ECOMIX®

# **SUPER SOFTENER**

SIMPLE SOLUTION FOR 5 PROBLEMS:

hardness |

iron |

manganese |

natural organic matter |

ammonium |





# WHAT ECOMIX® IS

ECOMIX® is a multi-component, complex filter material for softening and removing major contaminants from well or municipal water.

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



DISTRIBUTED TO MORE THAN 50 COUNTRIES OF THE WORLD IN: EUROPE, ASIA, AMERICA, AFRICA AND AUSTRALIA



ECOMIX® is certified in EU for compliance with LFGB requirements for foodcontacting materials by TÜV SÜD. Meets the requirements: LFGB, ResAP(2004)3, EU Guideline 2002/72/EG



The quality of ECOMIX® is confirmed by the Gold Seal certificate (USA), which proves its safety in contact with drinking water. 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

# REDUCING OF IRON AND MANGANESE

FERROSORB IS A PROPRIETARY SORPTION
MATERIAL FOR 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.

The best efficiency of iron and manganese removal is achieved when water is supplied from the well directly to the filter with ECOMIX<sup>®</sup>.

Aeration and oxidative pre-treatment must be avoided.

Treat water against iron bacteria before installing ECOMIX<sup>®</sup>.



## REDUCING OF 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.

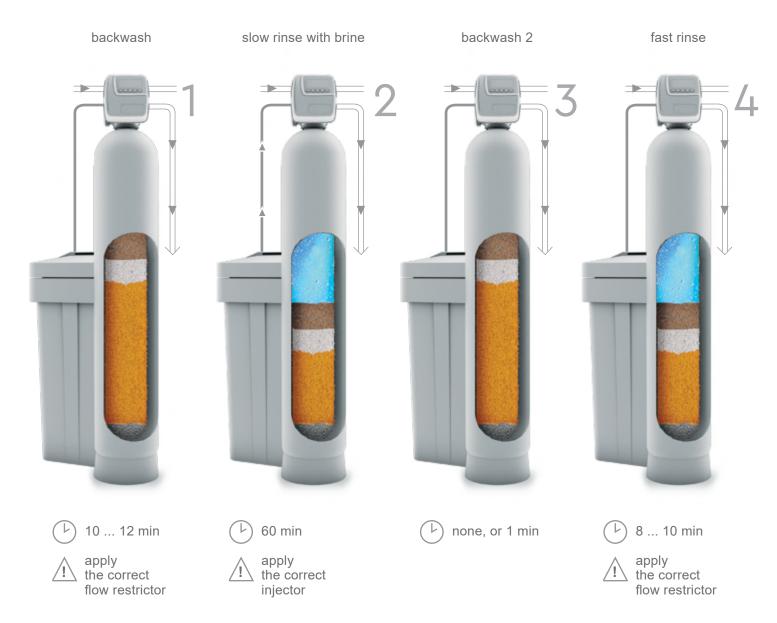
ECOMIX® is intended for the treatment of well water and municipal water.

ECOMIX® is not intended for surface water treatment (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®.





Use the ECOMIX® calculator to select the correct injector and DLFC.

<sup>\*</sup> For pressure tanks larger than 1665, typical duration of each stage should be 20...30% longer.

#### brine tank filling



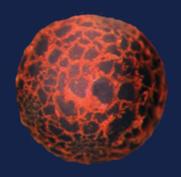
8 ... 10 min

# **ECOMIX®** REGENERATION

**AS A STANDARD SOFTENER** 

ECOMIX® IS REGENERATED WITH THE SAME STEPS AS NORMAL SOFTENERS:

BACKWASH | BRINE RINSING FAST RINSING |



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.

Vessel size	Flow restrictor (DLFC**)	Injector **	
0844	037	В	purple
1054	027	Е	white
1252	042	F	blue
1354	053	G	yellow
1465	065	Н	green
1665	075	I	orange
2162	130	K light green	

<sup>\*\*</sup> Injectors and DLFCs are shown for Clack Corporation control valves.

