



## Ion exchange resins and filtering media



# GREENSAND PLUS

- REF. RA074;
- filter media used for removing soluble iron, manganese, hydrogen sulphide, arsenic and radium from well water supplies;
- like the sister product Manganese Greensand, the substrate media has a manganese dioxide coated surface that acts as a catalyst in the oxidation-reduction of iron and manganese. The difference between GREENSAND PLUS and Manganese Greensand is the substrate that forms the core of the media and the method by which the manganese dioxide coating is attached to that substrate. GREENSAND PLUS has a silica sand core and coating is fused to it, while manganese greensand has a glauconite core and the coating is ionically bound to it;
- the silica sand core allows to better withstand operating conditions in waters that are low in silica, TDS and hardness. Also can withstand higher operating temperatures and higher differential pressure that can Manganese Greensand;
- exact replacement for manganese greensand. It can be used in CR (continuous regeneration) or IR (intermittent regeneration) and requires no changes in backwash rate or times or chemical feeds;
- not shipped in regenerated form; prior to use it is necessary to regenerate with a solution of potassium permanganate contacting the bed for a minimum of 4 hours. A regeneration level of 4 g of potassium permanganate per liter is recommended. Before placing in service the filter must be rinsed of all remaining traces of potassium permanganate;
- available in 14,2 liters bags.



## PHYSICAL PROPERTIES:

Colour	black
Specific gravity (g/l)	2400
Bulk density (g/l)	1375
Effective size (mm)	0,30 ÷ 0,35
Uniform coefficient	1,6

## OPERATING CONDITIONS:

Minimum bed depth (mm)	750
Service flow rate continuous (m <sup>3</sup> /h m <sup>2</sup> )	7 ÷ 15
Service flow rate intermittent (m <sup>3</sup> /h m <sup>2</sup> )	15 ÷ 30
Backwash flow rate (m <sup>3</sup> /h m <sup>2</sup> )	30 ÷ 35
Backwash bed expansion (%)	35 ÷ 40
pH range	6,2 ÷ 8,5

# MTM

- REF. RA071;
- MTM consist of a light weight granular core with a coating of manganese dioxide, and is used for reducing iron, manganese and hydrogen sulphide from water. Its active surface coating oxidizes and precipitate soluble iron and manganese, and hydrogen sulphide is oxidized to a sulphur. The precipitates are filtered out in the granular bed and removed by backwashing;
- compared to other iron removal medias, MTM has many advantages: pH level as low as 6,2 can be treated, dissolved oxygen is not essential, the media light weight reduces backwash water requirements;
- chlorine can be beneficial in extending filter run times;
- MTM requires intermittent or continuous regeneration to maintain its oxidizing capacity, with a weak solution of potassium permanganate;
- regeneration  $\text{KMnO}_4$  solution from 1,5 to 2 g per liter MTM;
- a new bed should be regenerated at the start up;
- CAUTION: operating the filter after its oxidizing capacity is exhausted will reduce its service life and may cause staining;
- influent limitations: none oil and polyphosphates;
- available in 28,3 liters bags.



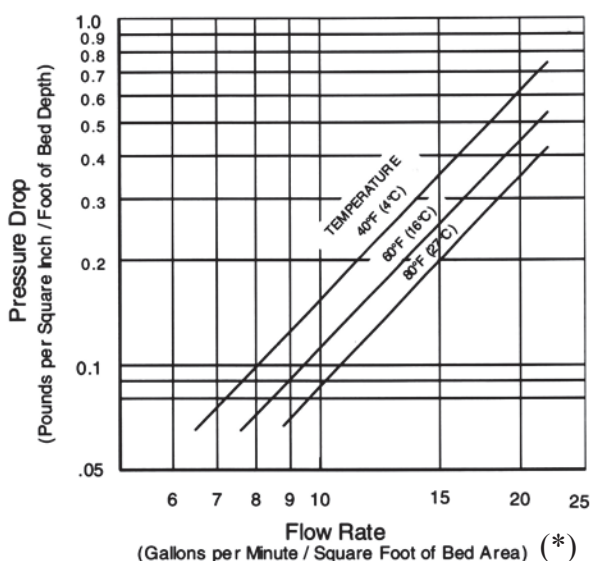
## PHYSICAL PROPERTIES:

