

PRESENTATION



ION POLARIZATION SYSTEM

THE IDEAL SOLUTION FOR COMPLICATIONS WITH LIMESCALE

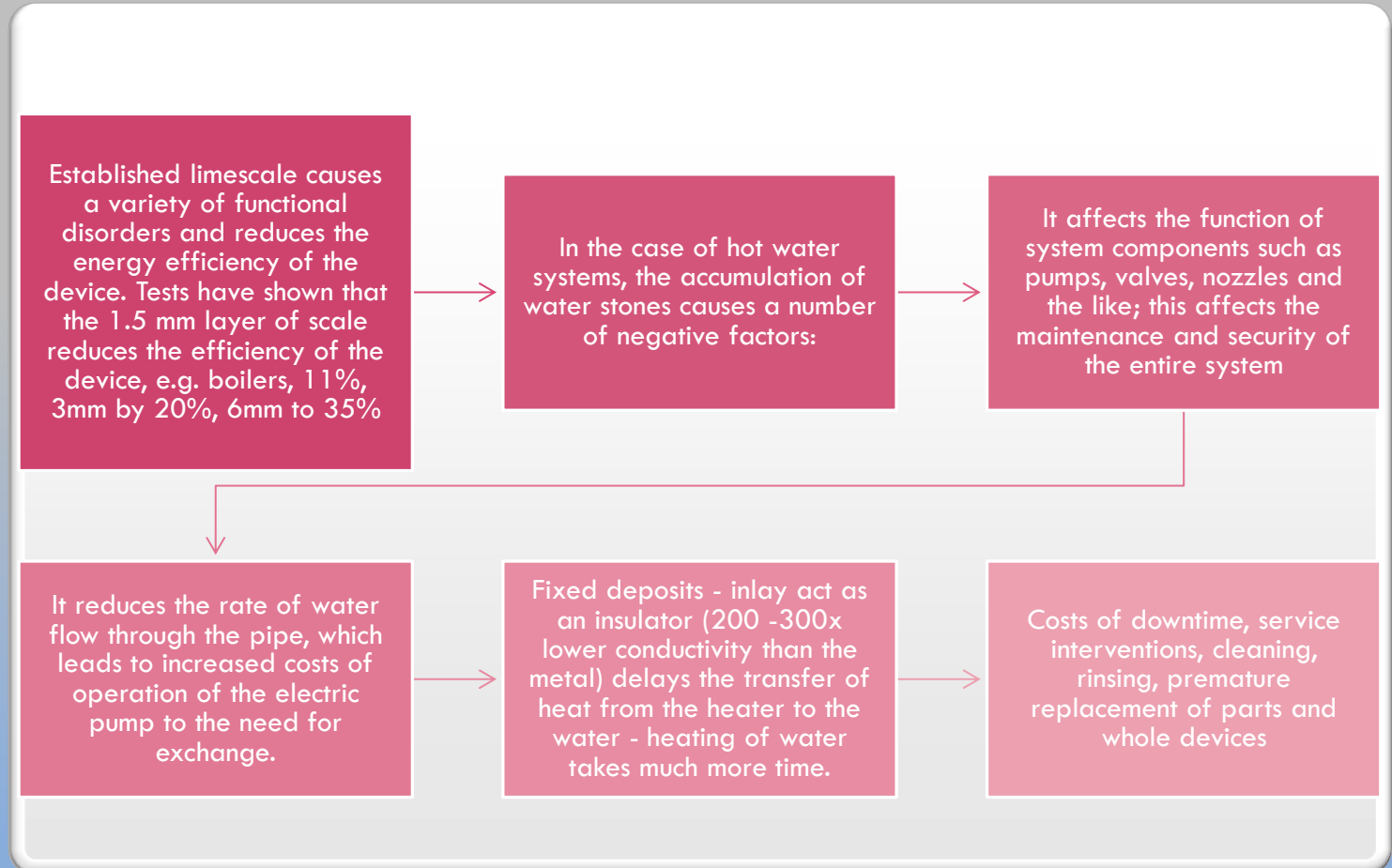


EACH OF US HAS ALREADY MET WITH LIMESCALE? RESULT?