# **ECOMIX®** EFFICIENCY AND LIMITATIONS



ECOMIX® P	ECOMIX® A	ECOMIX® C
For well or tap water with low organic matter	For well or tap water with moderate organic matter	For well or tap water with high organic matter
Requires stable quality of water	Handles seasonal variations in water composition	Handles seasonal variations in water composition even with significant changes in raw water quality

Raw water quality requirements and efficiency of purification						
Hardness, ppm CaCO <sub>3</sub> 750         750						
Iron, mg/L	15	15	15			
Manganese, mg/L	3	3	3			
Chemical Oxygen Demand, mg/L O <sub>2</sub>	3	20 (Reduces by 50%)	20 (Reduces by 80%)			
Ammonium, mg/L	4	4	4			
Service life, years	3	5	5			

# **ECOMIX®**TECHNICAL SPECIFICATIONS

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

Parameter	Value
Service flow rate, m/h	20–25
Backwash flow rate, m/h	10–15!
Brine (slow rinse) flow rate, m/h	3–5
Minimum bed depth, mm	500
Recommended bed depth, mm	800
Freeboard, %	40 or more ! 1
Salt consumption, g/L	100*
Brine concentration, %	8–10
Water consumption per regeneration, L/L	under 10

<sup>\*</sup> If using potassium chloride increase salt dosage to 150 g/L.



— if the backwash rate is not followed, the iron removal efficiency will be reduced



— if the volume of ECOMIX® in the vessel is more than 60%, backwash may not be sufficiently effective

The use of resin cleaner or other harsh regeneration aids will reduce the efficiency of ECOMIX®.

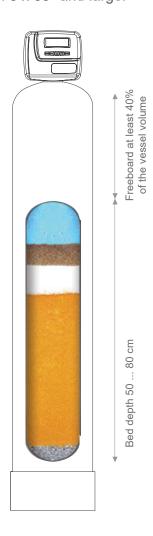
# **ECOMIX®** AND BED DEPTH

#### **COMPACT FILTERS**

cabinets 8 x 35" and larger

# Bed depth 50 ... 80 cm Freeboard at least 40% of the vessel volume

# **STANDARD FILTERS** vessel 8 x 35" and larger



It is not recommended to use ECOMIX in filters with a vessel height less than 35"

# **ECOMIX®**TECHNICAL SPECIFICATIONS



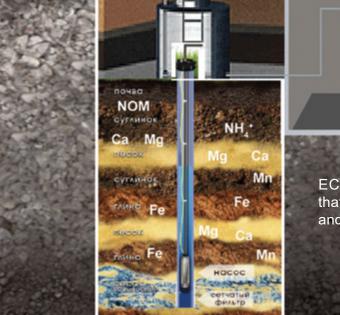
Size of vessel	1035	1054	1252	1354	1465	1665	2162
Ecomix® volume, L	25	37	50	62	75	100	150
Service flow rate, m³/h	1.3	1.3	1.8	2.2	2.5	3.3	5.5
System capacity, kg CaCO <sub>3</sub> *	0.7	1.2	1.5	1.9	2.3	3.0	4.5
Salt per regeneration, kg	2.5	3.8	5.0	6.2	7.5	10.0	15.0
Backwash flow rate, m³/h	0.6	0.6	0.9	1.1	1.2	1.6	2.7

<sup>\*</sup>The ion exchange capacity ECOMIX® C.

