

Družstevní závody Dražice - strojírna s.r.o.
Dražice 69
294 71 Benátky nad Jizerou

YOUR LETTER OF: 02/09/2024
OUR REFERENCE: EX241084, č. j. 13207/2024
EXECUTED BY: Ing. Lenka Mayerová, Ph.D.
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Summary expert health safety assessment of water heater components for contact with drinking water and hot water according to the requirements of Act No. 258/2000 Sb. and Decree of the Ministry of Health No. 409/2005 Sb., as amended.

On 02/09/2024 you asked us for a summary expert health safety assessment of water heater components for contact with drinking and hot water according to the requirements of Act No. 258/2000 Coll. and Decree of the Ministry of Health No. 409/2005 Coll. The components are as follows:

- Enamel by DZD (Družstevní závody Dražice)
- Plastic PEX inflation pipe: 95% Taborex TA 1108 HD + 5% Taborex TA 2111 HD (orange colour).
- EPDM rubber gasket (70 ShA).
- Noryl plastic outlet pipe and end cap (731S-701-0-NOR).
- Magnesium anode (EN-MAMgAl6Zn3).

The enamel is manufactured by your company Družstevní závody Dražice - strojírna s.r.o., Dražice 69, 294 71 Benátky nad Jizerou. The plastic inlet pipes are manufactured by Revel Příbram s.r.o., 261 01 Dubno 127. The EPDM gasket is manufactured by TF PRESS s.r.o., Horní Rybníky 54, 549 41 Zábrodí. The plastic outlet pipes and end caps are manufactured by SABIC Innovative Plastics B.V., Plasticslaan, Poort 1, 4612 PX Bergen Op Zoom, Netherlands. The magnesium anodes are manufactured by EZAL MG sp. z o.o. Sp.k., Zaczernie 188, 36-062 Zaczernie, Poland. The water heaters are distributed by your company Družstevní závody Dražice – strojírna s.r.o., Dražice 69, 294 71 Benátky nad Jizerou.

As a basis for our assessment, you have provided:

- Safety data sheets for enamel components.
- Technical data sheet PEX (95% Taborex TA 1108 HD + 5% Taborex TA 2111 HD, colour).
- Certificate No. 7935 01617/2018 issued by ITC, a.s. Zlín for Installation system based on PE-X pipes, d 16 mm – d 32 mm and connecting parts made of brass, stainless steel and PPSU on 27/02/2018.
- Technical data sheet for EPDM (70 ShA).
- Safety Data Sheet for outlet pipe and end cap, Noryl (731S-701-0-NOR).
- Certificate No. 7/2024, issued by EZAL L.Z. Pudłowscy Spółka Jawna dated 08/ 01/ 2024.
- Samples of enamel plates 10x10 cm, 5 pcs
- Samples of PEX inlet pipe, 3 pcs.
- Samples of EPDM gasket, 24 pcs (Figure 4) + new samples of EPDM gasket 10x10 cm, 10 pcs (Figure 5).

- Samples of Noryl outlet pipe, 7 pcs.
- Health safety assessment of water heater components according to Decree No. 409/2005 Coll. issued by the National Institute of Public Health in Prague, EX240576, Ref. No. 07255/2024, dated 11/ 07/ 2024 for Družstevní závody Dražice – strojírna s.r.o.

Test methodology:

The leaching tests and evaluation of the following materials (DZD enamel, PEX plastic inlet pipe, EPDM rubber gasket, plastic outlet pipe and end-cap Noryl) were carried out in accordance with Decree No. 409/2005 Coll. of the Ministry of Health on hygiene requirements for products in direct contact with water and for water treatment and Decree of the Ministry of Health No. 252/2004 Coll. specifying hygienic requirements for drinking and hot water and extent and frequency of monitoring for quality of drinking water (both as amended). The results of the laboratory analyses performed are presented in the attached "Laboratory Test Reports No. 1/24/56, č. 1/24/57, č. 1/24/58, č. 1/24/59 and č. 1/24/115, which are an integral part of this assessment.

The method of leaching tests assessment

The evaluation of the leaching tests is based on Section 3 of Decree No 409/2005 Coll. of the Ministry of Health, which stipulates that products intended for contact with water must meet the limits of leaching tests carried out under the conditions and according to the procedures listed in Annex 1 of the above-mentioned Decree. The proportion of water contamination caused by a product in direct contact with water that is intended to be in permanent contact with water measured by the leaching test must not exceed 10% of the hygiene limit for the monitored drinking water indicator laid down in Decree of the Ministry of Health No 252/2004 Coll., with the exception of TOC indicator where it is 20%, COD_{Mn} and mercury – 30 % of the hygiene limit. The proportion of water pollution caused by a product intended for short-term contact with drinking water (not exceeding 24 hours), as determined by the leaching test, must not exceed the hygienic limit of the monitored drinking water indicator established by Decree of the Ministry of Health No. 252/2004 Coll.

