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

ES CERTIFIKÁT TYPU

EC – Type-examination certificate

Číslo dokumentu:
Document number:
SK 08-MI001-SMU003 **Revision 3**
Revízia 3 nahrádza certifikát zo dňa 26. mája 2010
Revision 3 replaces the certificate issued by May 26, 2010

V súlade:
In accordance with:
nariadením vlády Slovenskej republiky č. 294/2005 Z. z. o meradlách, v znení nariadenia vlády SR č. 445/2010 Z. z., ktorým sa preberá smernica Európskeho parlamentu a rady 2004/22/ES v znení smernice 2009/137/ES
Government Ordinance of the Slovak Republic No. 294/2005 Coll., on measuring instruments as amended by Government Ordinance of the Slovak Republic No. 445/2010 Coll. which implemented the Directive 2004/22/EC measuring instruments as amended by Directive 2009/137/EC of the European Parliament and Council

Žiadateľ/Výrobca:
Issued to (Manufacturer):
Sensus GmbH Ludwigshafen
67063 Ludwigshafen, Industriestrasse 16 - Germany

Druh meradla:
Type of instrument:
Vodomer / Viacvtokový vodomer na studenú vodu
Water meter / Multi-jet impeller meter for cold water

Označenie typu:
Type designation:
420, 420PC

Základné požiadavky:
Essential requirements:
príloha č. 1 a príloha MI-001 k nariadeniu vlády SR č. 294/2005 Z. z. v znení nariadenia vlády SR č. 445/2010 Z. z.
Annex No. 1 and Annex MI-001 to Government Ordinance of the Slovak Republic No. 294/2005 Coll. as amended by Government Ordinance No. 445/2010 Coll.

Platnosť do:
Valid until:
30. októbra 2018
October 30, 2018

Notifikovaná osoba:
Notified body:
1781

Dátum vydania:
Date of issue:
28. februára 2014
February 28, 2014

Základné charakteristiky, popis meradla a podmienky schválenia sú uvedené v prílohe, ktorá je súčasťou tohto certifikátu a pozostáva zo 17 strán.
Essential characteristics, instrument description and approval conditions are set out in the appendix hereto, which forms the part of the certificate and it consists of 17 pages.

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Ing. Emanuel Godál
zástupca notifikovanej osoby
representative of notified body

Place of production:

1. **Sensus Slovensko a.s.**
   Nám. Dr. A. Schweitzera 194, 916 01 Stará Turá, Slovak Republic
2. **S.C.FLUID GROUP HAGEN S.R.I**
   Garei, Str. Agoston Nr. 68/A, Romania

1 Instructions and standards used within for 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. 294/2005 Coll., on measuring instruments as amended by Government Ordinance No. 445/2010 Coll. (next Government Ordinance), which implemented the Directive 2004/22/EC on measuring instruments as amended by Directive 2009/137/EC of the European Parliament and Council

Requirements are listed in Annex No. 1 and MI-001 to Government Ordinance of the Slovak Republic No. 294/2005 Coll. as amended by Government Ordinance No. 445/2010 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 49-2:2006 - Water meters intended for the metering of cold potable water and hot water. Part 2: Test methods
OIML R 49-3:2006 - Water meters intended for the metering of cold potable water and hot water. Part 3: Test report format

2 Type marking

Multi-jet impeller meter for cold water **type – 420, 420PC**

Multi-jet impeller meter is made in following subgroups:

Type of meter	Temperature class	Class	Nominal Diameter
420, 420PC	T50	M2[1]) C[2]) E1[1])	Q_3 – 2,5 : DN15, DN20 Q_3 – 4 : DN15, DN20, DN25 Q_3 – 6,3 : DN25, DN32 Q_3 – 10 : DN25, DN32 Q_3 – 16 : DN40

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[1] According to the Government Ordinance, Annex 1

[2] According to EN 14154-3:2005+A2:2011 and OIML R 49-2:2004

3 Description of measuring instrument

Meter name: Multi-jet impeller meter for cold meter

Type marking: 420, 420PC

Description of measuring instrument design: Multi-jet impeller meter type 420, 420PC is intended for metering of delivered water quantity of cold water. Every subgroup of multi-jet impeller meters are displayed on pictures No. 1 up to No. 14.

3.1 Description of subgroups

3.1.1 Construction

Types 420 and 420PC Nominal Sizes Q_3 2,5 and Q_3 4

Multi-jet impeller meters with threaded end connections for installation in horizontal and vertical pipelines (upstream and downstream). It is also allowed to use suitable bodies of any other brand, if necessary, using compensation rings.

Construction according to the drawings

- MID 0114 dated 04.03.08
- MID 0117 dated 05.03.08
- MID 0120 dated 05.03.08
- MID 0128 dated 06.03.08

and the corresponding bills of material

- MID 0051 dated 15.04.08

Types 420 and 420PC Nominal sizes Q_3 6,3 and Q_3 10

Multi-jet impeller meters with threaded end connections for installation in horizontal and vertical pipelines (upstream and downstream). It is also allowed to use suitable bodies of any other brand, if necessary, using compensation rings.

Construction according to the drawings

- MID 0115 dated 05.03.08
- MID 0118 dated 05.03.08
- MID 0121 dated 06.03.08
- MID 0138 dated 18.03.08

and the corresponding bills of material

- MID 0051 dated 15.04.08

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Types 420 and 420PC Nominal size Q_3 16

Multi-jet impeller meters with threaded end connections for installation in horizontal and vertical pipelines (upstream and downstream). It is also allowed to use suitable bodies of any other brand, if necessary, using compensation rings.

