Maintenance guide for Roediger NoMix toilets

C. Uhlmann, P. Goosse, M. Oser

From a user’s point of view, good maintenance practices are the most important aspect to guarantee the success of NoMix pilot projects. This guide proposes a maintenance strategy for Roediger NoMix toilets, based on the experiences at Eawag.

Introduction

Why NoMix toilets?

In NoMix toilets, the urine is separated from the other wastewater streams. Urine contains a lot of valuable nutrients such as phosphate, nitrogen and potassium. By separating urine, the nutrient load of the wastewater treatment plants is reduced significantly and the valuable nutrients can be recovered for the use in fertilisers.

The NoMix toilets at Eawag

Two buildings at Eawag in Dübendorf (FC and BU) are equipped with Roediger NoMix toilets. The NoMix toilets at the Forum Chriesbach (FC) are flushed with rainwater, for the ones in the BU building, groundwater is used as flushing water.

The difference in water hardness of the flushing water leads to different precipitation behaviour and therefore to different maintenance efforts of the two systems. The following maintenance advices are based on the experience in these two buildings.

Roediger NoMix toilets

The Roediger NoMix toilets have two separate outlets: one conventional outlet for faeces and paper located in the back part of the bowl, and one outlet for urine, which can be closed by a valve (Figure 1a). When the toilet seat is pressed down, the valve is mechanically opened by a Bowden cable and the urine flows to the front outlet (Figure 1b). After standing up the valve closes again and the faeces and paper can be flushed through the back outlet (Figure 1c).

Maintenance instructions

Daily cleaning

Clean the toilets with a cloth moistened with 5% citric acid. Exercise care that no cleaning water and/or citric acid enters the urine pipe. Ensure that the urine drain valve is closed.

Monthly cleaning

To prevent blockages in the urine pipes and to ensure reliable functioning of the urine drain valve, clean the NoMix toilets with citric acid as follows:

- Press the pin to open the urine drain valve.
- Pour 0.5 litre citric acid slowly through the open urine drain. Use a 10 % solution for systems with rainwater flushing and a 20 % solution for tap water flushing systems.
- Check whether the valve works properly or if the acid pours through the drain hole instead.
- Let the citric acid soak in for 30 minutes.
- Flush the toilet with the urine drain valve being open.

Alternative: To save a work step for the monthly cleaning, the citric acid may be poured into the toilet early in the morning. The acid will then soak in, until the first user flushes the toilet.

ATTENTION: When the urine is used for experiments as at Eawag, the entering of the citric acid into the urine tank should be prevented. During the monthly cleaning routine and three to four days afterwards, the urine should therefore flow over a bypass into the sewer.

The required cleaning interval and the necessary citric acid concentration depend heavily on the precipitation behaviour in the system: High water hardness of the flushing water causes more scaling, whereas soft flushing water (e.g. rain water) leads to less scaling. With soft flushing water, the monthly maintenance intervals can be extended up to 2 to 3 months. For NoMix toilets flushed with groundwater a monthly cleaning interval is recommended (see Table 1).
CITRIC ACID ($C_6H_8O_7$) SOLUTION
Be careful and use eye/hand protection while working with citric acid. Keep the acid away from metallic surfaces.

**Problem solving**

**Urine drain valve does not work**

The urine drain valve does not open properly and the urine cannot flow to the urine tank. There are two probable causes:

- **The urine drain valve got stuck.**

Deblock the valve mechanically e.g. with a small suction pump (Figure 3). To build up enough pressure on the valve the drain hole has to be closed. If the valve gets stuck frequently, a more concentrated citric acid solution can be used for cleaning or the cleaning interval can be shortened.

- **The Bowden cable between the pin and the valve is damaged.**

The Bowden cable has to be repaired or replaced by trained personnel.

**SCALING**

Remove scaling with strong citric acid, by brushing or by jet cleaning. If necessary, exchange clogged pipe segments or traps. Scaling can be reduced by installing urine pipes with larger diameter at a steep gradient.

---

<table>
<thead>
<tr>
<th>Table 1: Maintenance schedule for the NoMix toilets in the two buildings with different water sources used for flushing at Eawag in Dübendorf.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rain water flushing (building FC)</strong></td>
</tr>
<tr>
<td>Bowl cleaning with citric acid</td>
</tr>
<tr>
<td>Flush bowl and pipe with citric acid</td>
</tr>
<tr>
<td>Deblocking valve</td>
</tr>
<tr>
<td>Replacing Bowden cables</td>
</tr>
<tr>
<td>Replacing pipes</td>
</tr>
</tbody>
</table>

---

Figure 2: Without maintenance, scaling in urine conducting pipes leads to pipe blockage. Photo: Kai Udert 2002

Figure 3: Deblocking the valve with a suction pump. The drain hole is closed with a custom-made plug, consisting of two rubber balls and a threaded bar (total length 13.7 cm). Photo: Bastian Etter

Further information/literature


Material by Roediger Vacuum GmbH, Kinzigheimer Weg 104, 63450 Hanau, Germany, www.roevac.com