ECOMIX® is supplied in two size types: Bag - 25L and Half bag - 12L

Visit ecosoft.com or ecomix.us to use the ECOMIX® calculator







ECOMIX® is a specially developed material that can be used for treatment of the well water and tap water



# **ECOMIX**® IN HOUSES



#### **COMPACT SOLUTIONS:**

Model type (2) Number of bathrooms

FK1035CABCEMIXC 1...2 FK1235CABCEMIXC 2...3





#### **STANDARD SOLUTIONS:**

Model type (2) Number of bathrooms

FK1054CEMIXA 1...2 FK1252CEMIXA 2...3

FK1354CEMIXA 3...4





#### SOLUTIONS FOR LARGE

#### **COTTAGES:**

 $\begin{array}{ll} \mbox{Model type (2)} & \mbox{Number of bathrooms} \\ \mbox{FK1465CEMIXA} & 3...6 \end{array}$ 

FK1665CEMIXA 5...6



- 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

# **ECOMIX®** HAS INCREASED EFFICIENCY

# **COMPACT SYSTEM:**Solution with ECOMIX®

#### **CLASSIC SYSTEM**

to remove hardness, iron, manganese, natural organic matter, ammonium



# **ECOMIX®** HAS INCREASED EFFICIENCY

WITH LESS AREA AND LESS WATER DISCHARGE



3 times
SMALLER AREA

2 times

3 times

LESS VALVE

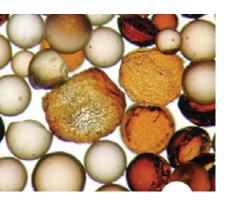
MAINTENANCE

30%
LESS SALT
CONSUMPTION

2 times
REDUCES OPERATING
WATER COSTS

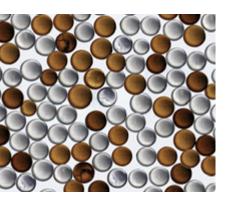
2 times
LESS MAINTENANCE
SPENDING

## **ECOMIX®** VS OTHER COMPLEX MATERIALS



#### **ECOMIX®**

The universal solution for most water without special precautions. Simple calculation of the capacity and resource of the filter, which are influenced only by the hardness of water.



#### **RESIN MIX**

Materials based on a mixture of commercially available resins are generally the most affordable. Remove iron, but quickly lose efficiency. Typically, after 20-30 regenerations (about 6 months of operation), such materials lose up to 30% of their capacity.



#### **ZEOLITES**

Zeolite — natural occuring media — used for removal of hardness, iron, manganese, for ammonia reduction and pH correction. They can be poisoned by hydrogen sulphide and organic matter, and also require careful consideration in calculating the size of the filter and filter cycle.

**Removed impurities** 

Capacity

Service life

Salt dose

Water consumption per regeneration per 1 liter of material

Restrictions:

Hardness

Iron

Manganese

Ammonium

**Organic metter** 

Regeneration aid chemicals

ECOMIX®	RESIN MIX	ZEOLITES
hardness, iron, manganese, ammonium, organic matter	hardness, iron, manganese	hardness, iron, manganese, ammonium
30-40 g CaCO <sub>3</sub> /L	40-50 g CaCO <sub>3</sub> /L by hardness and iron salts	25 g CaCO <sub>3</sub> /L
Ecomix C, A — 5 years Ecomix P — 3 years	2-3 years	2-3 years
100 g/L	140-160 g/L	130 g/L
8-10 L	10-13 L	14-16 L
No  15 mg/L Ecomix A, C reduces ferrous and organics iron	No  10 mg/L (After each regeneration, the filter capacity decreases by 0.7-1.4%). If the iron content is high, the filtration rate must be reduced.	Hardness must be > 50 ppm CaCO <sub>3</sub> and TDS > 80 mg/L  10 mg/L. Inorganic iron only
3 mg/L	2 mg/L. There may be emissions of manganese in treated water	Fe + Mn < 15 mg/L
4 mg/L	No data	Requires reducing the flow rate 2.5 times
Ecomix C reduces by 80%; Ecomix A reduces by 50%; Ecomix P does not remove	No, they can irreversibly poison resin	No, organic impurities will irreversibly reduce capacity
Not needed, only pelletized salt	Periodic regeneration with special reagents is required	In case of hydrogen sulfide poisoning, regeneration with soda is needed

