($\text{T} \times \times$)
- CE marking and metrology marking in line with the Directive 2014/32/EU

And additional marking for the electronic indicating device:

- Software version (shown on the display each 10minutes)
- CRC checksum (shown on the display each 10minutes)
- Environmental class (O)
- Electromagnetic environment (E1)
- Mechanical class (M1)
- The latest date by which the meter shall be replaced (10 years)

These markings shall be visible without dismantling the water meter after the instrument has been placed on the market or put into use. Example is in Figure 2.

5 Additional specifications

The water meters type TAVOR shall be put onto the market in line with the procedure of conformity assessment according to the Annex D or F of the Directive 2014/32/EU as well as in compliance with the technical description of this report and shall be tested in accordance with the requirements determined in ISO 4064-1:2014, respectively OIML R 49-1:2013. In case of marking the meter by letter H (without ↑), technical specification, that water meters shall be installed in horizontal position with the indicating device at the top, shall be attached to the water meter.

A metrological test may only be performed by a producer, or a notified body respectively in line with the conformity assessment procedure by the D or F Annexes of the Directive 2014/32/EU, respectively.

6 Ensuring the integrity of the instruments

The TAVOR meters with the indicating device type 3G have to be sealed by connecting two rings and the plastic head ring by using three screws. One of the screw have to be sealed by leaden seal with safeguarding mark.

The TAVOR meters with the indicating device type 3P have to be sealed by a sealing ring connecting body and a plastic head ring by using sealing ribs and have to be identified by safeguarding mark.

The TAVOR meters with the indicating device type LR have to be sealed by embedding of the clamp on cover of the meter to the body of the meter (there are 4 snaps on the bottom of the cover). The cover can be removed only destroying this part. The cover has to be identified by safeguarding mark.

The legally relevant software is protected with checksum (CRC-32) and manufacturer signature. The other protections are realized by backup on EEPROM.

The access to the adjusting screw is protected by cover that is sealed by safeguarding mark.
The location of seals is described in Figure 1.

7 Drawing of the instrument

Water meters type TAVOR are manufactured according to the technical documentation of manufacturer. Technical documentation contains following drawings:

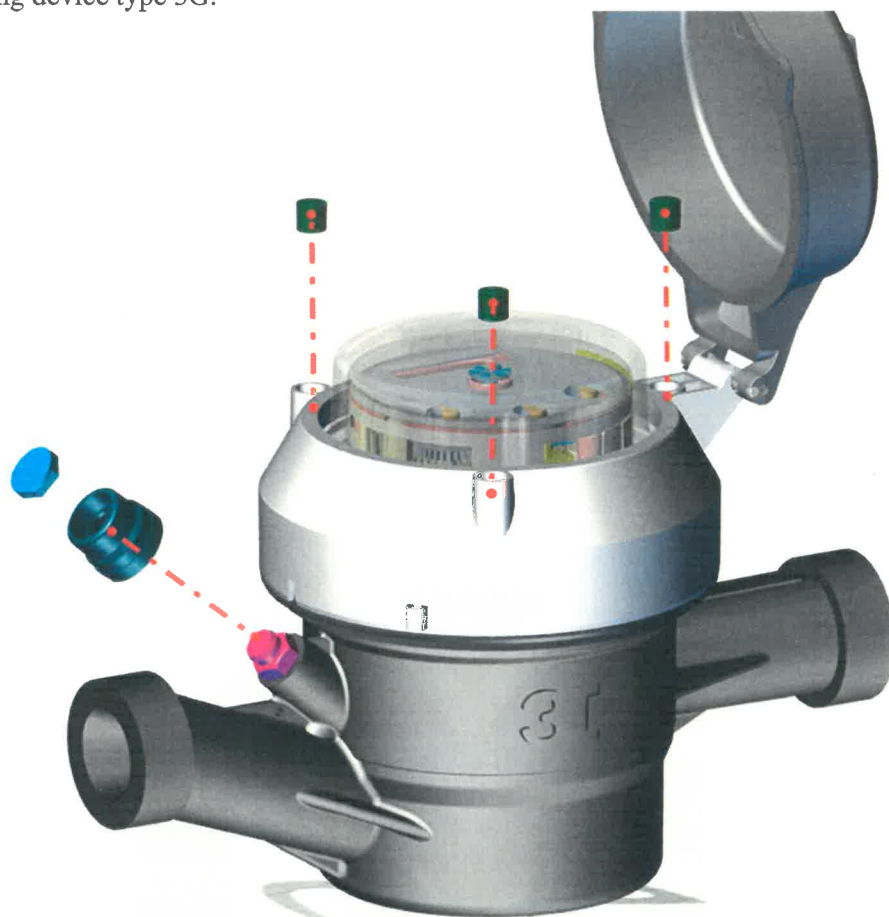
Document reference	Date	Brief description
21129001 / 01	21.10.2020	composite body DN15, G $\frac{3}{4}$ B; L = 190 mm
21159001 / 05	21.10.2020	composite body DN15, G $\frac{3}{4}$ B; L = 170 mm
21167001 / 04	21.10.2020	composite body DN15, G $\frac{3}{4}$ B; L = 165 mm
21164001 / 02	21.10.2020	composite body DN20, G 1" B; L = 190 mm
11444155MID / 02	7.12.2020	assembly drawing DN20; type 3G; $Q_3 = 2.5 \text{ m}^3$ (only dial No. 23632131 is part of certificate)
23632131 / 01	6.12.2020	dial plate DN20; type 3G; $Q_3 = 2.5 \text{ m}^3$
21180004	8.12.2020	dial plate DN20; type 3P; $Q_3 = 2.5 \text{ m}^3$
2718X64X_MID / 06	22.10.2020	exploded view and material list DN15 (dial type 3P, L165, L170, L190) and DN20 (dial type 3P; L190); $Q_3 = 2.5 \text{ m}^3$
7.2.9.1-c / 02	30.10.2020	exploded view and material list DN20; type 3G; $Q_3 = 2.5 \text{ m}^3$ and $Q_3 = 4.0 \text{ m}^3$
51142820 / 01	7.12.2020	Counting register TAVOR 3G (only dial No. 51142820 is part of certificate)
7.2.9.1- d / 02	30.10.2020	exploded view and material list DN20; type 3G; $Q_3 = 4.0 \text{ m}^3$
23633809 01	6.12.2020	dial plate DN20; type 3G; $Q_3 = 4.0 \text{ m}^3$
21180002 02	08.12.2020	dial plate DN15; type 3P
WI4499_1 / 02	07.10.2020	Process of placing & sealing TAVOR meter 3G
FO-IP-15 version 2.0	4.12.2020	Process of placing & sealing of adjusting screw and placing the serial number for TAVOR meter 3P
97510900/03	10.09.2020	dial plate DN20; type LR
90239000/00	24.05.2021	Laser init template TAVOR
WI4499_2/00	06.06.2021	Process of placing & sealing Tavor LR meter