- UNEXPECTED OPERATING COSTS
- OUTAGES THAT COST TIME AND MONEY
- COSTLY SERVICING AND MAINTENANCE OF EQUIPMENT
- NECESSITY TO PURCHASE NEW EQUIPMENT

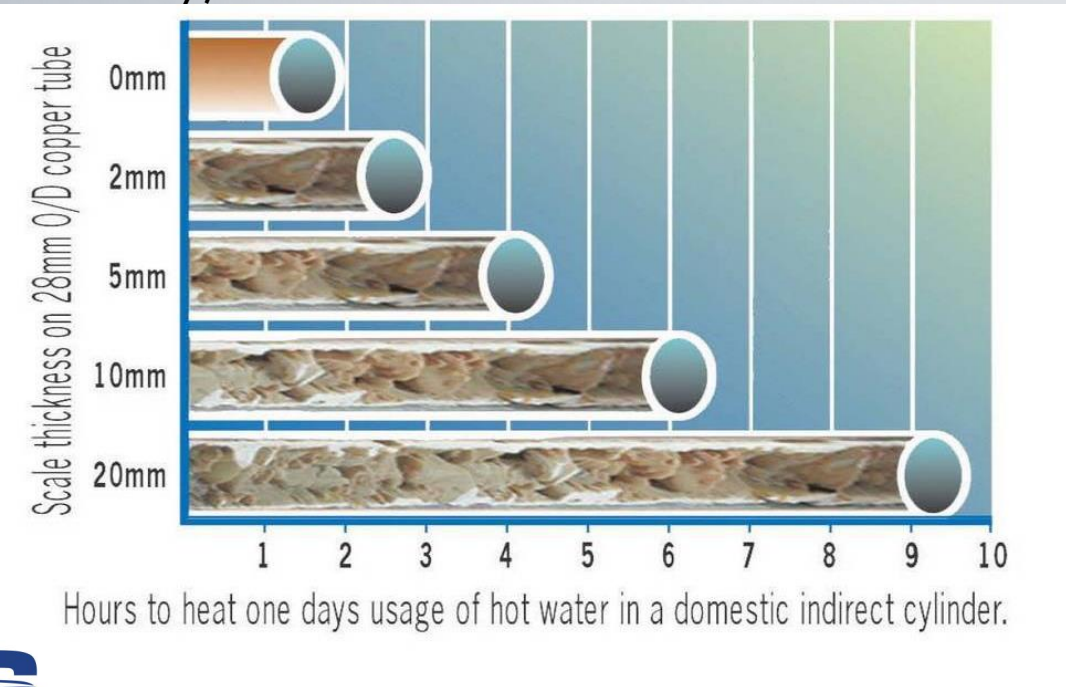


WHAT CAUSES LIMESCALE



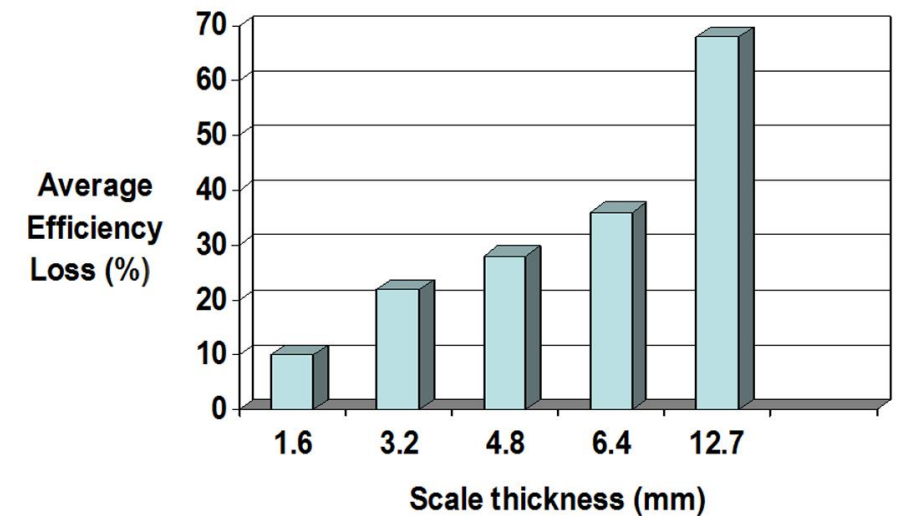
WHAT CAUSES LIMESCALE

Effect of sediment thickness on the number of hours of water heating in the copper pipe (source: Portsmouth University)



