

## INVITATION

### for research cooperation in the EFOP-1.8.0.-VEKOP-17-2017-00001 project

#### **Background:**

According to Government Decree No. 201/2001. (X.25.) on the quality standards and monitoring requirements of drinking waters, the parametric value for lead in drinking water is 10 µg/l (in accordance with the European legislation). The main source of lead in tap water is the materials that come into contact with water, particularly the lead pipes present in the water distribution systems of old city centres and in the premise plumbing of old buildings.

A complex public health project (EFOP-1.8.0-VEKOP-17-2017-00001) was initiated in the National Public Health Institute (hereinafter: OKI), part of which is the investigation and assessment of the lead exposure of the population from drinking water.

The main goal of this part of the project is to reduce lead intake of the population from drinking water through personalized risk assessment and recommendations. The primary aim of the project is therefore to survey which areas and what parts of the population are affected by the lead in drinking water exceeding the limit value and what are the potential health effects. Possible ways to reduce the lead content of drinking water are also identified and assessed.

The permanent solution to the problem of lead in drinking water is to replace all lead pipes and lead containing fixtures in the drinking water system. Until this is achieved, however, the aim is to make temporary suggestions for the public.

A potential temporary solution to reduce the lead content of drinking water is to use certain types of domestic water treatment units.

It is also important to consider not only the effectiveness of lead reduction, but also the potential health risks and the additional costs (e.g.: periodic disinfection and filter replacement) of the appropriate (hygienic) use of the water treatment units.



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As part of the project, different water treatment units will be installed into homes that are affected by lead in drinking water to a different degree. Not every type and model can reduce the lead content of drinking water with the same efficiency and the lead removal capacity of the units can also differ. The different water treatment units have to be tested separately and their lead removal capacity has to be evaluated while taking other public health risks into account. Other water chemical, microbiological and microscopic biological parameters are also measured in order to allow the assessment of other public health risks from the use of the water treatment units during the study.

According to the legislation in effect, the user's manuals, advertisements, and product information regarding the water treatment units can only contain unambiguously verified statements on the parameters that can be removed by device. Tests conducted in accordance with the conditions described in this invitation can be used to confirm lead removal efficiency if the results are appropriate.

#### ***The conditions of the research cooperation***

OKI plans to investigate 10 different water treatment units. The distributors of the water treatment units can participate in the investigation **on a voluntary basis** by filling out the application form in Annex 1 and sending it to the following E-mail address: [olom@oki.antsz.hu](mailto:olom@oki.antsz.hu). **The deadline for the application is: October 31, 2018.**

The main condition of application is for the proposed water treatment unit is to have a valid water safety licence that complies with Government Decree No. 201/2001(X.25.) or a supportive public health expert opinion issued by the OKI no longer than a year ago on the applicability of the unit in drinking water treatment. If the unit only has a valid expert opinion, then a condition for the acceptance of the application is that the unit should receive the water safety licence by the time it is installed for the purpose of the investigation. One distributor may suggest more water treatment unit models for testing.



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**NATIONAL PUBLIC HEALTH INSTITUTE**

**1097 Budapest, Albert Flórián út 2-6.**

Tel: (1) 476 1100

Mailing address: 1437 Budapest, Pf. 839.

*In case of water treatment units without a drinking water safety licence, the expert opinion necessary for the licence can be requested in a separate procedure and upon the payment of the expert opinion fee. Information on the expert opinion process can be requested at the following E-mail address: [vizosztaly@oki.antsz.hu](mailto:vizosztaly@oki.antsz.hu) .*

A completed application form and a drinking water safety licence do not automatically result in participation in the project. OKI selects the unit types for the research based on the number of applicants, the proposed unit types, their setup (their operational principle, filter material, microbiological protection, their method of installation and operation etc.), and the documents and test results submitted for the expert opinion process of the previous licencing procedure. Table 1 contains the selection criteria.