Colour	dark brown
Specific gravity (g/l)	2000
Bulk density (g/l)	715
Effective size (mm)	0,45

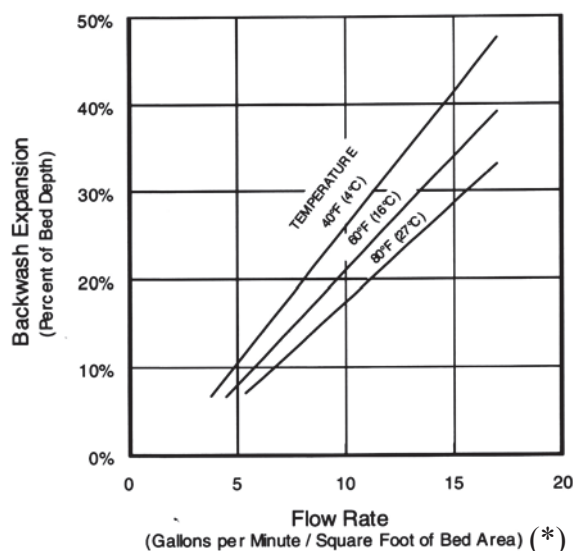
## OPERATING CONDITIONS:

Bed depth (mm)	600 ÷ 900
Service flow rate ( $\text{m}^3/\text{h m}^2$ )	8 ÷ 13
Backwash flow rate ( $\text{m}^3/\text{h m}^2$ )	20 ÷ 24
Backwash bed expansion (%)	20 ÷ 40
Capacity per liter (g)	1,4 Fe or 0,7 Mn
pH range	6,2 ÷ 8,5

## SERVICE FLOW – PRESSURE DROP



## BACKWASH BED EXPANSION



(\*) Note: a “Gallon per Minute / Square Foot of Bed Area” is equal to 2,44448  $\text{m}^3/\text{h}$  .



# BIRM

- REF. RA072;
- granular filter media used for the reduction of iron and manganese dissolved in the water. In ground water the dissolved iron is usually in the ferrous bicarbonate state and is not filterable; BIRM acts as an insoluble catalyst to enhance the reaction between dissolved oxygen and iron compounds, producing ferric hydroxide which precipitates and may be easily filtered;
- the physical characteristics of BIRM provide an excellent filter media which is easily cleaned by backwashing to remove the precipitant;
- BIRM is not consumed in the iron removal operation;
- available in 28,3 liters bags;
- following are the conditions necessary for a good efficiency of the BIRM:
  - no oil or hydrogen sulphide in the water;
  - pH 6,8 ÷ 9,0 (if water contains also manganese pH has to be 8,0 ÷ 8,5);
  - dissolved oxygen content must be equal to at least 15% of the iron content;
  - alkalinity should be greater than two times the combined sulphate and chlorine concentration;



**CAUTION:** chlorination greatly reduces BIRM activity.

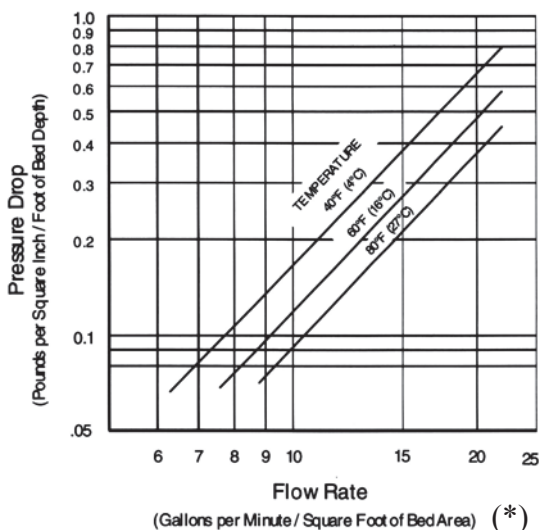
## PHYSICAL PROPERTIES:

Colour	black
Specific gravity (g/l)	2000
Bulk density (g/l)	700 ÷ 800
Effective size (mm)	0,6

