by ZEOMEDIA

FLUOREX

New high-efficiency defluoridation media

FLUOREX® is an advanced adsorbent media developed for the **efficient removal of fluoride from water.**

This material exhibits outstanding characteristics in terms of adsorption capacity and stability, making it ideal for various water treatment applications.

APPLICATIONS

- Water purification in rural communities.
- Domestic water purification.
- Use in municipal plants for fluoride removal.
- Pre-filtration for industrial processes sensitive to contaminants.

MAIN FEATURES

- High fluoride adsorption capacity, even at low concentrations.
- Optimal performance at neutral pH (pH 7).
- Designed for domestic and industrial applications.
- Long lifespan and easy regeneration.

PHYSICOCHEMICAL PROPERTIES

Property	Value
Particle Size	0.5 - 1.5 mm
Apparent density	1.25-1.45 g/cm³
Porosity	0.4
Adsorption capacity	0.5-4 mg F-/g
Optimum operating pH	6.5-.7.5

OPERATIONAL CONDITIONS

Property	Value
Average operating rate	>6 m^3/m^2 h
Hydraulic retention time	<12 min
Backwash rate	50-55 m^3/m^2h
Fe and Mn concentration	<0.1 ppm
Free chlorine concentration	<5 ppm
Estimated useful life*	It depends on the volume treated and the quality of the water

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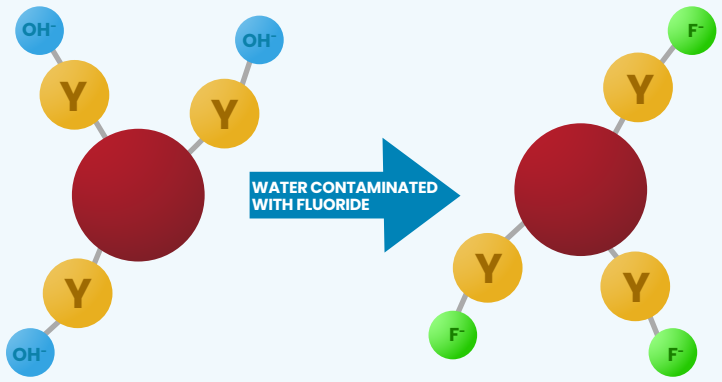
MECHANISM OF ACTION

The FLUOREX® adsorbent removes fluoride through a mechanism based on:

Physical filtration:
Retention of particles within the porous structure, maximizing fluoride exposure to the active medium.

Ion exchange:
Substitution of anions such as OH- with F- at specific active sites on the material.

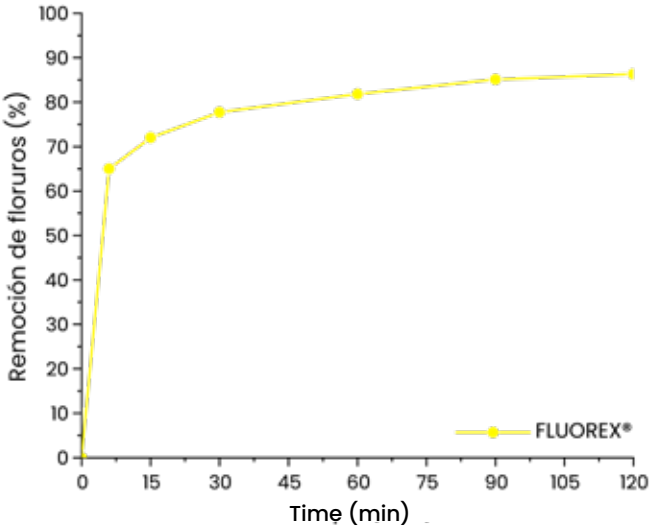
Chemical adsorption:
The active surfaces of the material interact with fluoride ions through ionic bonds and the formation of stable complexes.



This mechanism combines chemical and physical efficiency to ensure rapid and sustained fluoride removal, even at low initial concentrations.

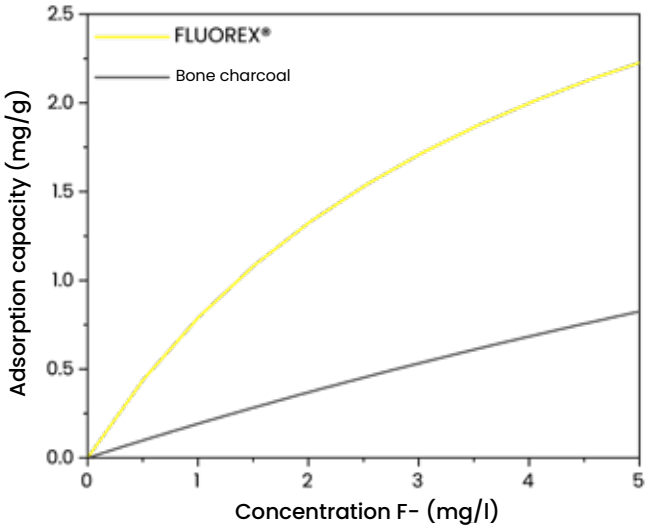
ADSORPTION KINETICS

The dynamic behavior of the FLUOREX® adsorbent material under standard conditions exhibits superior kinetics, reaching equilibrium quickly. Achieving 70% removal in just 12 minutes.



ADSORPTION ISOTHERM (AT pH 7)

The following graph compares the performance of FLUOREX® with bone charcoal in terms of fluoride adsorption:



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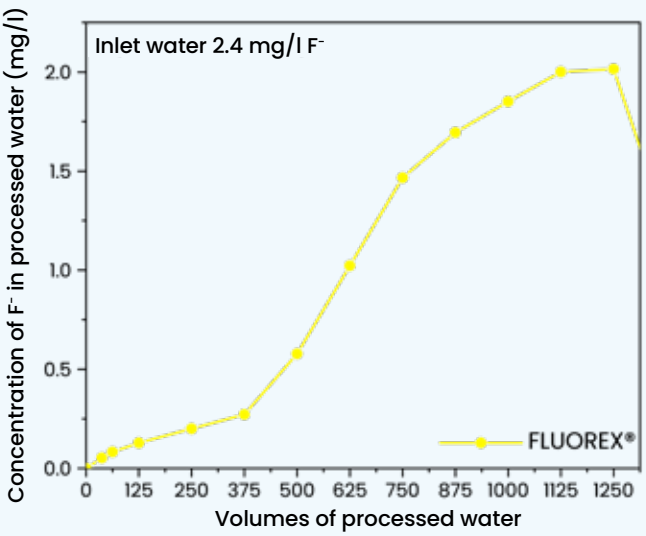
TECHNICAL BENEFITS

- **High adsorption capacity:** Its optimized design ensures efficient fluoride removal even at very low concentrations.
- **Operational versatility:** Stable performance across a wide range of flow rates and operating conditions.
- **Economical regeneration:** Easy to regenerate using common reagents, reducing operating costs.
- **Physical resilience:** Resistant to mechanical wear, allowing for greater durability and long-term stability in filtration systems.
- **Compatibility:** It can be integrated into existing systems without complex modifications.

VOLUME TREATED



REGENERATION

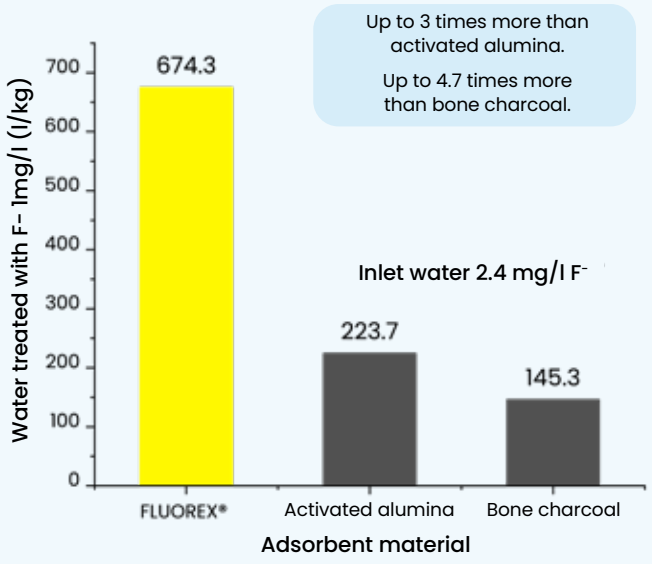
FLUOREX® can be regenerated using a simple and economical protocol, extending its shelf life.

Regeneration (per kg of FLUOREX® material).
Main steps:

1. Dissolve 30 g of sodium hydroxide (NaOH) in 6 L of water.
2. Circulate the solution through 1 kg of FLUOREX® material until the fluoride concentration in the solution stabilizes.
3. Allow the solution to stand in the material for 3–6 hours.
4. Treat the residual solution with calcium hydroxide ($Ca(OH)_2$) to precipitate the fluoride, separate the precipitate, and regenerate the solution by adding 10 g of solid NaOH.
5. Rinse the regenerated material with tap water or feed water.

Regeneration frequency: Depending on water quality and fluoride load, but generally every 3-6 months for domestic systems or after processing 250-650 bed volumes (BV) in industrial systems depending on the incoming water quality.

PERFORMANCE COMPARISON



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