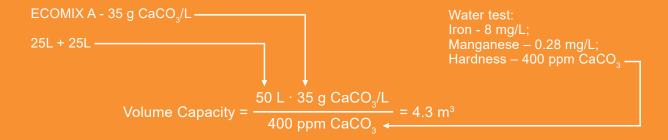
# CALCULATION OF **ECOMIX®** VOLUME CAPACITY

The volume capacity is calculated in a simple way using only influent water hardness and the media's ion exchange capacity as follows:

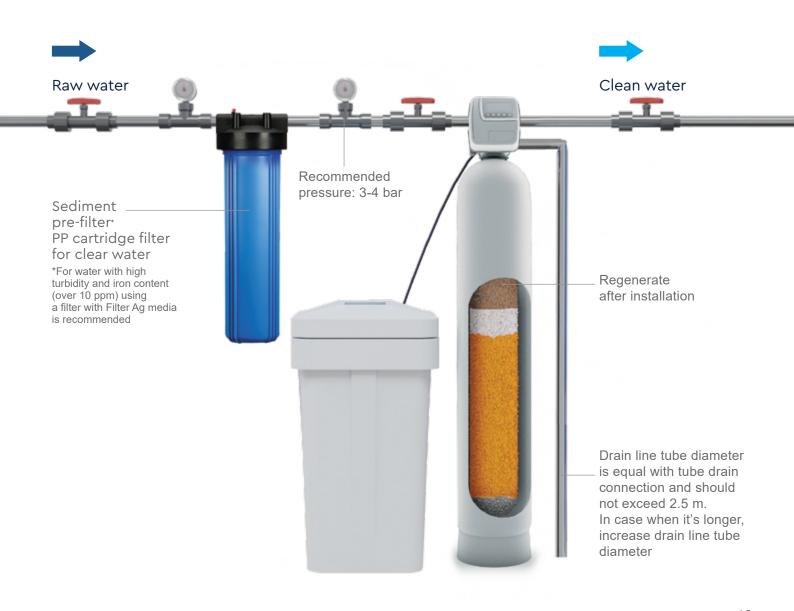
ECOMIX C — 30 g CaCO
$$_3$$
/L ECOMIX A — 35 g CaCO $_3$ /L ECOMIX P — 40 g CaCO $_3$ /L

The volume capacity doesn't have to be corrected for the influent iron and manganese levels.

Example is given for FK1252 ECOMIX A:



# FILTER INSTALLATION SCHEME



# DOES **ECOMIX**® REALLY WORK SO WELL?

#### Zhytomyr, Ukraine

ECOMIX®: Type A				
Test description	Units	Requirements	Raw water	Treated water
Hardness	ppm CaCO <sub>3</sub>	<350	500	5.0
Iron	mg/L	<0.2	11.4	0.2
Manganese	mg/L	<0.05	0.34	<0.01
TOC	mg/L	<5.0	1.9	1.5
Ammonium	mg/L	<0.5	2.8	0.05
TDS	mg/L	<1000	720	810
рН		6.5-8.5	6.9	6.2

#### Kiev, Ukraine

ECOMIX®: Type P					
Test description	Units	Requirements	Raw water	Treated water	
Hardness	ppm CaCO <sub>3</sub>	<350	525	10	
Iron	mg/L	<0.2	2.59	<0.01	
Manganese	mg/L	<0.05	0.34	<0.01	
TOC	mg/L	<5.0	2.3	2.2	
Ammonium	mg/L	<0.5	0.4	0.05	
TDS	mg/L	<1000	705	739	
рН		6.5-8.5	6.9	6.2	

#### Srebrno jezero, Velico Gradište, Serbia

ECOMIX®: Type C					
Test description	Units	Requirements	Raw water	Treated water	
Hardness	ppm CaCO <sub>3</sub>	<350	676	9	
Iron	mg/L	<0.2	9.3	0.18	
Manganese	mg/L	<0.05	0.15	<0.05	
TOC	mg/L	<5.0	12.7	3.9	
Ammonium	mg/L	<0.5	0.45	0.05	
TDS	mg/L	<1000	742	870	
рН		6.5-8.5	6.9	6.9	