Loss of efficiency of the heater depending on the thickness of the deposits

Increased Energy Use



HOW TO REMOVE LIMESCALE?

Most environmentally friendly and financially the least onerous solution is just physical treatment.

It is secured by an IPS maintenance-free device (ion polarization system)

With the effect of elimination of limescale min. 76% efficiency (IAPMO)



TECHNICAL DESCRIPTI ON OF IPS

01

The IPS is composed of a flow-through body with inlet and outlet ports.

02

Electrodes are located in the body. Each is of other electrically conductive material. The water that flows through the body creates a galvanic wet cell with the electrodes.

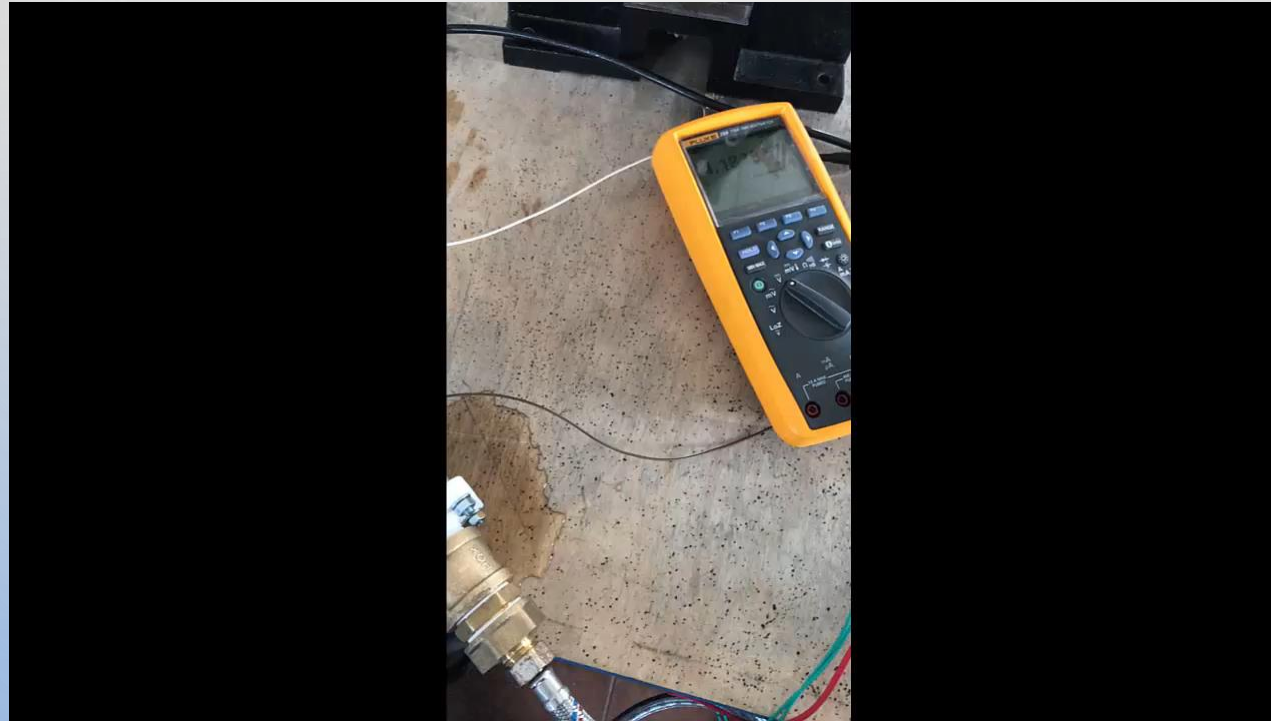
03

The electrical voltage of this cell is sufficient for water molecules to polarize. The voltage is dependent on the electrical conductivity of the water. This phenomenon can be used with water with a conductivity of 50 - 2000 $\mu\text{S} / \text{cm}^2$. This is conventional water in which the salt content is from 50 to 2000 mg / l.