Construction according to the drawings

- MID 0116 dated 05.03.08
- MID 0119 dated 05.03.08
- MID 0122 dated 06.03.08
- MID 0138 dated 18.03.08

and the corresponding bills of material

- MID 0053 dated 15.04.08

3.1.2 Measurement sensor

The multi-jet impeller meter measuring mechanism comprises the impeller chamber and the impeller. It is seated inside a body, which is also suitable for connecting the meter to the pipeline. The water flows into the measuring chamber through several passages and starts the impeller moving. The measuring mechanism is equipped with a bottom pin bearing and centring the impeller. The inlet passages are scattered around the impeller chamber circumference. The impeller movements are transmitted directly to the register by impeller axle and pinion.

Construction of the multi-jet impeller meter measuring mechanism according to drawings

- MID 0111 dated 04.03.08
- MID 0112 dated 04.03.08
- MID 0113 dated 04.03.08

3.1.3 Measurement transducer

Obsolete, because the multi-jet impeller meters are equipped with mechanical registers.

3.1.4 Measurement indication

Every multi-jet impeller meter is equipped with a wet-dial-pointer-register, which can optionally be constructed in pure wet-dial register version or in wet-dial register version with encapsulated set of cipher rolls. The registers have 5 rolls before and 4 pointer scales after the decimal point and a reading star. The fastest cipher roll operates in a jumping manner. The indication is in m^3.

The pointer with the circle value 1 ℓ can be equipped with a modulator plate. (see no. 3.1.8)

3.1.5 Wet-dial pointer register (register 420)

Wet-dial pointer register in pure wet-dial register version

Example according to drawing:

- MID 0123 dated 06.03.08

Register is displayed on the picture No. 15.

3.1.6 Register with encapsulated set of cipher rolls (register 420PC)

The register corresponds to the register 420 according to 3.1.5; however the register is water tightly encapsulated and filled with a mixture of glycerine and water. The pressure compensation between the register and the part of the meter, which is in contact with water, is made possible by an elastic sealing element. Example according to drawing: MID 0124 dated 06.03.08

Register is displayed on the picture No. 16.

3.1.7 Optional equipment and features, which are subject to the Measuring Instruments Directive

- none-

3.1.8 Integrated equipment and features, which are not subject to the Measuring Instruments Directive

The pointer register can also be equipped with an inductive pulser device. The pulser device can also be mounted subsequently, if required, on installation site of the meter.

The screwed-on pulser device must not influence the volume indication. All interfaces shall be non-interactive.

The visual readability of the register indication, all identification data of the meter and the verification bodies must not be affected.

The upgrade of the pulser device shall only be carried out by particularly trained fitters. The pulser device shall be secured against removal by a user seal.

Construction and way of operation:

A modulator plate is situated on the pointer of circle value 1 ℓ. The pulse rate is not less than 1 ℓ per pulse. The electronic evaluation device for scanning is situated in a separate casing screwed onto the register bonnet. The electronic evaluation device identifies forward and backward turns of the pointer.

Example of a mounted pulser device – HRI -, according to the drawing:

- MID 0125 dated 06.03.08
- MID 0126 dated 06.03.08
- MID 0127 dated 06.03.08

3.1.9 Non-return valve

The multi-jet impeller meters can optionally be equipped with a spring-loaded non-return valve. The non-return valve can already be present during the metrological test or it can be subsequently installed on condition that no verification seal will be injured.

4 Technical documentation

The main drawings with technical documentation are listed below

- drawing MID 0111 dated 06.03.08 – 420/PC Q_3 2,5/4 metering insert
- drawing MID 0112 dated 04.03.08 – 420/PC Q_3 6,3/10 metering insert
- drawing MID 0113 dated 04.03.08 – 420/PC Q_3 16 metering insert
- drawing MID 0114 dated 04.03.08 – 420/PC Q_3 2,5/4 meter compl. horizontal
- drawing MID 0115 dated 05.03.08 – 420/PC Q_3 6,3/10 meter compl. horizontal
- drawing MID 0116 dated 05.03.08 – 420/PC Q_3 16 meter compl. horizontal
- drawing MID 0117 dated 05.03.08 – 420/PC Q_3 2,5/4 meter compl.-riser upstream
- drawing MID 0118 dated 05.03.08 – 420/PC Q_3 6,3/10 meter compl.-riser upstream
- drawing MID 0119 dated 05.03.08 – 420/PC Q_3 16 meter compl.-riser upstream
- drawing MID 0120 dated 05.03.08 – 420/PC Q_3 2,5/4 meter compl.-riser downstr.
- drawing MID 0121 dated 06.03.08 – 420/PC Q_3 6,3/ meter compl.-riser downstr.
- drawing MID 0122 dated 06.03.08 – 420/PC Q_3 16 meter compl.-riser downstr.
- drawing MID 0123 dated 06.03.08 – 420 Q_3 2,5 -- 16 register
- drawing MID 0124 dated 06.03.08 – 420PC Q_3 2,5 -- 16 register
- drawing MID 0125 dated 06.03.08 – 420/PC Q_3 2,5/4 meter compl. with HRI
- drawing MID 0126 dated 06.03.08 – 420/PC Q_3 6,3/10 meter compl. with HRI
- drawing MID 0127 dated 06.03.08 – 420/PC Q_3 16 meter compl. with HRI
- drawing MID 0128 dated 06.03.08 – 420/PC Q_3 2,5/4 meter compl. explosion
- drawing MID 0138 dated 18.03.08 – 420/PC Q_3 6,3/10 meter compl. explosion
- drawing MID 0139 dated 18.03.08 – 420/PC Q_3 16 meter compl. explosion
- bill of material MID 0051 dated 15.04.08 – 420/PC Q_3 2,5/4 Multi jet meter
- bill of material MID 0052 dated 15.04.08 – 420/PC Q_3 6,3/10 Multi jet meter
- bill of material MID 0053 dated 15.04.08– 420/PC Q_3 16 Multi jet meter
- drawing MID 0254 dated 11.05.2010 - Belaserung 420/420PC for production Fluid Group Hagen