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**Table 1: Summary of the evaluation criteria of the water treatment units to be included in the research**

<i>Selection criterion</i>	<i>Weight</i>	<i>Value</i>	<i>Points / Assessment</i>
Existing licence or a positive OKI expert opinion issued within the past 12 months	-	yes	0
		no	exclusion
Supporting lead removal effectiveness	40	data from literature	5
		submitted test reports	5
		previous OKI tests	3
		confirmation from the manufacturer	1
		no	0
The risk of nitrite formation Explanation: children are especially vulnerable to drinking water lead and nitrite exposure	25	nitrite concentration exceeds the limit value in any treated water sample	exclusion
		detectable amounts of nitrite in any treated water sample	-10
		detectable amounts of ammonium compared to the test water in any treated water sample	-5
		did not arise	1



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<i>Selection criterion</i>	<i>Weight</i>	<i>Value</i>	<i>Point / Assessment</i>
Microbiological parameters	20	the presence of <i>Ps. aeruginosa</i> in any sample	-10
		significant colony count increase	-5
		there is no microbiological risk	1
Typical silver content	10	<10 µg/l	1
		10-25 µg/l	-1
		25-100 µg/l	-3
		>100 µg/l	exclusion
AOX / sufficiently reduces free active chlorine (by at least 50%)	5	yes	10
		no	0
A significant amount of bound active chlorine (greater than 0.1 mg/l growth compared to the test water) in the treated water	5	yes	-3
		no	0
Total hardness in the treated water	5	<50 CaO mg/l	-3
		>50 CaO mg/l	0
Questionable water quality due to any other parameter in any of the treated water samples	5	yes	-5
		no	0
Inadequate water quality due to any other parameter in any of the treated water samples	-	yes	exclusion
		no	0
Polycarbonate-based part that comes into contact with water	5	yes	-10
		no	0

The total points for the given water treatment unit is calculated as a weighted sum of points for each criterion.



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Participation in the research for the distributors is free of charge. The installation and maintenance of 3 water treatment units from each type has to be ensured at the given locations for the duration of the research. OKI is responsible for selecting the locations of installations and performing the related administrative tasks, sampling and analysis.

Each unit type is studied for three (small, intermediate, large) lead concentrations (if the unit is capable of removing large concentrations based on the declaration by the manufacturer or the distributor). The ammonium content and bacteriological risk of the drinking water of the given settlement is also taken into account when selecting the sampling sites.

With their application the distributors agree that they install a water treatment unit at the location specified by the OKI (typically a private apartment) at the agreed time and that they provide the information (user's manual) for the operation of the unit to the consumer. The distributors agree to provide the water treatment unit free of charge for the consumer for the entire duration of the investigation (min. 6 months, max. 1 year) and that they perform the prescribed periodic maintenance tasks (e.g.: filter replacement, disinfection etc.) and repair the unit if there is a malfunction free of charge. The installations, maintenance, filter replacements, and disinfections have to be recorded in an operational logbook. The exact conditions of the participation in the research are going to be recorded in the contract.

The operation of the devices that take part in the research are monitored for 6-12 months, during which the staff of the OKI take samples from the treated and untreated tap water according to a pre-determined research program (Annex 2).

The research plan and test parameters given in the annexes are only for information. The final plan is specified based on the water quality (lead content, organic material content, ammonium concentration, microbiological adequateness etc.) of the selected location, the assessment of the consumption habits, and the type of the water treatment unit.



OKI is going to publish the list of water treatment units that performed with good results (appropriate lead removal efficiency while considering other public health risks) on the website of the project and will show how to access the list in the information materials created for the public at the end of the project.

*The suitability is assessed based on the following:*

- Based on lead removal:

Is the unit capable of reducing a given lead concentration below the limit value? If yes, with what capacity?

- Assessment based on other parameters:

1) If the microbiological quality of any of the treated water samples is inadequate, or questionable (e.g.: due to the presence of *Pseudomonas aeruginosa*), the distributor has to disinfect the unit out of turn. If the problem persists or reoccurs the investigation of the unit is ended and the distributor removes it. In this case the given unit is not considered suitable. If the problem is solved and does not reappear during the research period then the parameter that caused the problem is indicated for the given unit as a risk.

2) If a chemical parameter is present in any treated sample in a concentration above the limit value (with the exception of lead), the distributor can attempt to locate or eliminate the cause of the problem. If the problem persists or reoccurs, the investigation of the unit is aborted and the distributor removes it. In this case the given unit is not considered suitable. If the problem is solved and does not reappear during the study period then the parameter that caused the problem is indicated for the given unit as a potential risk.