04

When water flows between electrodes, there is a phenomenon when calcium, magnesium and iron salts in the form of carbonates, sulphates and chlorides are dissociated to hydroxides. As a result, cations lose the ability to form crystalline deposits. These carbonates are formed further, but only in the form of soft particles - sludge.

EVIDENCE OF ENERGY FLOWING IN IPS





BENEFITS OF IPS DEVICE

- WITHOUT EXTERNAL SOURCE
- WITHOUT MAINTENANCE
- NO OPERATING COSTS
- NO CHEMISTRY
- PATENTED TGP TECHNOLOGY
- CERTIFICATED EFFICIENCY
- ENVIRONMENTALLY-FRIENDLY (ECOLOGICAL)

BENEFITS OF IPS DEVICES

- PROTECTS EQUIPMENT, PIPES AND APPLIANCES AGAINST HARD DEPOSITS AND CORROSION
- THEY ARE VERY EFFECTIVE IN CIRCULATING BRANCHES OF HOT WATER ALONG WITH A CIRCULATING PUMP.
- REDUCES CHLORINE IN WATER - BENEFICIAL TO THE SKIN
- ADJUSTS PH 7.5 - 9.0 (LOWEST CORROSION) ALKALINE WATER - BENEFICIAL TO THE HUMAN ORGANISM
- IT IMPROVES THE QUALITY OF DRINKING WATER - (FLAVOR AROMA) AND HOT WATER
- AREAS OF APPLICATION IPS DEVICE?
- CAN BE USED EVERYWHERE AND DAILY, WHERE COLD WATER OR HOT WATER IS WITH A HARDNESS OF MORE THAN 1.8 MMOL / L (OR 10 ° DH)..

EFFICIENCY OF IPS

- TESTING OF IPS DEVICE FOR THE PROTECTION OF HEATING BODIES, PRIOR TO LIMESCALE CLOGGING
- **PIC. 1: DEMONSTRATION OF ARAGONITE DEPOSITS IN THE BOILER. (MODIFIED BY IPS)**
- **PIC. 2: A CLEAR DEMONSTRATION OF SPIRAL CLOGGING.**
- **COIL ON THE LEFT – TREATED BY IPS**
- **SPIRAL ON THE RIGHT – WITHOUT TREATMENT**





TEST REPORT

5001 East Philadelphia Street
Ontario, California – USA 91761-2816
Ph: 909.472.4100 | Fax: 909.472.4243
<http://www.iapmoril.org>

Report Number: 2475-17001

Report Issued: September 29, 2017

Project No.: 28587

Client: Swiss Aqua Technologies SK s.r.o.,
Obereggerstrasse 50,
Berneck, Switzerland, CH-9442

Contact: František Pancurák

- Line 1) Stainless steel heating element, without water softener (untreated)
- Line 2) Stainless steel heating element, with IPS Kalyxx device.
- Line 3) Copper heating element, without water softener (untreated).
- Line 4) Copper heating element, with IPS Kalyxx device.

Note: Lines 2 & 4 were connected to the same IPS Kalyxx device (by a Tee).

During a period of 11 days, 4 times per day (at 8 AM, 11 AM, 1 PM and 4 PM), a 30 liters of water each time was drained and refilled simultaneously. Except the 2 weekend days, only 3 water exchanges were done (at 8AM, 12PM and 4PM).

Before each water draw, the hot water temperature was measured and registered, average of 65.2°C (min: 65.0°C / max: 65.5°C). During each water refill, the cold water temperature was measured and registered, average of 17.2°C (min: 16.9°C / max: 17.7°C). On daily basis, the water hardness was verified and registered, average of 17.9° dH (min: 17.51° dH / max: 18.06° dH).