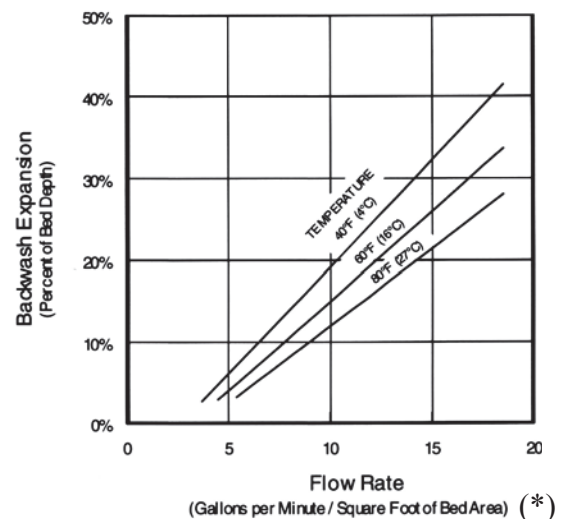
## OPERATING CONDITIONS:

Bed depth (mm)	750 ÷ 900
Service flow rate (m <sup>3</sup> /h m <sup>2</sup> )	9 ÷ 13
Backwash flow rate (m <sup>3</sup> /h m <sup>2</sup> )	24 ÷ 30
Backwash bed expansion (%)	20 ÷ 40

## SERVICE FLOW – PRESSURE DROP



## BACKWASH BED EXPANSION



(\*) Note: a “Gallon per Minute / Square Foot of Bed Area” is equal to 2,44448 m/h .

# PYROLUSITE

- REF. RA069;
- PYROLUSITE is manganese dioxide ( $\text{MnO}_2$ ) of very good quality and pureness obtained by washing, drying and screening of mineral selected for the specific catalytic activity;
- used as catalyser for the reduction of iron, manganese and hydrogen sulphide dissolved in the water, by sand filters, mixed at 20% with sand 0,8 ÷ 1,2 mm;
- does not require a compulsory regeneration with  $\text{KMnO}_4$  , but you can do a continuous chlorination or a chlorination during the backwash;
- PYROLUSITE complies the standard UNI ISO EN 13752 “Products for potable water treatment”;
- hardness 3° ÷ 5° Mosh;
- available in 25 kg bags.



## PHYSICAL PROPERTIES:

Colour	brown
Bulk density (g/l)	2000
Effective size (mm)	0,3 ÷ 0,8
Mn (%)	80

## OPERATING CONDITIONS:

Composition	Mixed at 20% volume with sand size 0,8 ÷ 1,2 mm
Suggested filtration speed (m/h)	10
Max backwash speed ( $\text{m}^3/\text{h m}^2$ )	25
Min contact time (min)	6

# ACTIVATED CARBON

- REF. RA204 (it is not suitable for treatment of water intended for human consumption), RA206 and RA208;
- RA206 and RA208 are in conformity with the rule UNI ISO EN 12915-1 : 2004 “Chemicals used for treatment of water intended for human consumption”;
- range of granular activated carbons designed for reduction of chlorine and organic contaminants dissolved in water;
- manufactured from select grades of bituminous (or vegetal origin) coal, with a thermal activation process at strictly controlled temperature to obtain a large surface area and a porous structure allowing the adsorption of low and high molecular weight organic compounds;
- high density activated carbons with good resistance to the attrition and mechanical stocks;
- activated carbon require periodic backwashing to eliminate accumulated suspended matters and to regrade the filter bed;
- a good backwashing of the AC filter bed of the start-up is required.