3) If the microscopic biological or the colony count parameter is inadequate an extra disinfection has to be performed. The parameter that caused the problem is indicated for the given unit as a potential risk.



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4) If the silver content of the treated water samples is typically over 10 µg/l, special application conditions may be determined with regard to the consumption of the treated water for children under the age of three.

5) Based on the results, application conditions other than the ones specified in the licence and the original expert opinion can be given in the expert opinion on lead removal efficiency.

The names of the water treatments units that do not perform adequately in the investigations (inadequate lead removal efficiency and other public health risks) are not going to be published by OKI in any form.

The research data are used for research purposes only and the results are going to be published only to inform the public and the consumers in the publications with regard to lead removal efficiency and other water quality parameters. The suitable water treatment units will be published on the project website for the information of the public.

If you are interested in this opportunity you can request further information or apply by sending the application form to the following E-mail address: [olom@oki.antsz.hu](mailto:olom@oki.antsz.hu)

**Address:**

Országos Közegészségügyi Intézet  
1097 Budapest, Albert Flórián út 2-6.  
A épület 2. emelet

**E-mail:** [olom@oki.antsz.hu](mailto:olom@oki.antsz.hu)

**Website:** [https://www.antsz.hu/felso\\_menu/rolunk/projektek/EFOP180](https://www.antsz.hu/felso_menu/rolunk/projektek/EFOP180)

**Facebook:** [Országos Közegészségügyi Intézet](#)



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*Annex 1*

**Application form**

**1, The applicant company's**

Name:

Address:

Name of contact person:

Telephone number:

E-mail address:

We would like to apply for research cooperation in the EFOP-1.8.0.-VEKOP-17-2017-00001 project with regard to the investigation of drinking water treatment units.

**2, Details of the product suggested for the research<sup>1</sup>:**

Name and type number:

Fantasy name:

Manufacturer:

Drinking water safety licence (previously OTH licence) number:

OKI expert opinion number:

Water treatment part used for lead removal (please indicate with an X):



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RO membrane	Ion exchange resin	Zeolite	Special adsorbent	Other
Type:	Material:	Material:	Material:	Material:
	Type:	Type:	Type:	Type:
	Its amount in the w.t. unit:			

Nominal lead removal capacity (if such data exists):

The maximal lead concentration that the water treatment unit could be capable of removing (if such data exists):

The product can be used for removing lead as supported by the following documents (*the listed documents have to be attached to the application*):

Date:.....

.....

Signature

(Official Stamp)

<sup>1</sup>: More than one type can be suggested, please submit a separate application form for each type.



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**Annex 2**

**Preliminary research plan**

After installation (1<sup>st</sup> month)

Initial chemical and microbiological tests of the raw and untreated water<sup>1</sup>:

Chemical parameters: pH, specific electric conductivity, total hardness, alkalinity, total organic content (TOC), AOX, free and bound active chlorine, ammonium, nitrite, iron, lead, silver<sup>2</sup>

Microbiological parameters: Colony count on 22°C, *Pseudomonas aeruginosa*, *Escherichia coli*, coliform bacteria

Microscopic biology

During continuous use (2<sup>nd</sup>-5<sup>th</sup> month)

At least once a month chemical tests of the raw and treated water<sup>1</sup>

Chemical parameters: pH, specific electric conductivity, lead, nitrite<sup>3</sup>, total hardness<sup>2</sup>, silver<sup>2</sup>

At least once every two months microbiological and microscopic biological tests of the raw and treated water<sup>1</sup>

Microbiological parameters: Colony count on 22°C, *Pseudomonas aeruginosa*

Microscopic biology

6<sup>th</sup> month:

Comprehensive chemical, microbiological and biological test of the raw and treated water<sup>1</sup>:

Chemical parameters: pH, specific electric conductivity, total hardness, alkalinity, total organic content (TOC), AOX, free and bound active chlorine, ammonium, nitrite, iron, lead, silver<sup>2</sup>

Microbiological parameters: Colony count on 22°C, *Pseudomonas aeruginosa*, *Escherichia coli*, coliform bacteria

Microscopic biology

<sup>1</sup>= Other parameters relevant can be added depending on the type of the water treatment unit.

<sup>2</sup>= Optional parameters depending on the type of the water treatment unit.

<sup>3</sup>= Depending on the quality of the raw water.



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