All drawings, schemes and technical documentation which are used during the conformity assessment are saved by applicant and in document No. NO-056/08 and No. NO-098/10.

5 Basic technical characteristics

Table No. 1

Q_3			2,5	4	6,3 and 10	16
Nominal diameter DN		mm	15, 20	15, 20, 25	25, 32	40
Type of register		-	Wet-dial / Semi-dry-dial			
Indicating range		m^3	10^5			
Calibration value		m^3	0,05			
Maximum admissible pressure [MAP]		bar	16			
Working pressure range		bar	0,3 to 16			
Pressure loss [Δp]		bar	0,63			
Temperature class [MAT]		°C	T 50			
Flow profile sensitivity classes		-	U0, D0			
Position		-	H			
Connection			≥ G ¾ B	≥ G ¾ B	≥ G 1¼ B	≥ G 2 B
Length	• inline	mm	≥145	≥165	≥260	≥300
	• vertical - upstream	mm	≥105	≥105	≥150	≥200
	• vertical - downstream	mm	≥105	≥105	≥150	≥200
Climatic and mechanical environments		-	Closed spaces/from -10°C until 55°C/mech. class M2			
Electromagnetic environments		-	E1			

5.1 Additional technical characteristics

IP Code	IP 68

6 Basic metrological characteristics

The maximum admissible error (accuracy class):

± 5 % ($Q_1 \leq Q < Q_2$)

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

Table No. 2 **Multi jet meter 420, 420PC Q_3 2,5 and Q_3 4**

Minimum flow rate	Q_1	m^3/h	0,016	0,031	0,063	0,025	0,050	0,100
Transitional flow rate	Q_2	m^3/h	0,025	0,05	0,1	0,04	0,08	0,16
Permanent flow rate	Q_3	m^3/h	2,5	2,5	2,5	4	4	4
Overfload flow rate	Q_4	m^3/h	3,125	3,125	3,125	5	5	5
Value of ratio R	Q_3/Q_1	m^3/h	160	80	40	160	80	40
Ratio	Q_2/Q_1	m^3/h	1,6	1,6	1,6	1,6	1,6	1,6

Table No. 3 **Multi jet meter 420, 420PC Q_3 6,3 and Q_3 10**

Minimum flow rate	Q_1	m^3/h	0,039	0,079	0,158	0,063	0,125	0,250
Transitional flow rate	Q_2	m^3/h	0,063	0,126	0,252	0,1	0,2	0,4
Permanent flow rate	Q_3	m^3/h	6,3	6,3	6,3	10	10	10
Overfload flow rate	Q_4	m^3/h	7,875	7,875	7,875	12,5	12,5	12,5
Value of ratio R	Q_3/Q_1	m^3/h	160	80	40	160	80	40
Ratio	Q_2/Q_1	m^3/h	1,6	1,6	1,6	1,6	1,6	1,6

Table No. 4 **Multi jet meter 420, 420PC Q_3 16**

Minimum flow rate	Q_1	m^3/h	0,100	0,200	0,400
Transitional flow rate	Q_2	m^3/h	0,16	0,32	0,64
Permanent flow rate	Q_3	m^3/h	16	16	16
Overfload flow rate	Q_4	m^3/h	20	20	20
Value of ratio R	Q_3/Q_1	m^3/h	160	80	40
Ratio	Q_2/Q_1	m^3/h	1,6	1,6	1,6

7 Results of conformity assessment

Results of tests, assessments and evaluations shown in the evaluation report No. 6199/230/142/08 dated 30.10.2008 verify that the technical design of a measuring instrument – multijet-meter type 420 and 420PC-- is in compliance with the technical requirements of the MID 2004/22/EC in accordance with the Slovak Republic Governmental Ordinance No. 294/2005 Coll. on measuring instruments, Annex I (essential requirements) and MI-001, and the EN 14154-1:2005+A2:2011 and OIML R 49-1:2006.

8 Data placed on the measuring instrument

Attached to the meter the following information shall be available:

- name or company name of manufacturer or his trademark
- flow rate Q_3 and the ratio R (Q_3/Q_1)
- year of production and individual serial number of the meter
- number of the type examination certificate
- the maximum operation temperature
- the operating position
- flow direction
- measuring unit
- maximum admissible pressure

Example for marking see drawing:

- drawing MID 0125 dated 06.03.08 – 420/PC Q_3 2,5/4 meter compl. with HRI
- drawing MID 0254 dated 11.05.2010 – Belaserung 420/420PC for production Fluid Group Hagen

Additional inscriptions are allowed, as long as they cannot be mixed up with the a.m. details.