At the end of the 11-day test, the heating elements were left drying and then taken out from the tanks. The lime scale, which was attached to the heating elements, were mechanically scraped off and weighed.

Finding:

Line number	1	2	3	4
Weight of deposited limescale (g)	0.7133	0.1759	4.7843	1.1336

From these results, it's concluded that the IPS Kalyxx reduced 75.3% limescale deposit on stainless steel heating element, and 76.3% limescale deposit on copper heating element.

Tested by,

Robert Schut, Project Specialist

Reviewed by,

Sean Vuu, P.E., Manager, Specialty Projects



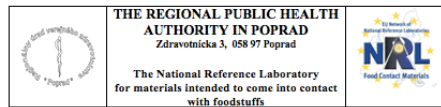
IPS PERFORMANCE CERTIFICATE

- THE EFFICIENCY CERTIFICATE CONFIRMS A MINIMUM EFFICIENCY OF 76.3% FOR THE REDUCTION OF HARD SCALE ON HEATING ELEMENTS.



IPS TEST REPORT

SILVER



TEST REPORT

Laboratory analysis results and assessment of safety of materials intended to come into contact with drinking water Nr. 50 – 55/2018

Customer: Swiss Aqua Technologies SK s.r.o.
Šebastovská 2
080 06 Prešov
SLOVAKIA

Date of samples receipt: 10.01.2018
Date of issue: 16.02.2018

Samples title: silver plated planes for IPS Kalyxx device

Producer: Swiss Aqua Technologies SK s.r.o.
Application: for direct permanent contact with drinking water (physical treatment of water - prevention of water formation and corrosion at the point of consumption)

Submitted documentation:
1. Certificate nr. A80026535 by company Peter Jarabica Servis Metal on material 3061100 – Sheets CW508L.

Chemical examination

The sample tested in accordance with requirements of the:
Ministry of Health of The Slovak republic Decree No. 550/2007 Coll. laying down the details of the requirements for the products intended for contact with potable water and
Ministry of Health of The Czech republic Decree No. 409/2003 Coll. on hygienic requirements for products that come into direct contact with water and water treatment.

Pre-arrangement of the sample:
Pre-arrangement treatment stagnation:
Testing sample submerged into potable water for 24 h ± 0.5 h at temperature (23 ± 2°C). Then water is renewed by fresh drinking water tempered to the test temperature and left during 16 h ± 0.5 h at testing temperature.
Flushing:

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Laboratory analysis results and assessment of safety of materials intended to come into contact with drinking water Nr. 50 – 55/2018

All samples are flushed by potable water during 60 min. ± 10 min. below constant current of 5 cm² s⁻¹ ± 2 cm² s⁻¹ and finally are flushed with testing water during at least 2 minutes.

Procedure of migration test:

The migration test is conducted in parallel with two equal test samples. The migration tests are conducted immediately after the pre-arrangement procedure of the samples intended for contact with water into the testing water. The samples are leached out three times subsequently over the time period of 72 h. After the first and the second exposure time (72 h), the all volume of the leach is removed and immediately, it is replaced with the equal volume of the new testing water. The laboratory examination is carried out using the leaches obtained after every migration time separately.

Conditions testing:

The samples were leached out three times in the 72-hour intervals, which were subsequently each other, at temperature of 23 ± 2 °C.
Surface of testing sample to volume of water was in the rate of 1:1 (1 cm² / 1 cm³).
Testing water – deionized water.
Tests were performed and duplicated.