#### West Palm Beach, FL, USA

ECOMIX®: Type C				
Test description	Units	Requirements	Raw water	Treated water
Hardness	ppm CaCO <sub>3</sub>	<350	585	15
Iron	mg/L	<0.2	1.9	0.07
Manganese	mg/L	<0.05	0.04	<0.03
TOC	mg/L	<2.0	6.5	0.27
TDS	mg/L	<1000	625	660

#### Zhibek Zholy, Kazakhstan

ECOMIX®: Type A				
Test description	Units	Requirements	Raw water	Treated water
Hardness	ppm CaCO <sub>3</sub>	<350	1150	40
Iron	mg/L	<0.2	0.63	0.17
Manganese	mg/L	<0.05	2.13	<0.05
TDS	mg/L	<1000	3730	3767
рН		6.5-8.5	7.45	7.95

#### Grammene, Belgium

ECOMIX®: Type A				
Test description	Units	Requirements	Raw water	Treated water
Hardness	ppm CaCO <sub>3</sub>	<350	510	25
Iron	mg/L	<0.2	2.9	0.178
Manganese	mg/L	<0.05	0.25	0.043
TOC	mg/L	<5.0	1.6	1.32
Ammonium	mg/L	<0.5	2.8	0.4

#### Vattenprov, Sweden

ECOMIX®: Type A					
Test description	Units	Requirements	Raw water	Treated water	
Hardness	ppm CaCO <sub>3</sub>	<350	468	28	
Iron	mg/L	<0.2	1.6	0.15	
Manganese	mg/L	<0.05	0.65	0.014	
Ammonium	mg/L	<0.5	0.84	0.3	
рН		6.5-8.5	7.3	7.35	



## For more information visit our website

#### Beregovo, Ukraine

ECOMIX®: Type A					
Test description	Units	Requirements	Raw water	Treated water	
Hardness	ppm CaCO <sub>3</sub>	<350	155	2	
Iron	mg/L	<0.2	9.5	0.1	
Manganese	mg/L	<0.05	3.2	0.02	
TOC	mg/L	<5.0	2.0	1.7	
Ammonium	mg/L	<0.5	1.0	0.4	
TDS	mg/L	<1000	375	475	
рН		6.5-8.5	6.6	6.6	

#### Velyka Aleksandrovka, Ukraine

ECOMIX®: Type P					
Test description	Units	Requirements	Raw water	Treated water	
Odor	Units	<2	0	0	
Turbidity	mg/L	<0.58	2.9	0.21	
Hardness	ppm CaCO <sub>3</sub>	<350	525	10	
Iron	mg/L	<0.2	0.592	<0.01	
Nitrates	mg/L	<50	4	3	
TDS	mg/L	<1000	701	737	

#### Ovruch, Ukraine

ECOMIX®: Type P					
Test description	Units	Requirements	Raw water	Treated water	
Odor	Units	<2	0	0	
Turbidity	mg/L	<0.58	<0.2	<0.2	
Hardness	ppm CaCO <sub>3</sub>	<350	590	30	
Iron	mg/L	<0.2	0.32	<0.01	
Nitrates	mg/L	<50	43	43	
TDS	mg/L	<1000	763	954	

#### Pancevo, Serbia

ECOMIX®: Type A					
Test description	Units	Requirements	Raw water	Treated water	
Hardness	ppm CaCO <sub>3</sub>	<350	535	14	
Iron	mg/L	<0.2	2.2	0.16	
Manganese	mg/L	<0.05	0.05	0.03	
Ammonium	mg/L	<2.0	1.3	0.05	
TDS	mg/L	<1000	709	783	
рН		6.5-8.5	7.7	7.7	