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

The multi-jet impeller meter for cold water -type 420 and 420PC- introduced at market the shall be in accordance with the procedure of conformity assessment according to the Annex D or F of the Governmental ordinance as well as in compliance with the technical description in chapter 3 of this report and shall be tested in accordance with the requirements determined in OIML R 49-1:2006. Metrological test is performed by testing equipment which should be in compliance with the requirements determined in EN 14154-3:2005+A2:2011 or OIML R49-1:2006 with following points of flow rates:

a) Minimum flow rate $Q_1 \leq Q \leq 1{,}1Q_1$
b) Transitional flow rate $Q_2 \leq Q \leq 1{,}1Q_2$
c) Permanent flow rate $0{,}9Q_3 \leq Q \leq Q_3$

A metrological test may only be performed by a producer, or a notified body respectively in line with the conformity assessment procedure by the D or F Annexes of the Governmental ordinance respectively.

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10 Measures asked for providing measuring instrument integrity

10.1 Identification

The multi-jet impeller meter for cold water - type 420 or 420PC- should be in compliance with the description in chapter 3 of this report as well as in compliance with the marking specified in chapter 7 of this report. The type examination certificate no. shall be attached on each measuring instrument.

Location of the conformity mark shall be in conformity with § 7 of the MID.

Example for the marking, see drawing MID 0125 dated 06.03.08

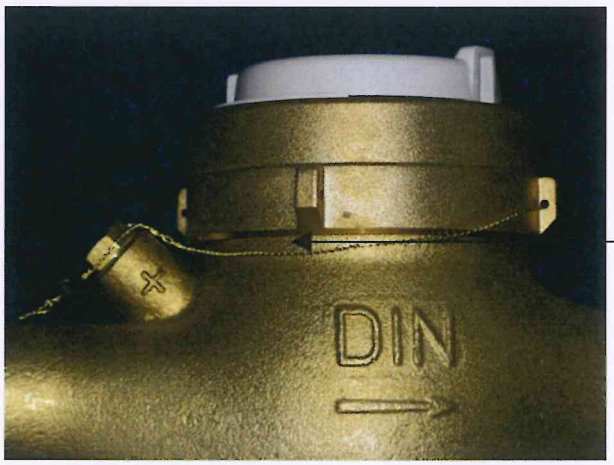
10. 2 Sealing of the measuring instrument

The multi-jet impeller meter for cold water type -420 and 420PC- shall be sealed before conformity assessment according to the Annex D or F will be declared.

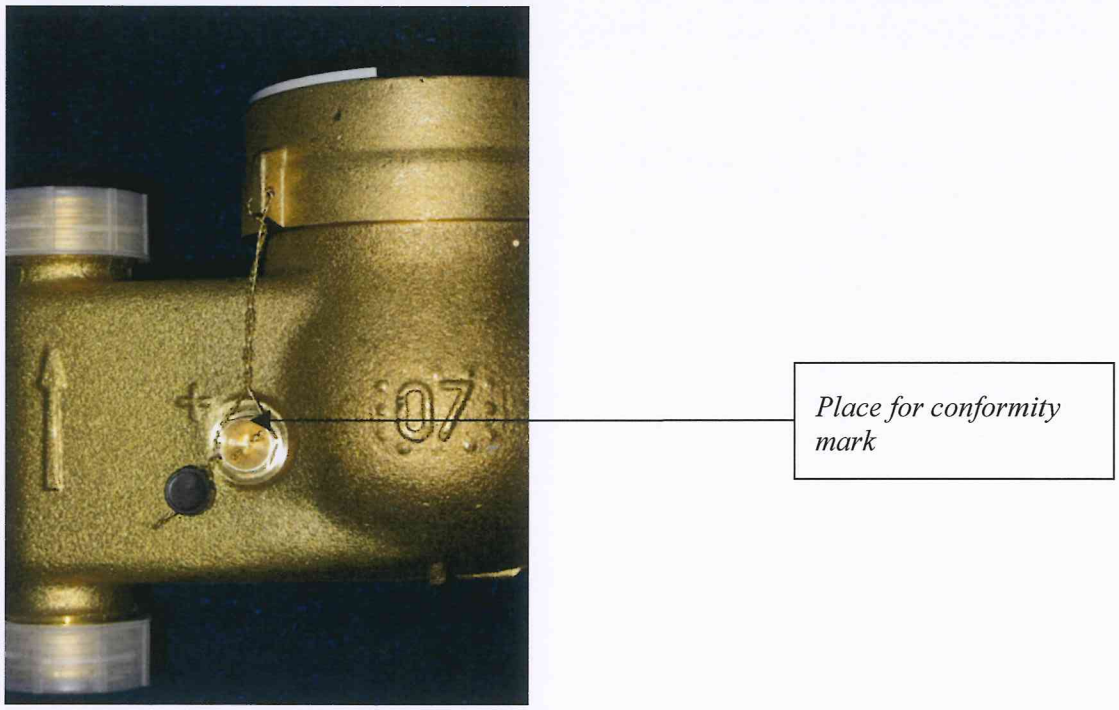
The head ring closing the meter shall be secured towards the meter body by a seal, so that an intentional opening of the meter is only possible by damaging this sealing marks. (Picture No. 17 up 19)

For protection against soiling or damage during transport the inlet and outlet passages shall be covered. (Picture No. 19)

Picture No. 17 Sealing with a short loop - inline -



Picture No. 18 Sealing with a long loop - inline -



Picture No. 19 Sealing with a short loop

11 Requirements for installation, especially conditions of using

11.1 Installation data

Q_3		2,5	4	6,3	10	16
Diameter DN	mm	15, 20	15, 20, 25	25, 32	25, 32	40
Connection		≥ G ¾ B	≥ G ¾ B	≥ G 1¼ B	≥ G 1¼ B	≥ G 2 B
Construction length • inline	mm	≥145	≥165	≥260	≥260	≥300
• vertical - upstream	mm	≥105	≥105	≥150	≥150	≥200
• vertical - downstream	mm	≥105	≥105	≥150	≥150	≥200

11.2 Rules for Installation requirements

The multi-jet impeller meter for cold water -type 420 and 420PC- shall be put into use by a qualified and certified plumber. The meter shall fulfil the requirements of design and performance in accordance with this report as well as the plumber has to follow the manufacturer guidance/installation requirements before the meter put into operation. The water meter shall be installed in direction of flow water.