Extract description:

Extract type	Sample
1st extract (1. – 3. day)	72 h, 23 °C volume of testing waters 26 ml, surface of testing sample 0.26 dm ²
2nd extract (3. – 6. day)	72 h, 23 °C volume of testing waters 26 ml, surface of testing sample 0.26 dm ²
3rd extract (6. – 9. day)	72 h, 23 °C volume of testing waters 26 ml, surface of testing sample 0.26 dm ²

Test results

comparative sample (blank experiment)

Parameter	Unit	Parallel determination	1st extract	2nd extract	3rd extract
Ag	mg.l ⁻¹	I.	< 0.0003	< 0.0003	< 0.0003
		II.	< 0.0003	< 0.0003	< 0.0003

sample - silver plated planes for IPS Kalyxx device

Parameter	Unit	Parallel determination	1st extract	2nd extract	3rd extract
Ag	mg.l ⁻¹	I.	0.003	0.002	0.002
		II.	0.003	0.002	0.002

Sensory evaluation – 1st extract		Matter model affected by material		
Evaluator No.	Matter model	taste change	smell change	design change

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Laboratory analysis results and assessment of safety of materials intended to come into contact with drinking water Nr. 50 – 55/2018

1.	drinking water	1	1	1
2.		1	1	1
3.		1	1	1
4.		1	1	1
5.		1	1	1
General average of changes		1.0	1.0	1.0

Sensory evaluation – 2nd extract				
Evaluator No.	Matter model	Matter model affected by material		
		taste change	smell change	design change
1.	drinking water	1	1	1
2.		1	1	1
3.		1	1	1
4.		1	1	1
5.		1	1	1
General average of changes		1.0	1.0	1.0

Sensory evaluation – 3rd extract				
Evaluator No.	Matter model	Matter model affected by material		
		taste change	smell change	design change
1.	drinking water	1	1	1
2.		1	1	1
3.		1	1	1
4.		1	1	1
5.		1	1	1
General average of changes		1.0	1.0	1.0

Evaluation average:

≤ 1.8 small probability, that material or object will influence sensorial facilities of food and drinking waters

1.9-2.4 material or object is able to influence sensorial facilities of food and drinking waters

> 2.4 high probability, that material or object will influence sensorial facilities of food and drinking waters

Calculation of average concentration K₀ of the parallel determinations of the tested substances in the blank experiment

comparative sample (blank experiment)

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Laboratory analysis results and assessment of safety of materials intended to come into contact with drinking water Nr. 50 – 55/2018

Index	Unit	K ₀ ²¹ ; 1	K ₀ ²¹ ; 3
Ag	mg.l ⁻¹	< 0.0003	< 0.0003

Calculation of average concentration K₀ of the parallel determinations of the tested substances for the migration time of 24 h and calculation of migration values M_{24h} of the substances after the third migration test

sample - silver plated planes for IPS Kalyxx device

Index	K ₀ ²¹ ; 1	K ₀ ²¹ ; 3	M _{24h} ²¹ ; 3
Unit	mg.l ⁻¹	-	mg.l ⁻¹
Ag	0.003	0.002	0.00007

Used analytical methods:

Parameter	Identification of method	LOD	LOQ	Limit*
Ag	SPP-SA3	0.0082 mg/ml	0.0285 mg/l	50 µg/l

* Ministry of Health Decree of The Slovak republic No. 247/2017 laying down details on drinking quality water, quality control of drinking water, monitoring and risk management program at supply

The laboratory analyses were carried out in accredited testing laboratory department of chemical analysis of the Regional Public Health Authority with residence in Poprad with accredited SNAS Reg. No. 126/S-196 dated 18.11.2015 and concerns exclusively the samples which were tested.

The test results refer only on testing samples.

This protocol may not be duplicating in any form and without the consent of testing laboratory.

Validity:

The results of laboratory analyses should be updated if some changes carry out in the manufacturing process which can cause changes in the migration of substances into used food simulators or if there are changes in the current legislative regulations.

Assessment of safety of materials intended to come into contact with drinking water

Silver plated planes for IPS Kalyxx device was laboratory tested in accredited laboratory in Regional Public Health Authority with residence in Poprad from the point of view of its effects on the quality of potable water in accordance with the following requirements:

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Laboratory analysis results and assessment of safety of materials intended to come into contact with drinking water Nr. 50 – 55/2018

- Act No. 355/2007 Coll. on protection, support and development of public health and amendment and supplementing to some acts and in accordance with the requirements of the
- Ministry of Health of The Slovak republic Decree No. 550/2007 Coll. laying down the details of the requirements for the products intended for contact with potable water and
- Ministry of Health of The Czech republic Decree No. 409/2003 Coll. on hygienic requirements for products that come into direct contact with water and water treatment.