#### Linkoping, Sweden

ECOMIX®: Type A					
Test description	Units	Requirements	Raw water	Treated water	
Hardness	ppm CaCO <sub>3</sub>	<350	159	10	
Iron	mg/L	<0.2	0.68	0.17	
Manganese	mg/L	<0.05	0.41	0.04	
Ammonium	mg/L	<0.5	0.12	0.1	
рН		6.5-8.5	7.8	7.9	

#### Dormagen, Germany

ECOMIX®: Type A					
Test description	Units	Requirements	Raw water	Treated water	
Hardness	ppm CaCO <sub>3</sub>	<350	425	20	
Iron	mg/L	<0.2	0.396	0.178	
Manganese	mg/L	<0.05	4.89	0.043	
TOC	mg/L	<5.0	1.4	1.32	
Ammonium	mg/L	<0.5	0.4	0.02	
рН		6.5-8.5	7.4	7.6	

#### Deerfield, Wisconsin, USA

ECOMIX®: Type A					
Test description	Units	Requirements	Raw water	Treated water	
Hardness	ppm CaCO <sub>3</sub>	<350	550	17	
Iron	mg/L	<0.2	1.8	0.1	
Manganese	mg/L	<0.05	1.7	0.01	
TDS	mg/L	<1000	615	648	
рН		6.5-8.5	7.1	7.2	

# **ECOMIX®** Q&A

#### Can I regenerate with untreated water?

Regenerating with untreated or raw water will not affect the performance of ECOMIX®.

# Why is the softening capacity of ECOMIX® so low compared to cation softening resin?

The softening capacity is not lower. The capacity of the cation resin component of ECOMIX® is rated lower because a bag of ECOMIX® contains more than just cation resin. Cation softening resin is only one of the five components in ECOMIX®.

## Should I use resin cleaners or salt with resin cleaners when I regenerate ECOMIX® system?

No, resin cleaners should not be used with ECOMIX®. There are several reported cases when ECOMIX® efficiency was severely impaired after usage of resin cleaners. Regular softener salt and proper regeneration sequencing will keep ECOMIX® clean.

#### How will the TDS change after the system with ECOMIX®?

The TDS after the ECOMIX® system will increase by an average of 10% of the original content. This is due to the replacement of hardness cations with harmless sodium cations during ion exchange.

# My tank holds a bag and a half of media. Can I use half a bag of ECOMIX® and save the other half for another installation?

Each bag contains 5 separate components in specific amounts. ECOMIX® components are thoroughly mixed during production and there should be no problem using half a bag. If you intend to use just half it is important to shake the bag before loading the vessel. To avoid the trouble, you can order ECOMIX® in full AND half bags. Specify packaging when ordering from your supplier.

## Is it possible to use ECOMIX® when iron content in water is higher than the limit of 15 ppm?

There are ECOMIX® units in operation which successfully remove iron in even greater concentrations. However, before doing so you should contact your water treatment specialist with a complete water analysis.

# Can I use ECOMIX® if there is aeration or oxidant dosing ahead of the unit?

We do not recommend installation of oxidation and/or aeration before the ECOMIX® system. If you have to use aeration or oxidant dosing for any reason we highly recommend pretreatment with a multimedia sediment filter and an activated carbon filter to remove residual active chlorine.

#### Is ECOMIX® sensitive to H,S?

ECOMIX® is not sensitive to hydrogen sulfide content in well water and its efficiency will not be affected.

#### Will ECOMIX® reduce H<sub>a</sub>S?

Sometimes ECOMIX® may slightly reduce the rotten odor of H<sub>2</sub>S but it is not recommended as a solution.

# Can I use ECOMIX® if it was accidentally frozen during storage?

Freezing of ECOMIX® should be avoided as it may cause damage to its components. To avoid freezing, ECOMIX® should be stored in a dry room protected from sunlight at temperatures of 35–80 °F (2–27 °C). If it does freeze, ECOMIX® should be thawed out slowly at room temperature before loading and use. Do not treat frozen ECOMIX® with heat or steam.