11.3 Conditions of use

- none –

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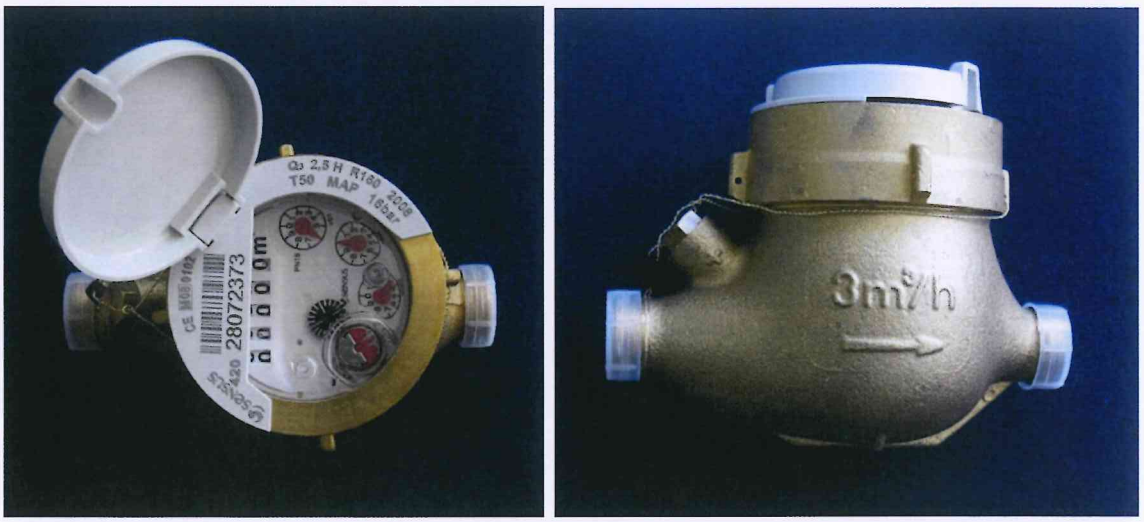
12 Pictures

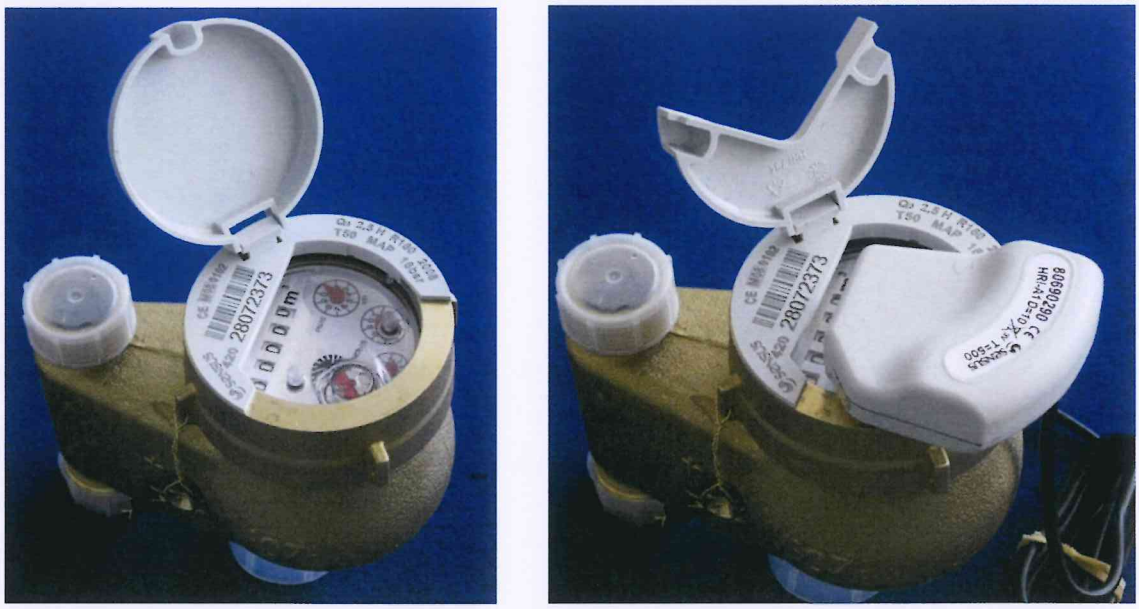
Multi jet meter **420/PC Q_3 2,5 inline**

*Picture No. 1 Multi jet meter **420/PC Q_3 2,5 inline** without and with HRI (perspective view)*