## PHYSICAL PROPERTIES:

REF.	TYPE	ORIGIN	SIZE (mm)	BULK DENSITY (g/l)	BET (m <sup>2</sup> /g)	IODINE NUMBER (mg/g)	BAG WEIGHT (kg)	BAG VOLUME (litres)
RA204	SC45 cylindrical	Mineral	4	530	700	750	25,0	47
RA206	GAC DCN 1000 8x30	Vegetal	0,5 ÷ 2,4	550	1100	1000	25,0	46
RA208	GAC DCN 1000 12x40	Vegetal	0,4 ÷ 1,6	550	1100	1000	25,0	46

## OPERATING CONDITIONS:

Bed depth (mm) (dechlorination)	650 ÷ 750
Service flow rate (m <sup>3</sup> /h m <sup>2</sup> ) (dechlorination)	12 ÷ 15
Backwash flow rate (m <sup>3</sup> /h m <sup>2</sup> )	24 ÷ 30
Backwash bed expansion (%)	30 ÷ 40

# FILTER SAND AND GRAVEL

- REF. RA050, RA051 and RA052;
- filter sand and gravel shape of alluvium origin, uncrushed;
- high contents of silica, selected for specific use in water filtration for potable and industrial application;
- hardness 7° Mosh.



REF.	SIZE (mm)	BAG WEIGHT (kg)
RA050	0,8 ÷ 1,2	25
RA051	1,0 ÷ 2,0	25
RA052	3,0 ÷ 5,0	25

## PHYSICAL PROPERTIES:

Colour	white
Specific gravity (g/l)	2650
Bulk density (g/l)	1500
SiO <sub>2</sub> content	> 96 %
Humidity	0,3 % max
Melting point	1700 g/c
pH	8

## OPERATING CONDITIONS:

Bed depth (mm) (sand filter)	450 ÷ 750
Service flow rate (m <sup>3</sup> /h m <sup>2</sup> )	8 ÷ 12
Backwash flow rate (m <sup>3</sup> /h m <sup>2</sup> )	30 ÷ 42
Backwash bed expansion (%)	5 ÷ 10

# ANTHRACITE

- REF. RA060 and REF. RA061;
- granular anthracite selected per gradation, hardness and purity for specific use in potable and industrial water filtration;
- the high filtering efficiency of anthracite is due to its angular shape, that allows high filtering speed, longer filter runs and less head loss;
- excellent media with density lower than sand, anthracite can be used alone or in multimedia filters;
- the ANTHRACITE complies the standard UNI ISO EN 12909 “Products used for treatment of water intended for human consumption”;
- minimum carbon contents 90%, low silica, hardness 3° Mosh average.



REF.	SIZE (mm)	BAGS (kg)
RA060	0,6 ÷ 1,0	25
RA061	2,0 ÷ 3,0	25

## PHYSICAL PROPERTIES:

Bulk density (g/l)	950
Absolute density (g/ml)	1400
Humidity packaging	2 % max
Ashes	4 % ( $\pm 2$ )
Substances volatiles	3 % ( $\pm 1$ )
Sulphur	0,5 % max
pH	8 ÷ 10

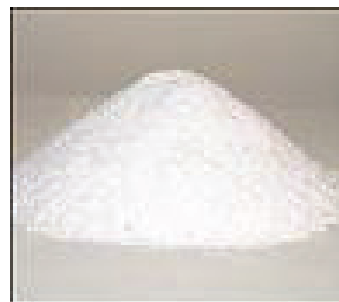
## OPERATING CONDITIONS:

- monolayer bed depth 600 ÷ 900 mm;
- top bed depth in multilayer beds 250 ÷ 450 mm;
- service flow rate following specific conditions;
- backwash flow rate 28 ÷ 35 m<sup>3</sup>/h m<sup>2</sup>;
- bed expansion 20 ÷ 30%.



# CALCITE

- REF. RA073;
- CALCITE is a natural crushed and screened calcium carbonate media which is used to neutralize low pH waters;
- acidic water slowly dissolves the calcium carbonate to raise the pH which reduces the potential leaching of copper, lead and other metals found in typical plumbing systems;
- one of the advantages of CALCITE is its self-limiting property, that corrects pH only enough to reach a non corrosive equilibrium;
- of course CALCITE will increase the hardness of the water;
- periodic backwashing of the bed is necessary to keep in working order the system;
- the CALCITE bed will have to be periodically replenished as the CALCITE is depleted;
- gravel support bed is recommended;
- available in 15,6 liters bags.



