



CATALYTIC CARBON[®]

ADSORPTION AND DESORPTION MEDIA

Description of CATALYTIC CARBON[®]

- **CATALYTIC CARBON[®]** is Coconut carbon
- **CATALYTIC CARBON[®]** is tested to meet NSF 61 Standard
- **CATALYTIC CARBON[®]** is Catalyzed with Iron ("Catalytic Structure")
- Iron Catalyst has the highest Oxidation and Adsorption pores "Inside as well as Outside the Activated Carbon"
- Surface of **CATALYTIC CARBON[®]** ranging from 2000 m²/g to 2500 m²/g



Iron Particles coated inside and outside the micro-pores of **CATALYTIC CARBON[®]** eliminates the need of expensive Ion-Exchange and Membrane Process to remove contaminants such as

- Suspended Solids ≤ 1 micron
- Humic Substances (organics)
- Tannins and Lignin
- Color and Odor
- Hydrogen sulfide (H₂S)
- Chloramines
- Trihalomethanes (THMs)
- Phenols and p-nitro phenol
- All kind of Dyes
- Heavy Metals (inorganic)
- Including **Arsenate, Arsenide, Chromium, Copper, Cyanide, Fluoride, Lead, Mercury and Selenium**



Independently Tested to meet ANSI/NSF 61



CATALYTIC
CARBON[™]



FINALLY A SIMPLE AND SAFE METHOD THAT REMOVES CONTAMINANTS FROM ANY KIND OF WATER AND WASTEWATER

Removal of tannins

Includine humic acid, fulvic acid and major constituents of natural organic matters. Humic substances with chlorine produce disinfection by products such as **Trihalomethanes** (THMs). Other problems are the transport of hydrophobic organic contaminants and the bind heavy metals with them. A very big problem with organics are bacterial growth in water distribution systems by serving as food source that induce unpleasant taste and color in drinking water. **CATALYTIC CARBON[®]** from Watch Water[®] can remove tannins, humic substances and can be regenerated [adsorption] for next effective treatment process. Regeneration cycle is short and very easy.

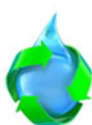
Watch Water[®] **CATALYTIC CARBON[®]** is made of coconut shells. Carbon from coconut shell is the most effective form. Activated Carbon used in **CATALYTIC CARBON[®]** systems is a Granulated Activated Carbon (GAC). Advanced Carbon technology [Catalyzed Carbon by Watch Water[®] is [highly activated] by coating a positive (+) charge which enhances the adsorption of contaminants that have negative charge. **CATALYTIC CARBON[®]** made by Watch Water[®] is an advanced Activated Carbon product designed to adsorb very high level of chloramines. Chloramines replace chlorine in the disinfection process and form Trihalomethanes (THMs) – a cancer causing substance.



How does the CATALYTIC CARBON[®] work?

CATALYTIC CARBON[®] offers better than any applied conventional method a way to remove humic substances which generates a large volume of wastewater. Using Watch Water[®] **CATALYTIC CARBON[®]** coated with iron-hydroxide, has huge capacity for humic substances, phosphates, copper and many other heavy metals (read on page one). Humic substances are negatively charged

at circumneutral pH conditions due to prevalence of carboxyl and phenol groups on their surface. Adsorption of humic substances, however is possible on surface chemistry, surface modification of activated carbon with iron-hydroxide coating that generates very strong positively charged **CATALYTIC CARBON[®]** – leading to the most favorable surface interactions between them.



Surface Chemistry

High oxygen on surface of Activated Carbon is the most important factor which influence its surface characteristics. To achieve these, the surface has to be treated in a very special way. The larger oxygen content the higher the hydrophilic character of the carbon surface. Watch Water[®] treatment gives an activated carbon a unique acid-base characteristics.

Increase of Activity

In a heterogeneous **CATALYTIC CARBON[®]**, many reactions proceed on the surface of the Catalyst. To increase the catalytic efficiency, it is essential to make the surface area as large as possible. When iron-oxide is used as catalyst it is coated from 20 to 50 nm and distributed on the porous supports with a pore structure and the largest surface area for reaction, and this increases the catalytic activity per unit weight.

