Description of CATALYTIC CARBON®

- CATALYTIC CARBON® is Coconut carbon
- CATALYTIC CARBON® is Certified by WQA to NSF/ANSI 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
FINALLY A SIMPLE AND SAFE
METHOD THAT REMOVES
CONTAMINANTS FROM ANY KIND
OF WATER AND WASTEWATER

Removal of tannins

Inclined 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.

CATALYTIC CARBON®

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 convetional 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 surafce chemistry, surface modification of
activated carbon with iron-hydroxite coating that
generates very strong positively charged CATALYTIC
CARBON® – leading to the most favorable surface
interactions between them.

Chlorine ➔ Chloramines ➔ THMs ➔ CANCER!
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 caracteristiques.

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 ey 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. Te required filtration rate viries according to the inlet water constituen. 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:

<table>
<thead>
<tr>
<th>Flow rate</th>
<th>Filtration rate</th>
<th>Bed contact time</th>
<th>CC media</th>
<th>Outlet water quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 m³/h</td>
<td>40 Bed-Volume/h*</td>
<td>90 seconds</td>
<td>25 liters</td>
<td>Satisfactory</td>
</tr>
<tr>
<td></td>
<td>30 Bed-Volume/h**</td>
<td>120 seconds</td>
<td>33 liters</td>
<td>Very good</td>
</tr>
<tr>
<td></td>
<td>≤ 20 Bed-Volume/h</td>
<td>180 seconds</td>
<td>50 liters</td>
<td>Best</td>
</tr>
</tbody>
</table>

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

Technical Specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Coarse granule</td>
</tr>
<tr>
<td>Color</td>
<td>Dark red</td>
</tr>
<tr>
<td>Particle size</td>
<td>0.6 - 2.4 mm</td>
</tr>
<tr>
<td>Mesh size (US)</td>
<td>8 x 30</td>
</tr>
<tr>
<td>Surface area (BET)</td>
<td>2000 - 2500 m²/g</td>
</tr>
<tr>
<td>Moisture Content</td>
<td>5 % [max.]</td>
</tr>
<tr>
<td>Ball pen hardness</td>
<td>98 % [min.]</td>
</tr>
<tr>
<td>Bulk density</td>
<td>630 - 640 kg/m³</td>
</tr>
<tr>
<td>pH</td>
<td>9.5</td>
</tr>
<tr>
<td>Expected service life</td>
<td>2 – 5 years *</td>
</tr>
<tr>
<td>Multiple regeneration</td>
<td>Yes **</td>
</tr>
</tbody>
</table>

* Depending on the contamination load and regeneration frequency
** CATALYTIC CARBON® can be regeneratied using OXYDES or OXYDES-P depending on the loaded contaminants
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 (•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

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