

Fluoride Removal

Catalytic Carbon Absorbent Media for Fluoride Removal

For removal of Fluoride from

- Well Water/Ground Water
- Oil/Gas Production
- Mining Operations
- Refineries
- Powerplants with scrubbers
- Metal Working
- Steel Mills
- Any Waste Water

**Ideal for Fluoride
& Arsenic Removal.**



Catalytic Carbon Media

Description:

Catalytic Carbon, media is a proprietary Fluoride adsorbent based on Activated Alumina, Iron and Silica that is designed for potable water as well as complete water treatment industry. A highly adsorptive activated alumina media and chemical treatment system, combined to provide a simple, safe and compact process with automatic controls. It is effective treatment for fluoride across a broad range of pH from 3 to 9 with the highest removal capacity is achieved with the pH range of 5 to 7.

Catalytic Carbon Process and How it works

pH Adjustment:

Well water containing Fluoride is chemically pre-treated to adjust the pH. At the optimum fluoride removal pH, some organic molecules and some trace heavy metals, including Arsenic are adsorbed on the media. An Automatic pH control ensures optimal chemical pre-treatment. Fluoride ions are caught and held onto the vast surface area, throughout the pores of **Catalytic Carbon**, and fluoride removal is reliably achieved.

Regeneration:

When **Catalytic Carbon** bed has adsorbed the maximum amount of fluoride, it requires regeneration to de-catch (remove) the adsorbed fluoride from the **Catalytic Carbon** media. The bed needs simple backwash to remove the suspended solids, next the bed is treated with OXYDES® solution to dissolve fluoride from the bed and disinfect in the same process. The bed is then flushed with raw water to remove excess OXYDES® and neutralize the bed.

Physical & Chemical Properties

Specification	Unit	Value
Appearance	-	Coarse granule
Color	-	Dark red
Particle size	mm	0.6 – 2.4
Mesh size (US)	-	8 x 30
Surface Area (BET)	m ² /g	2000 – 2500
Moisture Content	%	5 (max.)
Ball Pan Hardness	%	98 (min.)
Bulk density	kg/m ³	630-640
pH	-	9.5
Expected Service life	years	2 – 5*
Multiple Regeneration	-	Yes**

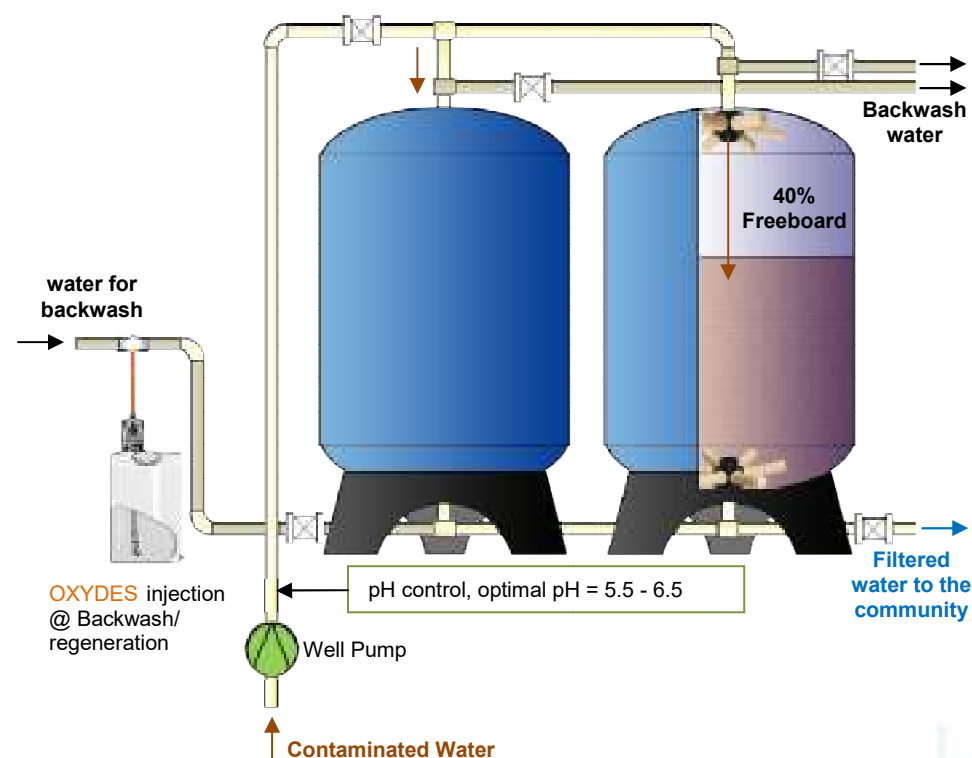
* Depending on the contamination load and regeneration frequency