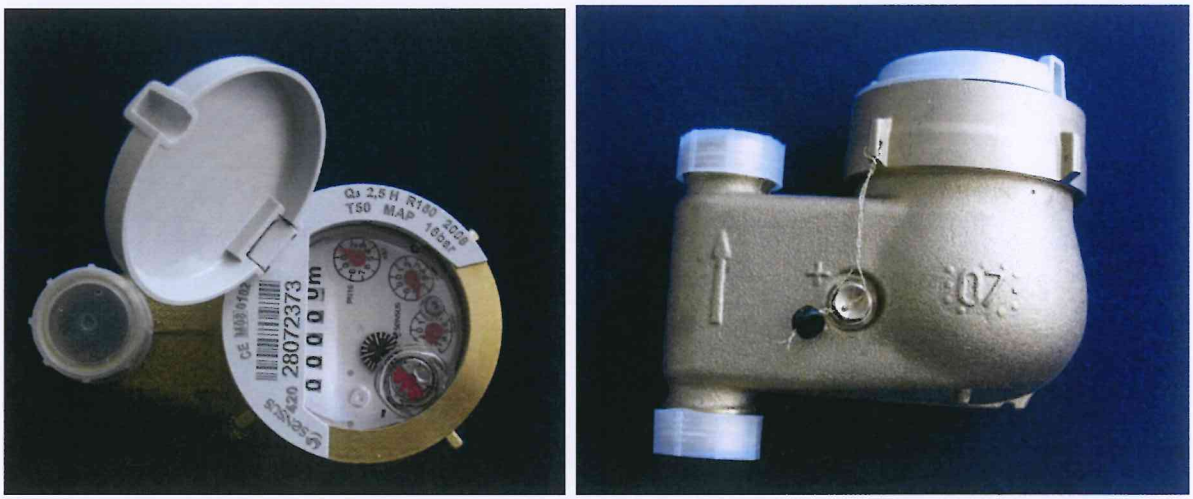


*Picture No. 2 Multi jet meter **420/PC Q_3 2,5 inline** (top view and side view)*

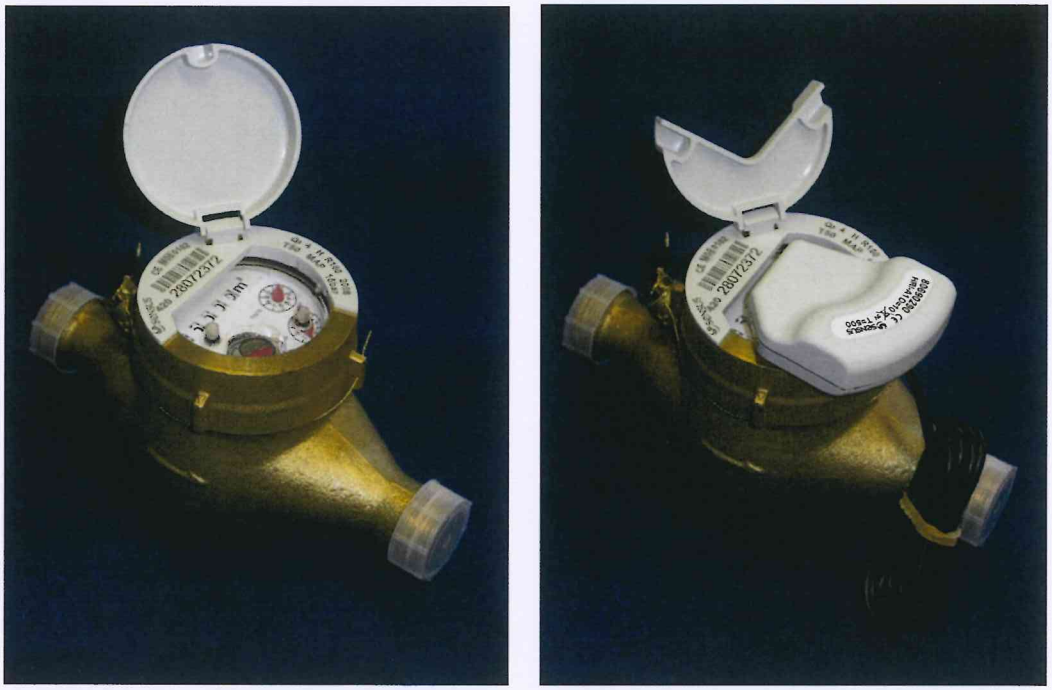
Multi jet meter **420/PC Q_3 2,5 vertical upstream (riser)**



*Pic. No. 3 Multi jet meter **420/PC Q_3 2,5** vertical upstream (riser) without and with HRI (perspective view)*

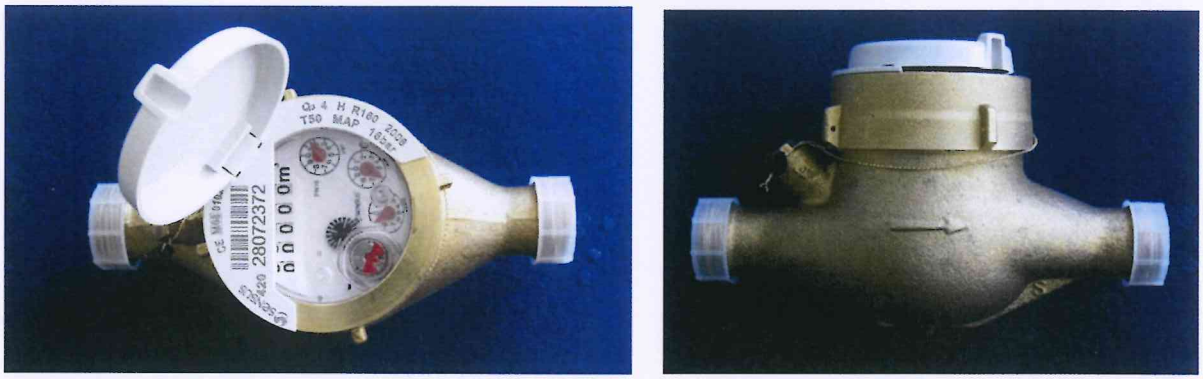


*Pic. No. 4 Multi jet meter **420/PC Q_3 2,5** vertical upstream (riser) (top view and side view)*