#### Why is a top basket distributor necessary?

This distributor is necessary in order to prevent ECOMIX $^{\otimes}$  from being lost during the backwashing sequence of regeneration.



For more information visit our website

# What happens if I operate the ECOMIX® system without that first regeneration?

The system will not remove the contaminants properly. There are 5 components in one bag of ECOMIX®. For proper filter operation these components need to be "layered". When ECOMIX® is being regenerated, the mixture self-classifies into layers making it becoming ready for usage.

# Is it true that ECOMIX® will remove all types of iron, including ferric?

ECOMIX® will not remove ferric or oxidized iron efficiently. In applications where ferric iron is present we recommend to install a sediment filter before the ECOMIX® system to trap ferric iron particulates.

# Can I use ECOMIX® in cases of high iron, manganese or tannins content and with low hardness level?

ECOMIX® will operate successfully under these conditions. However, raw water hardness must be used to program the control valve and you must set the "Day Override" to 3 or 4 days. Be sure to contact your water treatment specialist if you have any questions.

# My application is a well that is placed close to the surface water (lake, rivers, canals, ponds).

Water in shallow which are close to the surface water may be a mixture of well and surface water and may have higher than normal TOC and color. It could be microbiologically contaminated. In these situations, ECOMIX® is applicable but additional treatment may be required. We recommend paying attention to the color of the water and doing a tannin test. You must strictly follow the test instructions. For example, commonly used LaMotte test kits require a 30-minute wait before the results are indicated. Once complete, please send the water analysis and the tannin test results with a picture of the water in a white bucket to your water treatment specialist.

## Is the Ferrosorb an ion exchange based product that is also regenerated by salt?

Ferrosorb is regenerated due to surface scouring mechanism during backwash. This is the reason why we always draw attention on the proper backwash flow rate.

#### Can I use ECOMIX® to just remove organic matter and tannins?

ECOMIX® should not be used if organic matter reduction is the only purpose of treatment. But ECOMIX® can be used to reduce organic matter (color) and to soften water from well or municipal supply. The unit's capacity should still be rated based on raw water hardness.

# I have customers who use surface water (lake, rivers, canals, ponds) rather than well water. Can I use ECOMIX® for this application?

ECOMIX® is intended for well, but not the surface water treatment. Surface water may be microbiologically contaminated, have high levels of TOC (total organic carbons), tannins and color that often exceed ECOMIX® limitations. Surface water can be treated with ECOMIX® only after chlorination and sediment filtration followed by activated carbon filter.

## Is ECOMIX® sensitive to active chlorine, pH level or TDS?

ECOMIX® shows stable operation with active chlorine levels below 1 ppm and pH in the range of 5 to 9. ECOMIX® is not affected by the anion composition of the water and is stable with feed water TDS below 4000 ppm.

# **ECOMIX®** IN FIGURES

# ECOMIX® eliminates 5 most common water quality problems:

hardness | iron | manganese | natural organic matter (oxidizability) | ammonium |



up to 10 years of service life

- Simple calculation of the volume capacity using influent water hardness only
- High efficiency, which does not depend on water pH level (5 ... 9), presence of H<sub>3</sub>S and anionic composition
  - No acidic, alkaline or deironing chemicals are required for regeneration, only regular tableted salt
  - No pretreatment with oxidizing agents is required due to remove iron and manganese

INo dumping of iron and manganese even if the service run exceeds the softener's volume capacity

Low salt requirement — 100 g of NaCl per 1 liter of filter loading for one regeneration

Low water consumption for regeneration — 5-10 of filter loading volumes

NSF/ANSI and TÜV SÜD quality certifications

ECOMIX® is not only a unique water treatment technology, ECOMIX® has been a firm platform for the corporate success of numerous companies around the globe