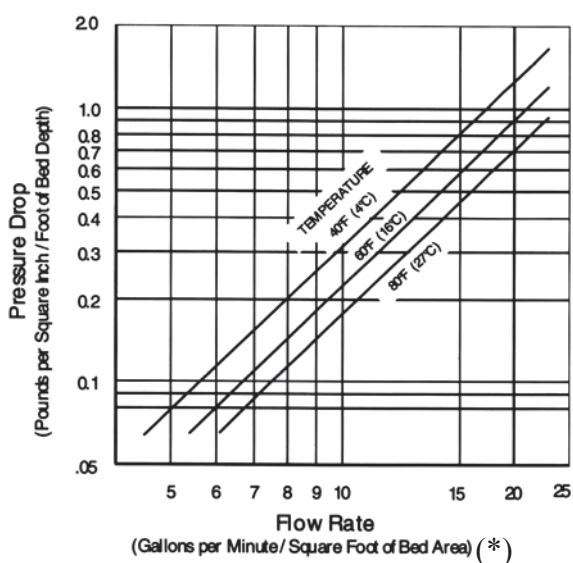
## PHYSICAL PROPERTIES:

Colour	white
Specific gravity (g/l)	2700
Bulk density (g/l)	1450
Effective size (mm)	0,4
Composition	CaCO <sub>3</sub> 95% min. MgCO <sub>3</sub> 3% max.

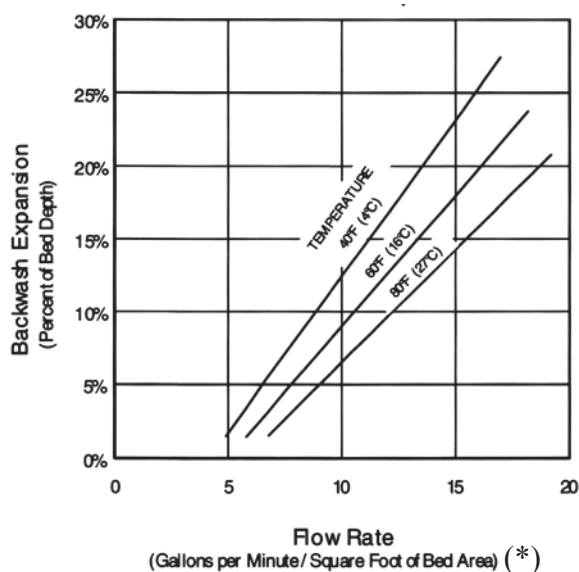
## OPERATING CONDITIONS:

Bed depth (mm)	600 ÷ 750
Service flow rate (m <sup>3</sup> /h m <sup>2</sup> )	7 ÷ 15
Backwash flow rate (m <sup>3</sup> /h m <sup>2</sup> )	20 ÷ 30
Backwash bed expansion (%)	35
pH range	5,0 ÷ 7,0

## SERVICE FLOW – PRESSURE DROP



## BACKWASH BED EXPANSION



(\*) Note: a “Gallon per Minute / Square Foot of Bed Area” is equal to 2,44448 m/h .

# FILTER AG

- REF. RA059;
- Filter-Ag is a non-hydrous silicon dioxide media which can be used as highly efficient filter media for the reduction of suspended matter. Its fractured edges and irregular surface provides an high surface area and complex flow path for efficient filtration;
- less pressure loss through a bed of Filter-Ag than through most other filter medias;
- light weight requires lower backwash rates than other filter medias;
- upon installation allow bed to soak overnight before backwashing;
- available in 28,3 liters bags.



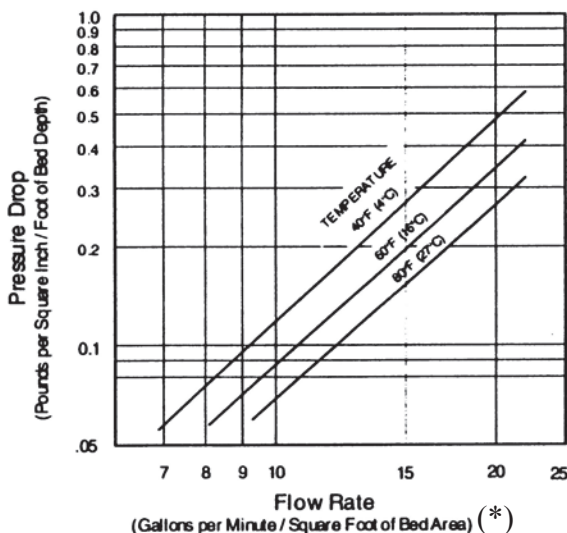
## PHYSICAL PROPERTIES:

