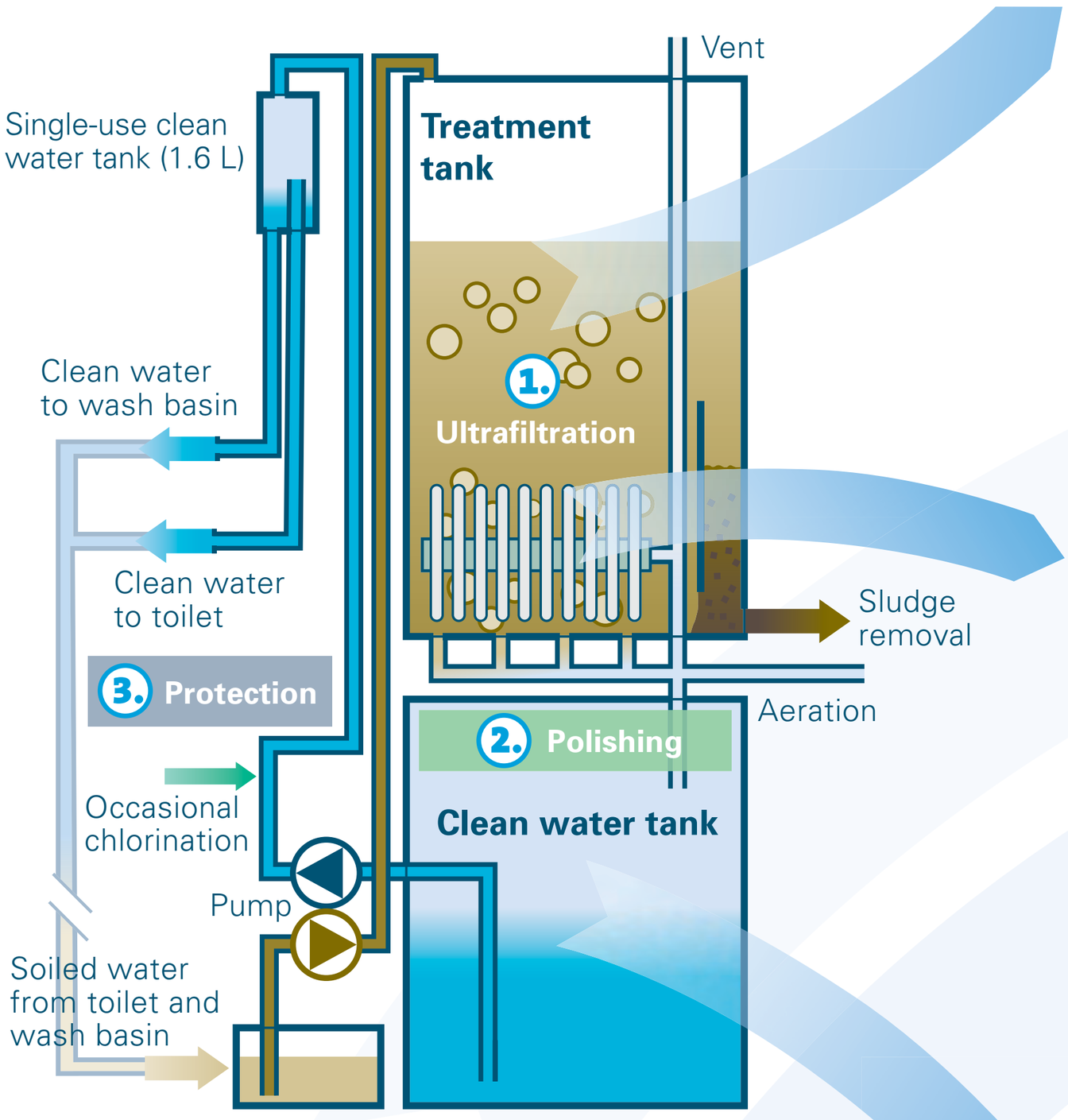
eawag
aquatic research

- **Question:**
  Can a successful drinking water technology be adopted for recovery of wash & flush water?
- **Challenge:**
  Water recycling and high organic loading with up to 5 % of total feces and urine from toilet
- **Results:**
  With moderate aeration long-term operation is possible without chemical cleaning



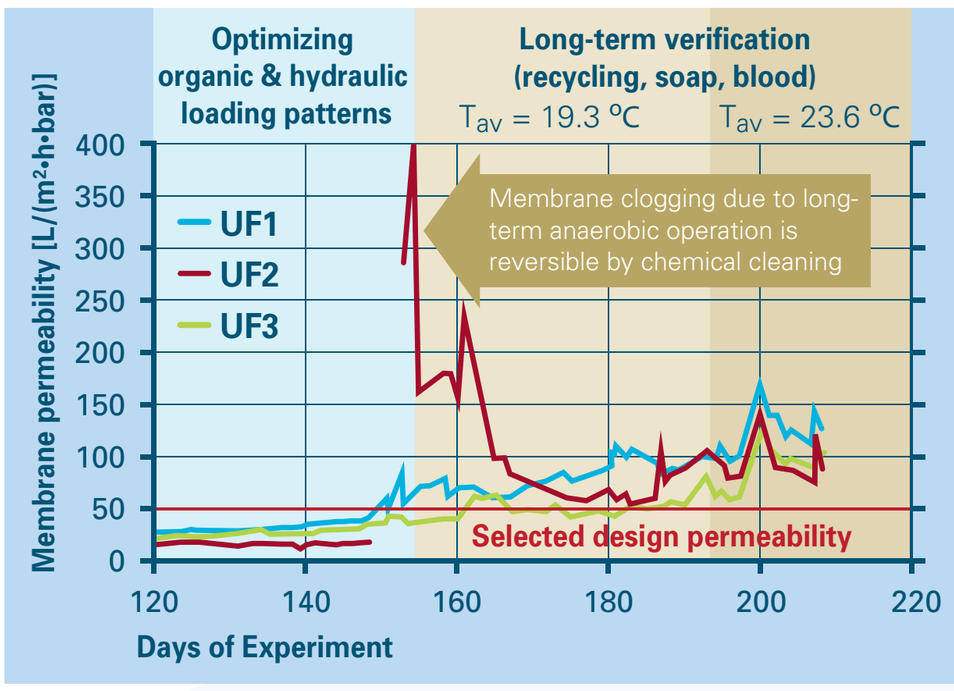
Design of the water wall

- **Optimized design & technology:**
  Membrane area: 2.7 m²
  Membrane costs: 125 $
- **Available clean water for use:**
  At least 1.2 liter per toilet visit
- **Electricity demand:**
  For aeration: 3-5 W/toilet
  For electrolysis: 1-3 W/toilet

Lab-testing of UF for wash & flush water

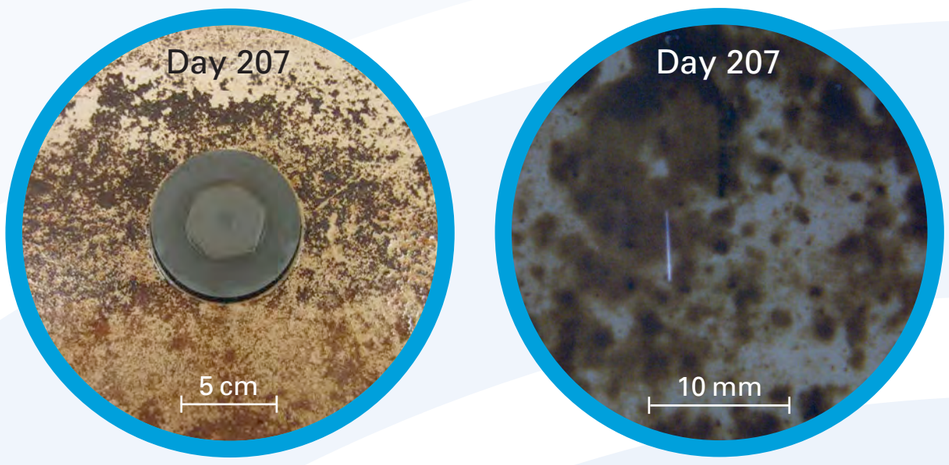
(experiments with real feces and urine in three parallel reactors)

The flux depends on the **permeability** of the UF membrane and the water pressure. A conservative **design permeability** as shown in the graph was used for reactor design.



Effect of aeration

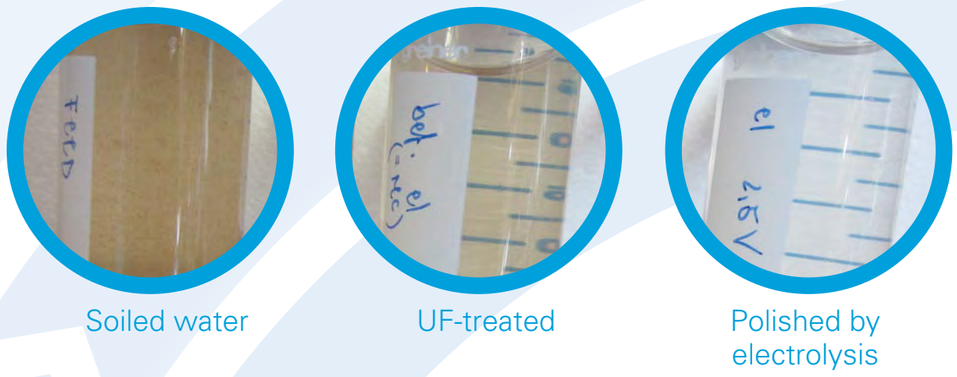
Biologically activated UF membrane.
No further maintenance is needed.



Photos of membrane surface on day 207
The open patterns are observed on different scales

High quality of recovered water

Color and pathogens are removed by electrochemical production of chlorine. If desired, additional chlorine may be added as protection against re-growth.



Soiled water | UF-treated | Polished by electrolysis

1B

diversion
for safe sanitation

A three-barrier approach to safe water recycling:
1. Ultrafiltration – 2. Polishing – 3. Protection

Design by EOOS