*Picture No.5 Multi jet meter **420/PC Q_3 4 inline** without and with HRI*

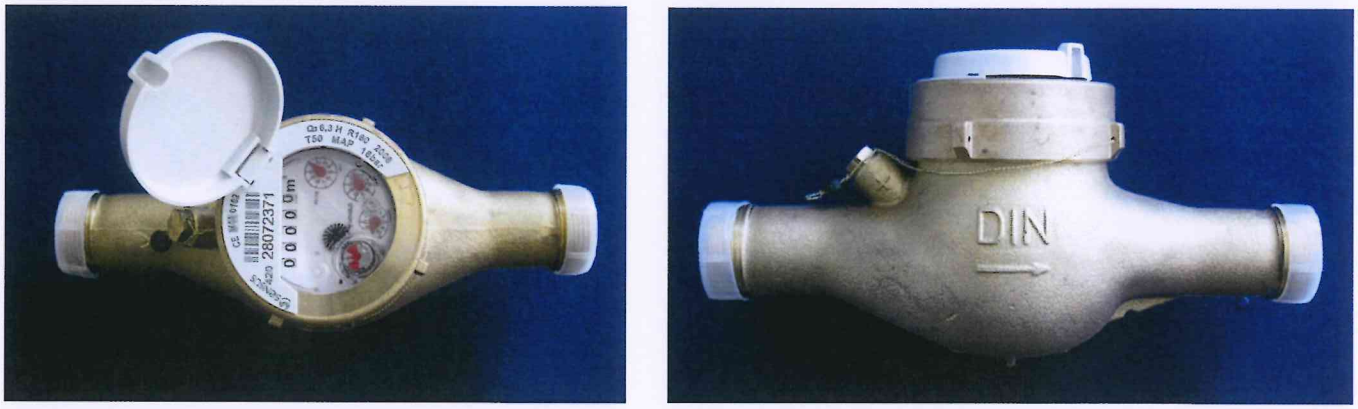
(perspective view)



*Picture No. 6 Multi jet meter **420/PC Q_3 4 inline** (top view and side view)*

Multi jet meter **420/PC Q_3 6,3 inline**

*Picture No. 7 Multi jet meter **420/PC Q_3 6,3 inline** without and with HRI (perspective view)*



*Picture No. 8 Multi jet meter **420/PC Q_3 6,3 inline** (top view and side view)*

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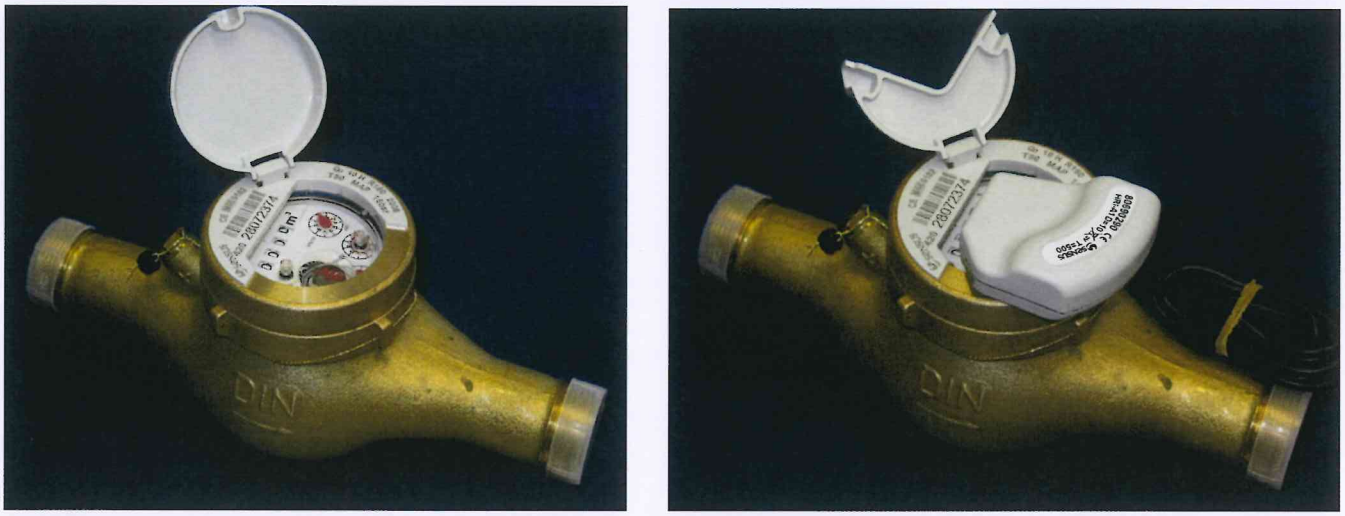
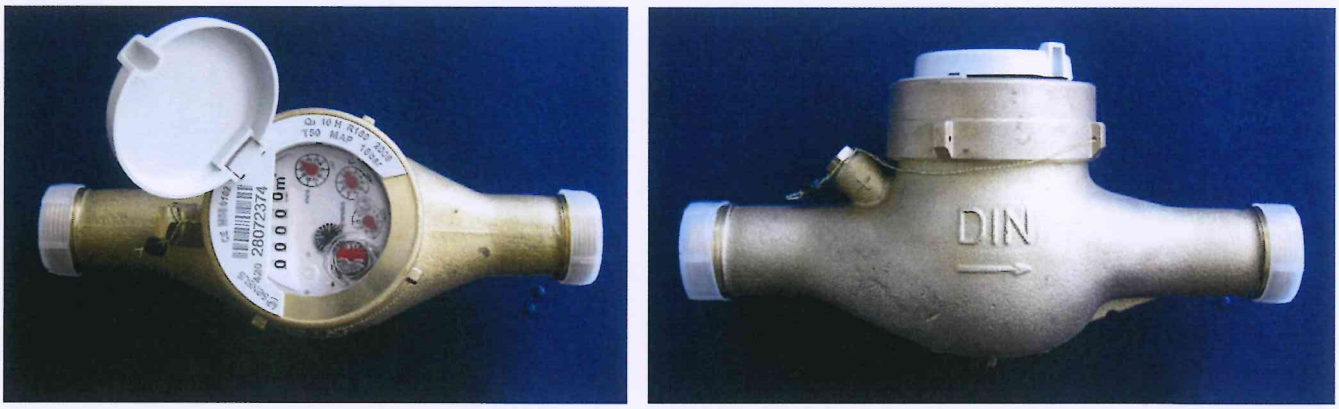
Multi jet meter **420/PC Q_3 10 inline**