System design with Watch Water[®] CATALYTIC CARBON[®]

Standard filtration rate is recommended to set at max. 40 BV/ hour to provide 90 seconds contact time (recommended minimum) to yield good results. The required filtration rate varies according to

Technical Specification

Specification	Value
Appearance	Coarse granule
Color	Dark red
Particle size	0.6 – 2.4 mm
Mesh size (US)	8 x 30
Surface area (BET)	2000 – 2500 m ² /g
Moisture Content	5 % (max.)
Ball pen hardness	98 % (min.)
Bulk density	630 – 640 kg/m ³
pH	9.5
Expected service life	2 – 5 years *
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 contaminants

the inlet water constituent. Pilot test is recommended for industrial applications, wastewater treatment and other critical waters. The table below to realize the expected water quality from different filtration rate:

Flow rate	Filtration rate	Bed contact time	CC media	Outlet water quality
1 m ³ /h	40 Bed-Volume/h*	90 seconds	25 liters	Satisfactory
	30 Bed-Volume/h**	120 seconds	33 liters	Very good
	≤ 20 Bed-Volume/h	180 seconds	50 liters	Best

*recommended max. filtration-rate, **recommended standard filtration-rate

Flow direction	Can be designed both up-flow (packed bed) and down-flow
System freeboard (down-flow)	25 – 35 %
Filtration rate	10 – 30 Bv/h (max. 40 Bv/h)
Backwash velocity	10 – 20 m/h
Bed depth	80 – 100 cm (max. 120 cm)
EBCT	≥ 90 seconds
Standard packing	60 liters (38 kg) in a drum, 18 drums on a pallet



RED-OXY TREATMENT

FILTRATION

KATALOX LIGHT
CRYSTOLITE

ADSORPTION

CATALYTIC CARBON
TITANSORB
FERROLOX

FILTERSORB

FILTERSORB SP3
SPECIAL FILTER

INSTANT PRODUCTS

ISOFT CHEMICALS
OXYDES
OXYSORB
BIOXIDE
SCALE-OVER
GREEN-ACID



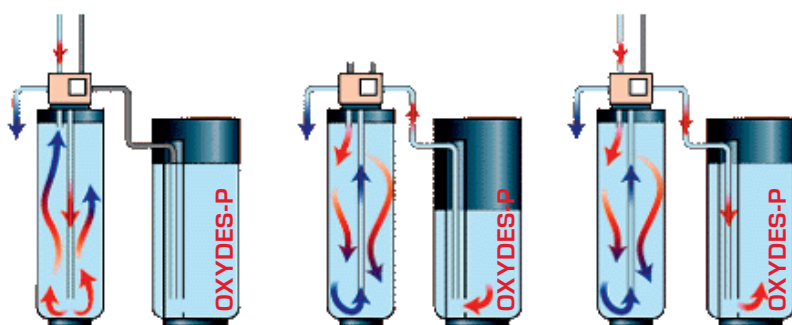
DESORPTION

Regeneration of Spent Activated Carbon

Superoxide Systems a very simple a) Brine Tank with b) Brine Wall and a control valve, same as water softener, can be used to apply this very unique technology to Regenerate contaminated **CATALYTIC CARBON**[®] and re-activate it up to 99%. Desorption and Destruction of all organics and adsorbed heavy metals can be achieved by 1% strength solution of **OXYDES-P** (Catalyzed Super Oxide). Catalyzed Super Oxide reactions are based on Fenton's like reaction which generates hydroxyl radicals ($\bullet\text{OH}$). These Hydroxyl radicals are so strong that it oxidizes all possible organics from the surface of Activated Carbon.

CATALYTIC CARBON[®] is re-activated and is like brand new Carbon the total amount of regeneration is as the following cycles:

1. Backwash – 5 minutes
2. Suction of regenerator (**OXYDES-P**) – 15 minutes
3. Fast rinse – 10 minutes
4. Back to service



1. Backwash
(5 minutes)

2. **OXYDES-P**
regeneration
(15 - 30 minutes)

3. Fast rinse
(10 minutes)

→ 4. Back to service

NOTE: The regeneration is every six month and the solution is prepared fresh just before the regeneration. **OXYDES-P** can be used for regenerating also for normal Activated Carbon media.

To know and learn more about this huge potential of On-Site-Reactivation of **CATALYTIC CARBON**[®] please contact us: