ADVANCED SOFTENING MATERIAL FOR PROBLEM WATER

SIMPLE SOLUTION FOR 5 PROBLEMS

- hardness
- iron
- manganese
- natural organic matter
- ammonium

Used by water treatment companies globally since 1998
WHAT ECOMIX® IS

ECOMIX® is a scientifically grounded technology, confirmed by 6 patents and service worldwide since 1998.

ECOMIX® works effectively in well water and municipal water within the allowable concentrations of iron and manganese, hardness and natural organic matter.

ECOMIX® consists of five ingredients, including two patented materials.

82 materials researched

1998 developing and patenting Ecomix®

6 patents

Ecomix® purifies water from:

- hardness
- iron
- manganese
- natural organic matter
- ammonium

Certified in compliance with the NSF/ANSI 44/61/372 standards
HOW ECOMIX® WORKS

- Delivered and loaded as homogeneous media
- Stratifies into five layers after regeneration
- Regenerates with softener plain salt*

* Potassium chloride at a higher dosage can also be used

- Gravel ensures uniform flow across the vessel
- Cation exchange resin softens water
- FerroSorb unique reduces iron and manganese compounds
- HumiSorb unique reduces natural organic matter and organic iron
- Inert layer enhances backwash

Do not use resin cleaner salt or chemicals.
Mechanism of iron and manganese reduction

**Mechanism of iron and manganese reduction**

**ADSORPTION – OXIDATION – ACTIVE LAYER FORMATION – AUTOCATALYTIC OXIDATION**

This chain works to reduce iron in the dissolved ferrous form (clear water iron).

The surface layer of FerroSorb contains active sites for reduction of manganese.

For best results pre-treat with a sediment filter only.

Aeration and oxidative pre-treatment should be avoided.

Treat iron bacteria before installing ECOMIX®.
REDUCING ORGANIC MATTER

HumiSorb is a proprietary sorption material for reduction of natural organic matter (reduces color and chemical oxygen demand)

Organic compounds and organic iron are reduced due to hydrophobic and electrostatic interactions with HumiSorb.

Check the level of chemical oxygen demand before using ECOMIX® when natural organic matter reduction is desired.

ECOMIX® is intended for the treatment of well water and chlorinated municipal water from tannins.

ECOMIX® is not designed for the treatment of surface water (lakes, ponds, rivers, swamps etc).

Water from a shallow well located close to the surface water should be checked for organic matter concentration and microbiological safeness.

Microbiologically unsafe water cannot be treated by ECOMIX®.
ECOMIX® REGENERATION

ECOMIX® is regenerated with the same steps as normal softeners: backwash, brine, rinse.

Calcium and magnesium ions are displaced from the cation exchange resin matrix with sodium ions.

Iron and manganese compounds are removed by surface friction of FerroSorb beads in fluidized bed during backwash.

HumiSorb exhibits a reversible mechanism of sorption of organic molecules, and is regenerated with chloride ions.
ECOMIX® EFFICIENCY AND LIMITATIONS

Raw water quality requirements and efficiency of purification

<table>
<thead>
<tr>
<th>Influent limitations</th>
<th>Max. efficiency, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type C</td>
</tr>
<tr>
<td>Hardness 750 ppm CaCO₃</td>
<td>97</td>
</tr>
<tr>
<td>Iron 15 ppm</td>
<td>98</td>
</tr>
<tr>
<td>Manganese 3 ppm</td>
<td>98</td>
</tr>
<tr>
<td>TOC* 17 ppm C</td>
<td>80</td>
</tr>
<tr>
<td>Ammonium 4 ppm</td>
<td>90</td>
</tr>
</tbody>
</table>

*TOC (total organic carbon) is used as a measure of natural organic matter

OPERATING CONDITIONS:

- pH 5–9
- No limits on influent hydrogen sulfide or anion content
- Active chlorine ≤ 1 ppm
- TDS ≤ 4000 ppm
ECOMIX® TECHNICAL SPECIFICATIONS

When designing ECOMIX® units, refer to the following figures:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service flow rate</td>
<td>20-25 m/h</td>
</tr>
<tr>
<td>Backwash flow rate</td>
<td>10-15 m/h!!!</td>
</tr>
<tr>
<td>Brine (slow rinse) flow rate</td>
<td>3-5 m/h</td>
</tr>
<tr>
<td>Minimum bed depth</td>
<td>500 mm</td>
</tr>
<tr>
<td>Recommended bed depth</td>
<td>800 mm</td>
</tr>
<tr>
<td>Freeboard</td>
<td>40% or more</td>
</tr>
<tr>
<td>Salt consumption</td>
<td>100 g/L</td>
</tr>
<tr>
<td>Brine concentration</td>
<td>8-10%</td>
</tr>
<tr>
<td>Water consumption per regeneration</td>
<td>under 10 L/L</td>
</tr>
</tbody>
</table>

Rust removal, resin cleaner salt, and chemicals will affect ECOMIX® performance.

If using potassium chloride increase salt dosage to 145 g/L.

ECOMIX® does not affect pH.
### COMMONLY USED VESSELS

<table>
<thead>
<tr>
<th>Size of vessel</th>
<th>1035</th>
<th>1054</th>
<th>1252</th>
<th>1354</th>
<th>1465</th>
<th>1665</th>
<th>2162</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ecomix® volume, L</strong></td>
<td>25</td>
<td>37</td>
<td>50</td>
<td>62</td>
<td>75</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td><strong>Service flow rate, m³/h</strong></td>
<td>1.3</td>
<td>1.3</td>
<td>1.8</td>
<td>2.2</td>
<td>2.5</td>
<td>3.3</td>
<td>5.5</td>
</tr>
<tr>
<td><strong>System capacity, kg, CaCO₃</strong></td>
<td>0.88</td>
<td>1.32</td>
<td>1.7</td>
<td>2.2</td>
<td>2.6</td>
<td>3.5</td>
<td>5.25</td>
</tr>
<tr>
<td><strong>Salt per regeneration, kg</strong></td>
<td>2.5</td>
<td>3.8</td>
<td>5.0</td>
<td>6.2</td>
<td>7.5</td>
<td>10.0</td>
<td>15.0</td>
</tr>
<tr>
<td><strong>Backwash flow rate, m³/h !!!</strong></td>
<td>0.6</td>
<td>0.6</td>
<td>0.9</td>
<td>1.1</td>
<td>1.2</td>
<td>1.6</td>
<td>2.7</td>
</tr>
</tbody>
</table>

*ECOMIX is supplied in two size types:
- Bag — 0.88 cu. ft. (25L)
- Half bag — 0.42 cu. ft. (12L)

!!! Pay attention to the backwash flow rate and choose the right drain line flow control (DLFC).

Visit [ecosoft.com/ecomix.us](http://ecosoft.com/ecomix.us) to use the ECOMIX® calculator.
Volume capacity can be calculated using just influent hardness and ECOMIX® IX capacity.

**ECOMIX® C** — 30 g CaCO$_3$ / L  
**ECOMIX® A** — 35 g CaCO$_3$ / L

Volume Capacity, m$^3$ = \[
\frac{\text{Ecomix volume, L} \times \text{IX Capacity, g CaCO}_3}{\text{Influent Hardness, ppm CaCO}_3}
\]

Average service life is 5 years

No need to compensate raw water hardness for iron and manganese concentration when calculating volume capacity.
**ECOMIX® INSTALLATION SCHEMATIC**

**Treated water**

- Input water hardness in control valve settings
- Regenerate after installation
- Drain line: tube diameter equal to tube drain connection and should not exceed 2.5 m. If longer, increase drain line tube diameter

**Feed pressure**
- 2.8-4.0 bar recommended

**Raw water**

**Sediment pre-filter**
- PP cartridge filter for clear water

*For water with high turbidity and iron content (over 10 ppm) application of filter with Filter Ag media is recommended*
ECOMIX® IN RESIDENTIAL ENVIRONMENT

**STANDARD SOLUTIONS**

1. Sediment filter for sand, rust and silt removal
2. ECOMIX® system for hardness, iron, manganese, natural organic matter & ammonium removal
3. Centaur carbon system for hydrogen sulfide removal

**MULTISTAGE SOLUTIONS**
ECOMIX® is used to treat raw water supplied to reverse osmosis systems, to soften and reduce iron from boiler feed water, to purify domestic water in hotels, apartment buildings and business centers.
ECOMIX® PRODUCTION

ECOMIX® is manufactured in Germany

The manufacturing process includes surface activation of FerroSorb and HumiSorb.

Digital control of ingredient mixing ensures consistent quality of finished product across batches.

ECOMIX® is certified in EU for compliance with LFGB requirements for food-contacting materials by TÜV SÜD.

ECOMIX® is certified in compliance with NSF/ANSI standards:
- NSF/ANSI 61 Drinking Water System Components – Health Effects
- NSF/ANSI 44 Residential Cation Exchange Water Softeners
- NSF/ANSI 372 Drinking Water System Components – Lead Content Scheme
ECOMIX® SUPREMACY

100 %
success rate

ECOMIX® is manufactured in Germany.

up to 10 years
service life

Most reliable technology for removal of iron and manganese

Highest permissible concentration of iron and manganese

Smallest regeneration salt requirement

Consistent quality of purified water throughout the material’s service life

ECOMIX® is not only a unique water treatment technology. It has been a firm platform for the corporate success of numerous companies around the globe.
SIMPLE SOLUTION FOR 5 PROBLEMS

- hardness
- iron
- manganese
- natural organic matter
- ammonium

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meets the requirements
LFGB
EU Guideline 2002/72/EG

Ecosoft Water Systems GmbH
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