*Picture No. 9 Multi jet meter **420/PC Q_3 10 inline** without and with HRI (perspective view)*



*Picture No. 10 Multi jet meter **420/PC Q_3 10 inline** (top view and side view)*

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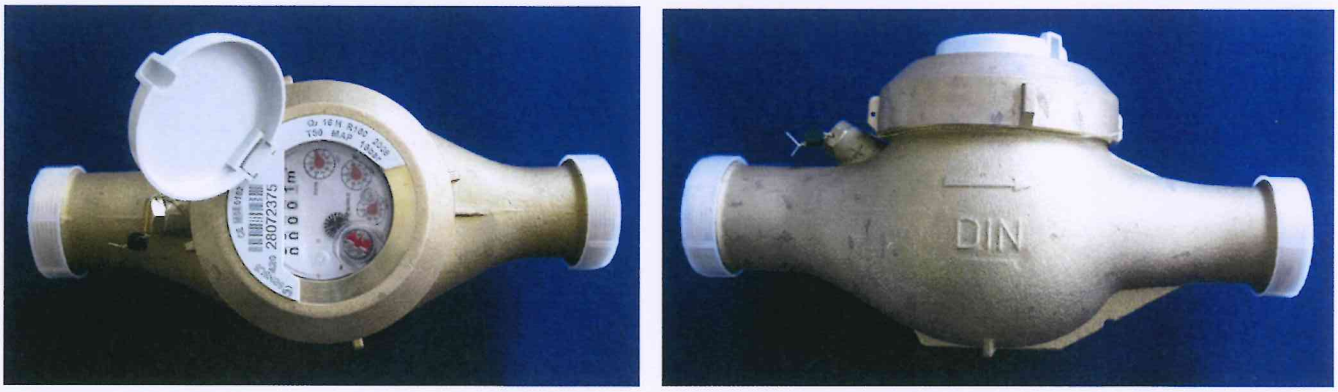
Multi jet meter **420/PC Q_3 16 inline**

*Picture No. 11 Multi jet meter **420/PC Q_3 16 inline** without and with HRI*

(perspective view)



*Picture No. 12 Multi jet meter **420/PC Q_3 16 inline** (top view and side view)*

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Multi jet meter **420/PC Q_3 16 vertical downstream**

*Picture No. 13 Multi jet meter **420/PC Q_3 16** vertical downstream without and with HRI (perspective view)*

*Picture No. 14 Multi jet meter **420/PC Q_3 16 riser-** (downstream) (top view and side view)*

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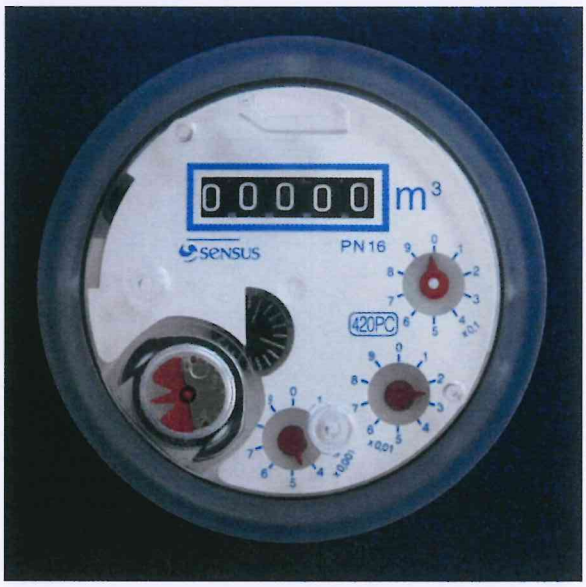
*Picture No. 15 Register **420 Q_3 2,5 – 16** with the possibility of HRI adaption*



*Picture No. 16 Register **420PC Q_3 2,5 – 16** with the possibility of HRI adaption*

Assessment done by: Ing. Viliam Mazúr

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