History of additions

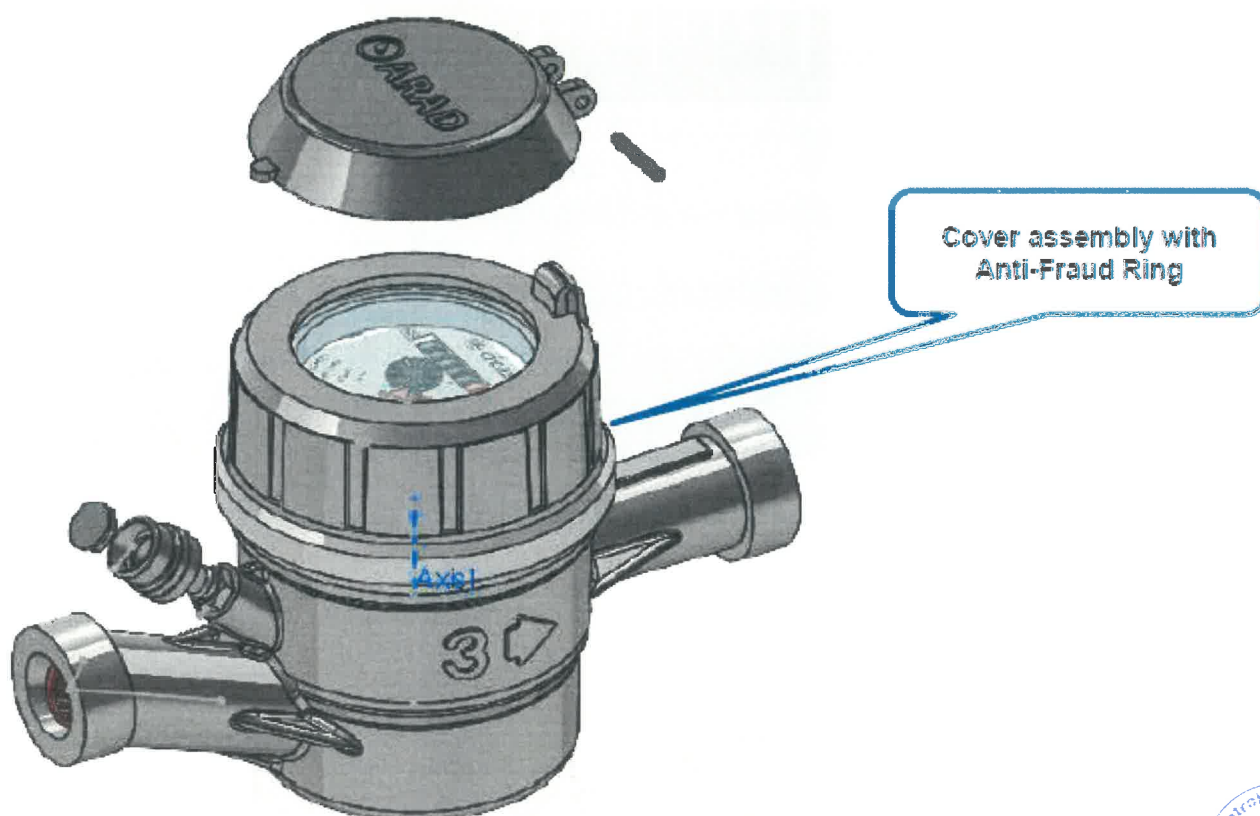
Addition No.	Description
Addition 0	Issuing certificate
Addition 1	Adding the electronic indicating device type LR. Adding flowrates for DN15 (R80 and R50)

Figure 1: The water meter type TAVOR – view and sealing:

- the indicating device type 3G:



- the indicating device type 3P:



- the indicating device type LR:

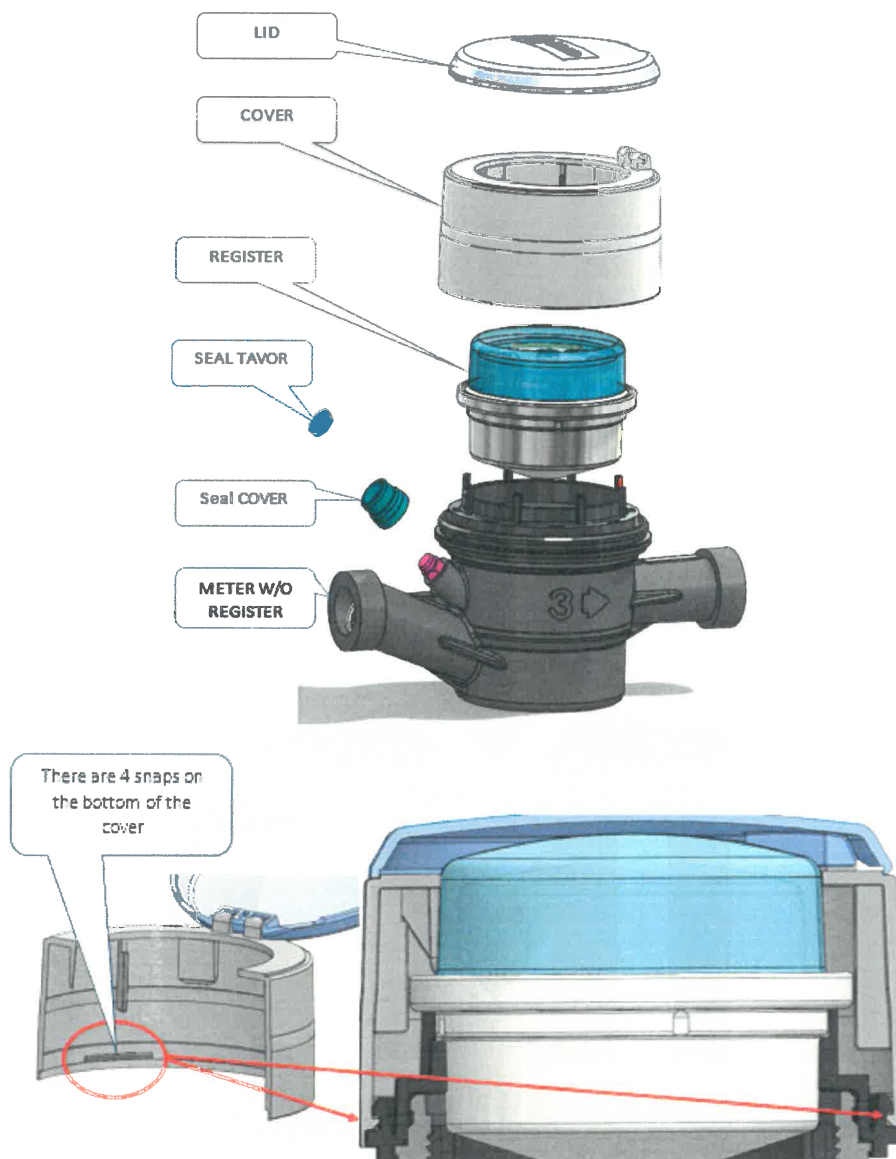
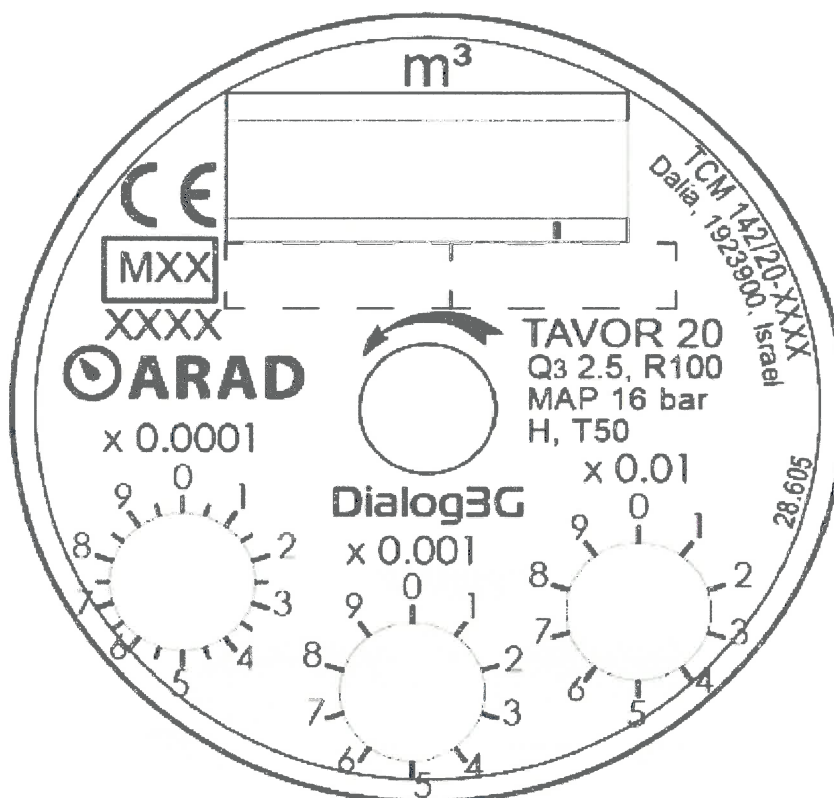
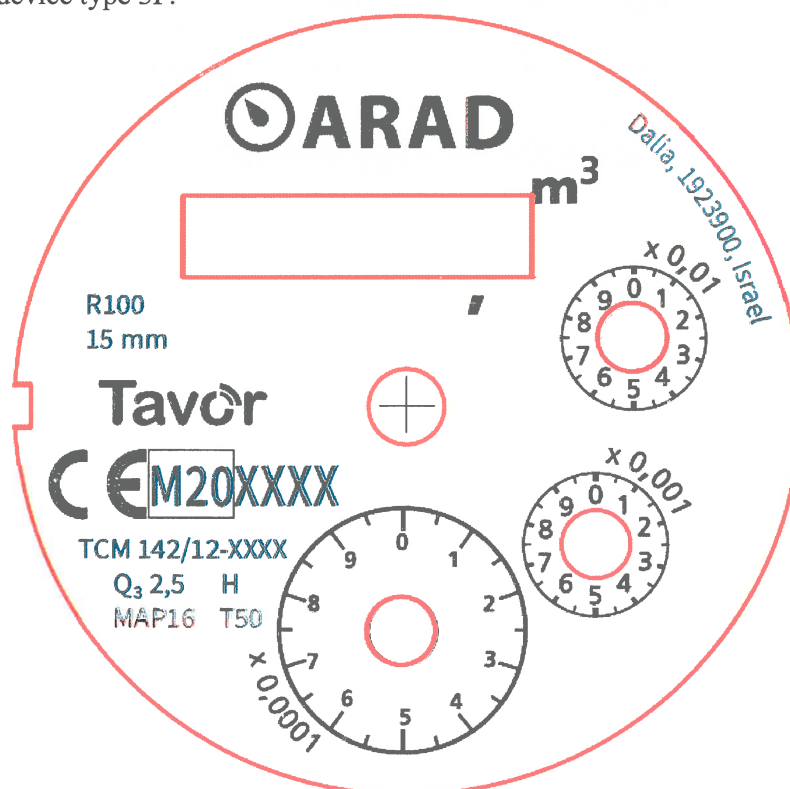