In examined parameters – content of Ag and sensory assessment meets the third 72-hour extract of the sample - silver plated planes for IPS Kalyxx device to the water at temperature 23°C the requirements of:

- Ministry of Health Decree of The Slovak republic No. 247/2017 laying down details on drinking quality water, quality control of drinking water, monitoring and risk management program at supply and
- Ministry of Health of The Czech republic Decree no. 252/2004 Coll. laying down hygienic requirements for drinking and warm water and the abundance and range of drinking water control.

The required maximum value of 10% of the hygienic limits set by the Ministry of Health of The Czech republic Decree no. 252/2004 Coll. and Ministry of Health Decree of The Slovak republic No. 247/2017 was not exceeded in the examined parameters.

Silver plated planes for IPS Kalyxx device meet the requirements of the § 9 of Ministry of Health of The Czech republic Decree no. 409/2003 Coll. on hygienic requirements for products that come into direct contact with water and water treatment.

Following the laboratory examination results and the submitted documentation - in term of the health protection – silver plated planes for IPS Kalyxx (modifications RedLine, BlueLine, GreenLine) produced by company Swiss Aqua Technologies SK s.r.o. meets the requirements of Act No. 355/2007 Coll. on protection, support and development of public health and amendment and supplementing to some acts and Act No. 258/2000 Coll. on the protection of public health and on the amendment of some related laws and is suitable for direct contact with drinking water (physical water treatment – prevention of water formation and corrosion at the point of consumption).

Mgr. Ing. Milada Štyřová, MPH
Head of the National Reference Laboratory for materials intended into contact with foodstuffs

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Cerfitication TUV/SUD

F 540 028-38EN (2015-10-01) (F540_028_38EN)

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ CERTIFICADO ◆ CERTIFICAT

TYPE CERTIFICATE



Registration number 09.171.895, Revision No. 1

issued for the manufacturer:

Swiss Aqua Technologies SK s.r.o.
Šebastovská 2
SK-080 06 Prešov, Slovak Republic
Company Registration No.: 50480090

for the product:

Name: **Ion polarization system**
Type designation: **IPS Plus, IPS Premium**
Modification: **G ½", G ¾", G 1", G 5/4", G 6/4", G 2"**
Place of the production: **Šebastovská 2, SK-080 01 Prešov, Slovak Republic**
Use: **Distribution systems of drinking, sanitary, hot and heating water inside buildings**
Restriction on the use: **Water conductivity 50 up to 2000 $\mu\text{S}\cdot\text{cm}^{-2}$; salts content 50 - 2000 $\text{mg}\cdot\text{l}^{-1}$; water temperature 0 up to 95 °C; pressure up to 1 MPa; speed up to 4 $\text{m}\cdot\text{s}^{-1}$; water flow up to 5 $\text{m}^3\cdot\text{h}^{-1}$**

at which the certification has been conducted pursuant to ISO/IEC 17067 – scheme 3 certification scheme in accordance with TUV SUD Czech certification system. The results are stated in Evaluation report file No. 09.185.334 from 15.12.2016 and No. 09.185.334, Revision No. 1 from 16.01.2017.

The product type mentioned above fulfils the applicable requirements of the following regulations/standards which were the basis for its evaluation:

STN 13 7100:1965, ČSN 13 7100:1965

This certificate is valid till: **29.12.2021**

Details and validity conditions are stated in the annex which forms an integral part of this Certificate and contains 1 page.

This certificate is issued on the basis of voluntary certification, and it does not substitute outputs of the authorized or notified body.

Prague, 19.01.2017



Head of the certification body

EFFICIENCY OF IPS IN CIRCULATING CIRCUIT



EL spol. s r.o.