Results of the leaching test of DZD enamel:

Leaching tests were applied to samples of DZD enamel. After pre-treatment (see Appendix No. 1 Decree No 409/2005 Coll. of the Ministry of Health), the samples were subjected to leaching 3 times for 72 hours in deionized water. The ratio of the area of the tested surface of the sample to the volume of the test deionized water was 1:1 [cm²:cm³].

DZD enamel met the leaching test conditions in the following indicators: lead, cadmium, barium, nickel, chromium, COD-Mn (chemical oxygen demand by permanganate), pH, total organic carbon (TOC). The values of their concentrations in the third leach were below 10% of the limit values of these indicators (or under 30% for COD-Mn and 20% for TOC) for drinking water given by the Decree of the Ministry of Health No. 252/2004 Coll. Cobalt in the third leach exceeded the required value of 10%, the concentration found was 0.0027 mg/l, which is 27 % of the hygiene limit for the observed drinking water indicator set by the Decree of the Ministry of Health No. 252/2004 Coll. The enamel samples received showed signs of damage (the coating was not intact), so cobalt may have leached from the underlying plates (see Figures 1–3).

Sensory assessment results: The 3x72-hour leach in comparative water satisfied the conditions in the odour and taste indicators.

DZD enamel **satisfied** the conditions of the leaching tests **for short-term contact** with drinking water and hot water in accordance with Decree of the Ministry of Health No. 252/2004 Coll.

Leaching test results of the PEX plastic inlet pipe (orange):

Leaching tests were performed on samples of PEX plastic inlet pipes (95% Taborex TA 1108 HD + 5% Taborex TA 2111 HD). After pre-treatment (see Appendix No. 1 Decree No 409/2005 Coll. of the Ministry of Health), the samples were subjected to leaching 3 times for 72 hours in deionized water. The ratio of the area of the tested surface of the sample to the volume of the test deionized water was 1:1 [cm²:cm³].

PEX plastic inlet pipes (95% Taborex TA 1108 HD + 5% Taborex TA 2111 HD) met the leaching test conditions in the following indicators: primary aromatic amines, barium, cobalt, copper, zinc and manganese. The values of their concentrations in the third leach were below 10% of the limit values of these indicators (or under 30% for COD-Mn and 20% for TOC) for drinking water given by the Decree of the Ministry of Health No. 252/2004 Coll.

Sensory assessment results: The 3x72-hour leach in comparative water satisfied the conditions in the odour and taste indicators.

The PEX plastic inlet pipe (95% Taborex TA 1108 HD + 5% Taborex TA 2111 HD) **satisfied** the conditions of the leaching tests for contact with drinking water and hot water in accordance with Decree of the Ministry of Health No. 252/2004 Coll.

Leaching test results: EPDM rubber gasket (70 ShA):

Leaching tests were applied to samples of EPDM gasket (70 ShA). After pre-treatment (see Appendix No. 1 Decree No 409/2005 Coll. of the Ministry of Health), the samples were subjected to leaching 3 times for 72 hours in deionized water. The ratio of the area of the tested surface of the sample to the volume of the test deionized water was 1:1 [cm²:cm³].

The EPDM gasket (70 ShA) met the conditions of leaching tests in the following indicators: colour, primary aromatic amines, turbidity, pH, polycyclic aromatic hydrocarbons (PAHs), phenols volatile with water vapour, barium, zinc, cadmium and lead. The values of their concentrations in the third leach were below 10% of the limit values of these indicators for drinking water given by the Decree of the Ministry of Health No. 252/2004 Coll. The total organic carbon (TOC) in the third leach exceeded the required value of 20%, the concentration found was 2.34 mg/l, which is 46.8 % of the hygiene limit for the observed indicator of drinking water set by Decree of the Ministry of Health No. 252/2004 Coll. Chemical oxygen demand by permanganate in the third leach exceeded the required value for drinking water of 20 mg/l Pt, the concentration was 1.64 mg/l Pt, which is 54.7 % of the hygiene limit for the observed indicator of drinking water set by Decree of the Ministry of Health No. 252/2004 Coll. Benzo(a)pyrene in the third leach exceeded the required value of 10%, the concentration found was 5.39 ng/l, which is 53.9 % of the hygiene limit for the observed drinking water indicator set by the Decree of the Ministry of Health No. 252/2004 Coll. In the third leach, also benzo(b)fluoranthene (PAH) at a concentration of 0,88 ng/l was found, but in the Ministry of Health Decree No. 252/2004 Coll. no limit values are stipulated.

Sensory assessment results: The 3x72-hour leach in comparative water satisfied the conditions in the odour and taste indicators.

The samples of the EPDM (70 ShA) gasket received for repeated leach are standard samples (Figure 5), The samples that were originally sent (Figure 4) were intended for mechanical testing.

The EPDM gasket (70 ShA) **satisfied** the conditions of the leaching tests for short-term contact with drinking water and hot water in accordance with Decree of the Ministry of Health No. 252/2004 Coll.

Leaching test results of the plastic outlet pipes Noryl (731S-701-0-NOR):

Leaching tests were applied to plastic outlet pipes Noryl (731S-701-0-NOR). After pre-treatment (see Appendix No. 1 Decree No 409/2005 Coll. of the Ministry of Health), the samples were subjected to leaching 3 times for 72 hours in deionized water. The ratio of the

area of the tested surface of the sample to the volume of the test deionized water was 1:1 [cm²:cm³].

The plastic outlet pipe Noryl (731S-701-0-NOR) met the conditions of leaching tests in the following indicators: colour, primary aromatic amines, pH, COD-Mn (chemical oxygen demand by permanganate), total organic carbon (TOC), lead, barium, zinc, cobalt, cadmium copper and manganese. The values of their concentrations in the third leach were below 10% of the limit values of these indicators (or under 30% for COD-Mn and 20% for TOC) for drinking water given by the Decree of the Ministry of Health No. 252/2004 Coll.

Sensory assessment results: The 3x72-hour leach in comparative water satisfied the conditions in the odour and taste indicators.

The plastic outlet pipe Noryl (731S-701-0-NOR) **satisfied** the conditions of the leaching tests for contact with drinking water and hot water in accordance with Decree of the Ministry of Health No. 252/2004 Coll.

Assessment of magnesium anode (EN-MAMgAl6Zn3):

Based on the materials submitted, we can conclude that magnesium anodes EN-MAMgAl6Zn3 manufactured by EZAL MG sp. z o.o. Sp.k., Zaczernie 188, 36-062 Zaczernie, Poland, **comply with hygiene requirements** for products coming into **permanent contact with drinking water** in accordance with requirements of Act No. 258/2000 Coll. and Decree of the Ministry of Health No. 409/2005 Coll., as amended.

Conclusion:

Based on the materials submitted, laboratory analyses and assessment we can conclude that the **materials assessed – the individual components of water heaters manufactured by you – comply with hygiene requirements for products coming into permanent contact with drinking and hot water** in accordance with requirements of Act No. 258/2000 Coll. and Decree of the Ministry of Health No. 409/2005 Coll., as amended. The components are specifically as follows:

- a) **“PEX inlet pipes (95% Taborex TA 1108 HD + 5% Taborex TA 2111 HD, orange colour)“**, manufactured by Revel Příbram s.r.o., 261 01 Dubno 127;
- b) **outlet pipes and end-caps „Noryl (731S-701-0-NOR)“**, manufactured by SABIC Innovative Plastics B.V., Plasticlaan, Poort 1, 4612 PX Bergen Op Zoom, Netherlands;
- c) **magnesium anodes „EN-MAMgAl6Zn3“** manufactured by EZAL MG sp. z o.o. Sp.k., Zaczernie 188, 36-062 Zaczernie, Poland.

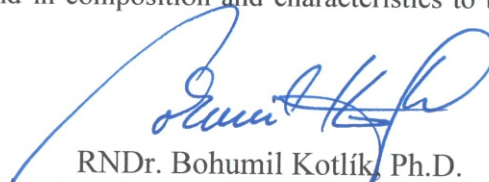
Based on the materials submitted, laboratory analyses and assessment we can conclude that the **materials assessed – the individual components of water heaters manufactured by you – comply with hygiene requirements for products coming into short-term contact with drinking and hot water** in accordance with requirements of Act No. 258/2000 Coll. and Decree of the Ministry of Health No. 409/2005 Coll., as amended. The components are specifically as follows:

- d) DZD enamel is manufactured by Družstevní závody Dražice - strojírna s.r.o., Dražice 69, 294 71 Benátky nad Jizerou.
- e) **Rubber gasket „EPDM (70 ShA)“**, manufactured by TF PRESS s.r.o., Horní Rybníky 54, 549 41 Zábrodí.

Notification:

Please note that our statement only applies to the submitted samples of DZD enamel, plastic inlet pipes PEX (95% Taborex TA 1108 HD + 5% Taborex TA 2111 HD, orange colour), rubber gasket EPDM (70 ShA), plastic outlet pipes and end-caps Noryl (731S-701-0-NOR), magnesium anodes EN-MAMgAl6Zn3. The conclusions drawn from this assessment can only be applied to other products of the same type if they fully correspond in composition and characteristics to the samples tested by us.

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