Colour	light grey
Specific gravity (g/l)	2250
Bulk density (g/l)	380 ÷ 420
Effective size (mm)	0,7

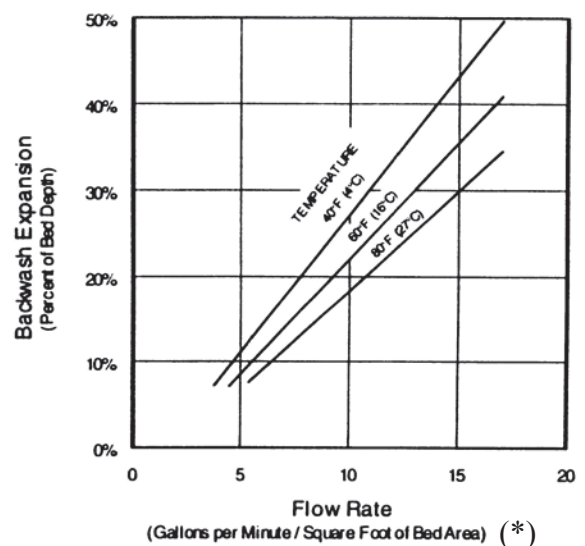
## OPERATING CONDITIONS:

Bed depth (mm)	600 ÷ 900
Service flow rate (m <sup>3</sup> /h m <sup>2</sup> )	12 ÷ 13
Backwash flow rate (m <sup>3</sup> /h m <sup>2</sup> )	20 ÷ 24
Backwash bed expansion (%)	20 ÷ 40

## SERVICE FLOW – PRESSURE DROP



## BACKWASH BED EXPANSION



(\*) Note: a “Gallon per Minute / Square Foot of Bed Area” is equal to 2,44448 m/h .

# GFH (GRANULAR FERRIC HYDROXIDE)

- REF. RA068 and RA068B;
- the granular ferric hydroxide GFH is an adsorbent for selective removal of arsenic (both arsenite and arsenate), phosphate, selenium, antimony, molybdenum and other heavy metals from natural water;
- preoxidation is not required for arsenic removal applications;
- once the media has exhausted its adsorption capacity, it is removed from the vessel and replaced with new media;
- the simplicity of this process is very attractive for small installations and wellhead applications;
- active substance  $\text{Fe}(\text{OH})_3 + \beta\text{-FeOOH}$ ;
- dry solids content 57% ( $\pm 10\%$ ).



REF.	WEIGHT (kg)	PACKAGING
RA068	30	drum
RA068B	800	Big bag

PHYSICAL PROPERTIES (with water content 45%):

Density of grains (g/l)	1590
Bulk density (g/l) backwashed	1150 ( $\pm 10\%$ )
Particle size range (mm)	0,2 ÷ 2
Specific surface (m <sup>2</sup> /g)	300 approx.
Porosity of grains (%)	72 ÷ 77
Bulk porosity (%)	22 ÷ 28

OPERATING CONDITIONS:

Bed depth (m)	0,6 ÷ 1,6
Specific flow rate (m <sup>3</sup> /h m <sup>2</sup> )	5 ÷ 20
Contact time (minutes)	4 ÷ 6
Backwash flow rate (m <sup>3</sup> /h m <sup>2</sup> )	9 ÷ 12
Expansion free volume	100 %
Pressure loss max (bar)	0,5
Operation temperature max (°C)	60
AsO <sub>4</sub> <sup>3-</sup> Arsenic adsorption density in the drinking water processing (g/kg)	2 ÷ 10 (*)

(\*) the adsorption density depends on pH and water chemistry.

ADSORPTION CAPABILITY:

Adsorption	Typical adsorber bed	Dry weight
AsO <sub>4</sub> <sup>3-</sup> Arsenic adsorption density	28 g/dm <sup>3</sup>	45 g/kg
o-PO <sub>4</sub> Phosphorus adsorption density	10 g/dm <sup>3</sup>	16 g/kg

REFERENCE CONDITIONS:

pH = 7, residual concentration = 0,1 µmole/dm<sup>3</sup>, 0,1 % NaCl solution.

# ECOMIX

- ECOMIX is a granular filtering media, suitable for remove natural organic matter, hardness, iron, manganese and ammonia independently of raw water pH, anions content and chlorine presence;
- ECOMIX is a homogeneous mixture of five high quality ion-exchange and adsorption materials of natural and synthetic origin;
- you can use ECOMIX as a ion-exchange resin and regenerate it with sodium chloride (NaCl);
- wide range of raw water as indicated in the “Limit Concentration Table” below;
- ECOMIX can treat water with high concentration of Fe and Mn, and with max TDS = 4000 mg/l;
- to calculate filter capacity, one should only consider water hardness and ion-exchange capacity (don't consider Fe and Mn data);
- shipping weight 0,75 kg / liter;
- available in 12,0 liters bags.



REF.	TYPE	ION EXCHANGE CAPACITY (eq/l)	ION EXCHANGE CAPACITY (g CaCO <sub>3</sub> /l)	DOSE OF REGENERANT (g NaCl 100% per liter)
RA080	Ecomix - A	0,75	37,5	100
RA081	Ecomix - C	0,65	32,5	100

- ECOMIX A is preferred when the contaminants to be removed are mainly hardness and iron;
- ECOMIX C is preferred when the contaminants to be removed are mainly organic matter.

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**WARNING:** if you use only a part of the product contained in a bag, you have make sure that all the contents are mixed, in order to homogenize the product before spilling. ECOMIX is a mixture of five materials with different specific weight and different particle size, which if not well mixed tends to stratify.

# ECOMIX

## LIMIT CONCENTRATION TABLES:

RA080	Hardness (ppm CaCO <sub>3</sub> )	Fe (mg/l) (ppm)	Mn (mg/l) (ppm)	COD (ppm KMnO <sub>4</sub> )	Ammonia (mg/l) (ppm)	TDS (ppm)
Raw water concentration limits	< 750	< 15	< 3	< 16	< 4	< 4000
Quality of purified water	≤ 20	< 0,3	< 0,1	< 8	< 0,5	No changes

RA081	Hardness (ppm CaCO <sub>3</sub> )	Fe (mg/l) (ppm)	Mn (mg/l) (ppm)	COD (ppm KMnO <sub>4</sub> )	Ammonia (mg/l) (ppm)	TDS (ppm)
Raw water concentration limits	< 750	< 10	< 3	< 80	< 4	< 4000
Quality of purified water	≤ 20	< 0,3	< 0,1	< 8	< 0,5	No changes

## OPERATING CONDITIONS:

OPERATING CONDITIONS		UNIT OF MEASUREMENT
Maximum operating temperature	40	°C
pH range	5 ÷ 10	
Minimum bed depth	500	mm
Optimum bed depth	800	mm
Service flow rate	20 ÷ 25	m <sup>3</sup> /h m <sup>2</sup>
Backwash flow rate (15÷20 min)	13 ÷ 15	m <sup>3</sup> /h m <sup>2</sup>
Regeneration flow rate (45÷65 min)	3 ÷ 5	m <sup>3</sup> /h m <sup>2</sup>
Rinse flow rate (15÷20 min)	20 ÷ 25	m <sup>3</sup> /h m <sup>2</sup>
Free bed volume	> 40	%
Regenerant solution (NaCl)	8 ÷ 10	%
Dose of regenerant	100	g NaCl 100% per liter

## SUGGESTED APPLICATIONS:

VESSEL	VOLUME (liters)	FLOW (l/h)
8 x 44	24	600 ÷ 800
10 x 44	36	800 ÷ 1000
10 x 54	48	1000 ÷ 1250
12 x 52	60	1400 ÷ 1750
13 x 54	72	1600 ÷ 2000