Radlinského 17A, 052 01 Spišská Nová Ves
Stredisko laboratórnych prác

Akreditované skúšobné laboratóriá - podľa ISO/IEC 17025, SNAS

Držiteľ osvedčenia o súlade so správnou laboratórnou praxou, SNAS

Meranie účinku zariadenia IPS na značne tvrdú pitnú vodu, ktorá ním cirkulovala v uzavretom obehu.

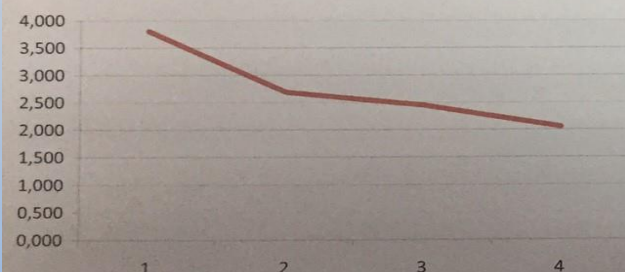
Realizácia merania bola v období od 13.6.2012 do 4.7.2012.

Vybrané parametre vstupnej vody a ich zmena po obehu cez zariadenie IPS sú v tabuľke nižšie.

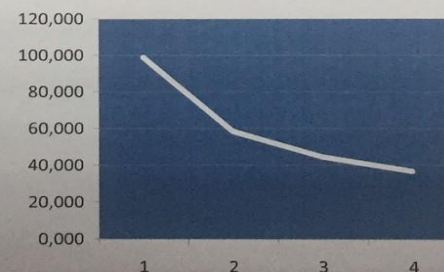
V uvedených protokoloch sú namerané aj iné parametre vody a ich zmena.

Dátum odberu vody na chemický rozbor	Výsledok chemického rozboru vody	Tvrdosť vody		Ca (Calcium) mg/l	pH
		mmol/l	°N		
Vstupná 13.06.2012 = značne tvrdá voda	Protokol o skúške č.: 12/10045	3,801	21,380	98,863	7,2
Odber 20.06.2012 = tvrdá voda	Protokol o skúške č.: 12/10116	2,687	15,114	58,300	8,2
Odber 27.06.2012 = tvrdá voda	Protokol o skúške č.: 12/10418	2,450	13,781	44,410	8,2
Odber 04.07.2012 = stredne tvrdá voda	Protokol o skúške č.: 12/10734	2,050	11,531	36,560	8,5

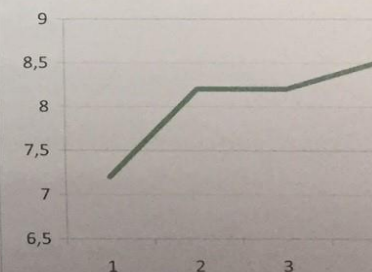
Tvrdosť vody v mmol/l



Ca (Calcium) v mg/l



pH



mmol/l zodpovedá 5,62 °N (Nemecký stupeň tvrdosti vody), napr. kvapkami na meranie zistíte tvrdosť vody v °N

analýzy realizovalo akreditované laboratórium EL, spol. s r.o., Radlinského 17A, 052 01 Spišská Nová ves.

ADVANTAGES OF S.A.T.

- OWN DEVELOPMENT AND PRODUCTION
- WORLD-WIDE PATENTED KNOW-HOW
- CERTIFICATED EFFICIENCY (*IAPMO R&T*)
- ADVICE + PROPOSAL FOR SOLUTION AND DELIVERY OF EQUIPMENT
- QUALITY&RELIABILITY OF OUR PRODUCTS

CONTACT US!



MUS SERVICES S.R.O.

ROYOVA 2890/31

831 01 BRATISLAVA - MESTSKÁ ČASŤ NOVÉ MESTO

SLOVAKIA, EUROPE

ING.KAROL LAURINEC

TEL: +421 911 741 911

INFO.MUSSERVICES@GMAIL.COM, KLAURINEC@GMAIL.COM

WWW.IPS.SYSTEMS