Figure 2: The water meter type TAVOR – example of registers (the year of manufacture is placed on water meter body using the safeguarding mark):

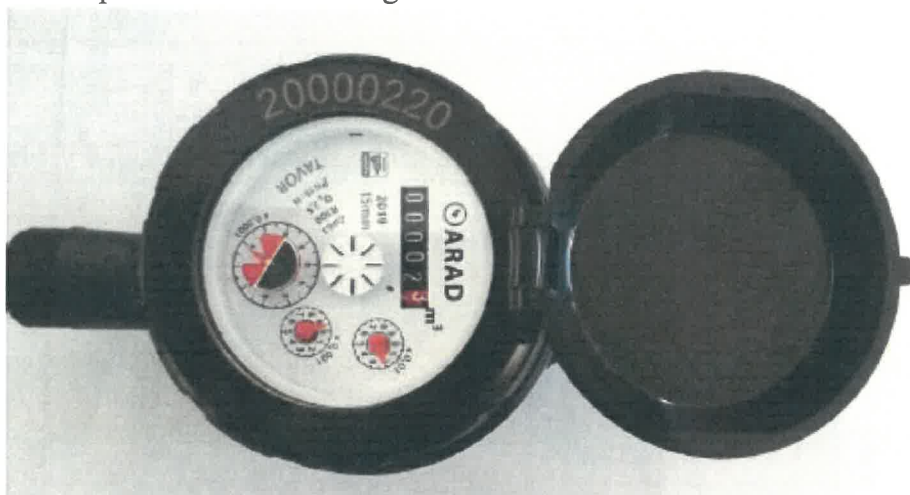
- the indicating device type 3G:



- the indicating device type 3P:



- serial number is placed on the head rings:



or



- the indicating device type LR (serial number and the latest date by which the meter shall be replaced are shown on dial plate):

