The global occurrence in water resources of Heavy metals, Radionuclides and Organic Micro pollutants such as micro plastics, Pharmaceuticals has raised concerns about potential negative effects on human health.

Activated carbon blocks (Cartridges) are the most widespread Adsorbent Filters used to remove organic pollutants up-take and very poor removal of many relatively hydrophilic micro pollutants. Furthermore, these blocks cannot be regenerated.

Insoluble structure of Titansorb-P is inexpensive and sustainable produced product. Macro surfaces of titanium is best known Adsorber for removing Heavy metals and micro pollutants from water by means of adsorption. Watch Water® has cross linked Titansorb-P with Powder Activated Carbon, providing a high-surface-area, mesoporous mixture of crosslink Carbon block rapidly sequesters (Trapp) almost 100% of Heavy metals and organic micro pollutants with constant adsorption rate.

50 to 200 times greater than those of conventional carbon blocks. In addition, the cartridge can be regenerated continuously for very long time using a UV lamp (Light) in carbon blocks with no loss in performance. Finally, the Titansorb-P outperformed a leading Activated Carbon block for rapid, flow-through water treatment.
**Introduction**

Up-to-date Titansorb is the most widely used Adsorber in the water treatment field mainly because of its high capacity, non-toxicity, low cost chemical stability and superior photoactivity over all other Adsorbers in the market. Watch Water's new media based on powder of Titansorb is called Titansorb-P, which has the highest adsorption capacity of Organics & Heavy Metals. The main drawback of the Titansorb powder: its easily lose during the process of water treatment. Therefore, Watch Water® has put great efforts to make and improve the reuse efficiency of Titansorb-P. The immobilization of Titansorb Powder (P) now has a support of Powder Activated Carbon (PAC).

Activated carbon block manufactures is based on Titansorb-P are showing increasing attention for the degradation of the following contaminants.

- Humic Acids, Fumic Acids
- All Phenolic Compounds
- Pesticides and Chlorinated Compounds
- All sort of Dyes
- Microplastic Compounds
- Antibiotics & Pharmaceutical
- Pathogenic Bacteria
- Provide a simple, highly effective heavy metal removal mechanism
- Can be used in industrial applications that require part per billion concentration like Arsenic, Uranium, radium, Lead and Chromium.

The Crosslink of both Powder Activated Carbon (PAC) and Titansorb-P posses high surface area, suitable pore structure and as a consequence, high adsorption capacity. Powdered Titansorb facilitates Photocatalysis which gives a unique advantage over normal carbon block.

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**Contaminants Removed by PAC**

- Crosslinked carbon block filters mechanically remove particles down to 0.5 microns, including Giardia and Cryptosporidium, turbidity and particulates.
- PAC/TSP (Titansorb-P), remove most of volatile organic chemicals (VOC'S), pesticides and herbicides, as well as very large amount of chlorine, chloramines, trihalomethane (THM's) compounds, Radon, Solvents and hundreds of man-made chemicals found in tap water.

**Contaminants Not Removed by Normal PAC**

- Normal Powdered Activated Carbon (PAC) does not remove sediment/ particulate material and often pretreatment by a sediment filter.
- Not successful at all to remove dissolved Inorganics, Contaminants of Heavy Metals such as Antimony, Arsenic, Asbestos, Barium, Beryllium, Cadmium, Copper, Fluoride, Mercury, Nickel, Lead, Selenium, Sulfate, Thallium and all possible Radionuclides.
- Carbon Block without Titansorb-P is used to remove some organics, chlorine, taste and odor only.
Micro-TiO₂/PAC is a Watch Water® INVENTION

Micro-TiO₂/PAC produces cleaner water without energy and no waste or concentrate like all conventional technologies like reverse osmosis or ion Exchange. Watch Water® Microtrapp changes all organics including reduction of PFAS in drinking water with this great treatment technology. Per-and Polyfluorinated substances (PFAS) are a group of Man-Made-Chemicals that persist in all water’s around the globe. These PFAS contaminants also dissolve in drinking water through using and handling of Plastic bottles.

All traditional drinking water treatment technologies are not able to remove them. Microtrapp is a method which work best to remove PFAS from drinking water. This technology can be used in drinking water system’s, hospitals, building or even at homes at the point-of-entry (POE), where water enters the home or the point-of-use (POU) such as in a kitchen sink or a shower.

Photocatalytic Oxidation; represents the most environmental friendly solution due to completely oxidize organics contaminants to carbon-dioxide, water and mineral acids hence it degrades the pollutants than transferring them back to nature. Titansorb-P is a well-known adsorber and photocatalyst degrade Organic pollutants under ultraviolet irradiation in water as well as waste water. Carbon dioxide produced from degraded Organics changes the chemistry of water, as well as the chemistry of Polluted and contaminated water.

Photodegradation of organics and adsorption of inorganics to achieve Adsorption-Desorption equilibrium using powder activated carbon as Catalyst support the increase of Photodegradation rate by progressively allowing an increased quality of substrate to come in contact with Titansorb through means of adsorption and giving a complete photodegradation process.

Selective Removal of Perfluorooctanoic Acid Using Powder Activated Carbon with Modified Titansorb-Powder.

www.watchwater.de
When Titansorb-P is irradiated with sunlight that exceeds its bandgap energy.

3.2eV for Titansorb-P with UV light.

Wavelength <38s for Titansorb-P, electron-hole pairs are created. The electron-hole pairs degrade organic pollutants on the catalyst surface either directly or indirectly in a water solution creating Hydroxyl and SUPEROXIDE RADICALS.

All the Titansorb-P particles are larger than the Powder Activated Carbon to avoid any blockage of the pores of activated carbon thus increasing the adsorption capacity of the crosslink PAC/Titansorb-P.

For drinking water a considerable attention has been served on the safety and efficiency of all water treatment technologies. All conventional water treatment processes such as Ozonolysis and chlorination create disinfection by-products (DBPs) such as Bromate and Trihalomethanes respectively, which have health risks as well as the risk of cancer. In order to avoid such problems, Watch Water® has focused on Advanced Oxidation Processes and one of them is Photocatalysis, using Titansorb-P and Powdered Activated Carbon.

The phytochemicals transformation of a molecule into lower molecular weight fragments, usually in an Oxidation process.

Catalytic reaction involving UV light absorption by a Catalyst or by a substrate.

Titansorb-P is the most effective due to its high photocatalytic activity, chemical stability, nontoxic nature and its highest adsorption capacity.