** Catalytic Carbon can be regenerated using OXYDES or OXYDES-P depending on the loaded

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Highlights

- Flow ranges from 10 gpm to 10,000 gpm (2.3 m³/h to 2271 m³/h)
- Easy Design, Easy build
- User friendly Systems
- No Caustic/No Acid use
- Regeneration through Dosing (max. 15 minutes)
- Automatic Control
- Competitive Operational Costs
- Standard Systems on Requests
- Pilot filter for field testing



Typical **Catalytic Carbon** Sizes

Suggested operating Parameters

Fluoride Concentration	- ≤8 ppm (mg/L) for the best results
Recommended pH range	- 5.5 - 7.5 (optimal 5.5 - 6.5)
Bed Depth (min.)	- 36 inches (~92 cm)
Empty Bed Contact Time (EBCT)	- 2 - 6 minutes (typical)
Service flow rate	- 2 - 4 gpm/ft ³
Service flow velocity	- 5 - 8 gpm/ft ²
Regeneration	- OXYDES® (or Contact Watch Water® for details)
Backwash velocity	- 6 - 8 gpm/ft ² (40% expansion)
Under bedding/support	- Gravel 2-3 cm

Highest Capacity Adsorbent:

Catalytic Carbon is able to absorb as much as 2 grams fluoride per 100 grams of media. For example a 100 liters unit will keep a stream containing max. 8 mg/L fluoride with 1200 L/h flow rate virtually free for 8 days without risking fluoride breakthrough.

Important:

Economical: Because of its high capacity the system will run much longer and will consume less chemicals.

Easy, So Easy to Regenerate:

Once saturated the media can be backwashed with water and inject **OXYDES®** continuously for 15 minutes (Dosing 5% **OXYDES®** solution for 15 minutes).

- Backwash with 5% **OXYDES®**
- Rinse with H₂O
- Go back to Service

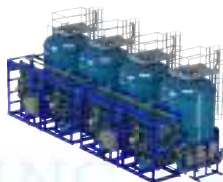
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Catalytic Carbon Standard F-removal Systems

Design basic:

Standard **Catalytic Carbon** systems are designed with an approximation of 340 liters per cubic feet of media. Which provides the EBCT of around 5 minutes which is highly recommended for good fluoride removal.

Virtually there is no flow rate limitations for **Catalytic Carbon** systems as **Catalytic Carbon** units can be configured in parallel to address industrial high flow requirements.



Typ	Flow rate		Connection	CC media amount	
	m ³ /h	gpm	inches	liters	ft ³
CC 1465	1.0	4.4	1"	85	3
CC 1665	1.4	6.2	1"	115	4
CC 1865	2.0	8.8	1½"	155	5½
CC 2160	2.5	11.0	1½"	200	7
CC 2469	3.5	15.4	2"	290	10½
CC 3072	5.0	22.0	2"	420	15
CC 3672	7.5	33.0	2"	620	22
CC 4272	11.0	48.4	2"	900	32
CC 4872	14.0	61.6	3"	1125	40
CC 6367	18.0	79.2	3"	1460	52
CC 6386	24.0	105.6	3"	1960	70

OXYDES®

Cleaning & Disinfection (Sanitization) for Watch-Water® **Catalytic Carbon**

What is Disinfection:

Disinfection is killing or removal of organisms that are capable of causing infection. Sanitization is usually performed with **OXYDES®** which cleans the surface of the media from organics and accomplishes sterilization (complete kill of organisms). **OXYDES®** will kill all the sensitive organisms including spores.

THE PURPOSE of C & D

The objectives of C & D (**C**leaning & **D**isinfection) are to penetrate any bio-films, to destroy organisms to remove contaminations to the greatest extent possible and to minimize the re-population.

- Minimize bacteria population
- prevent formation of biofilm
- Maintain the performance of **Catalytic Carbon**
- Maintain the desired flow rate
- Maintain product water quality

Alternative* to OXYDES®

- STEP 1: Washing the media with 1% NaOH
- STEP 1: Rinse with H₂O
- STEP 3: Reactivation with 0.5N of H₂SO₄

*This is very conventional process and related to very high costs.

Presented by:



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