

GRANULAR ACTIVATED CARBON REMOVES 1, 2, 3 - TCP

Pure Water. Clean Air. Better World.



What is 1, 2, 3 - TCP?

1, 2, 3 - TCP is a man-made, colorless, chlorinated hydrocarbon that is used as a degreasing and cleaning agent and industrial solvent. It was also used as a chemical in pesticides for low growing crops such as potatoes, tobacco, and beets. 1, 2, 3 - TCP passes through soil and leaches into ground water, contaminating drinking water sources. 1, 2, 3 - TCP is a non-aqueous liquid that is more dense than water, making it difficult to remove from ground water wells. This compound is currently unregulated by the USEPA, although it is on the Contaminant Candidate List 4 (CCL4) for future regulation.

Harmful Effects: 1, 2, 3 - TCP is a known genotoxic carcinogen, or cancer causing agent, that can also cause liver and kidney failure. Exposure can occur through ingestion, inhalation, and contact with the skin.

Treatment: Granular Activated Carbon (GAC) removes 1, 2, 3 - TCP and is considered by the EPA as a recommended available treatment technology. Comparative experimental data show that reagglomerated, bituminous coal-based GAC is the most effective choice for treating TCP contaminated ground water that is under the influence of TOC.

Economics: The monthly cost for a family of four to treat contaminated groundwater with GAC is around \$2 a month. A modestly sized city with a five-day water interruption could face costs exceeding \$50 million. Considering the potential economic losses resulting from a "do not drink" announcement, GAC is an extremely inexpensive solution that protects drinking water sources from a variety of potential contaminants.

Domestic Advantage: Domestically manufactured, reagglomerated GAC produced from bituminous coal that is mined in the United States of America has been shown to have superior performance in groundwater treatment applications versus direct activated GAC that is typically manufactured overseas.

Reactivation: Another benefit of using GAC for removal of 1, 2, 3 - TCP from groundwater, is the ability to recycle and reuse the GAC. GAC that is exhausted can be removed and transported backed to an NSF certified potable reactivation facility. The carbon is segregated from other carbons so it can be returned to the original water treatment facility once reactivated. The carbon is reactivated using a thermal process to remove the adsorbed contaminants from the structure of the carbon. Roughly 15% virgin GAC is added to make up for the losses during reactivation. The final custom product is returned to the source municipality. In essence, a municipality has the ability to recycle and reuse its own carbon at a fraction of the price of virgin GAC with minimal sacrifice in performance.

1, 2, 3 - Trichloropropane (1, 2, 3 - TCP)

The use of domestic reagglomerated bituminous coal-based GAC not only removes 1, 2, 3 - TCP from groundwater, but also removes Perfluorinated Compounds (PFCs), Total Organic Compounds, Disinfection By-Products and other Carcinogenic Volatile Organic Compounds (cVOC) such as Tetrachloroethylene (PCE) and Trichloroethylene (TCE).

Calgon Carbon provides financing options in affordable monthly installments through its "Potable Water Service" program to help utilities finance GAC and GAC equipment.

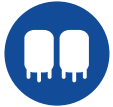
GAC

The Solution

Calgon Carbon Corporation is the only company that offers ALL of the following:



Domestic manufacturing of virgin, reagglomerated, bituminous coal-based GAC



Domestic ASME Code Equipment Manufacturing



Dedicated NSF Potable Reactivation Facilities



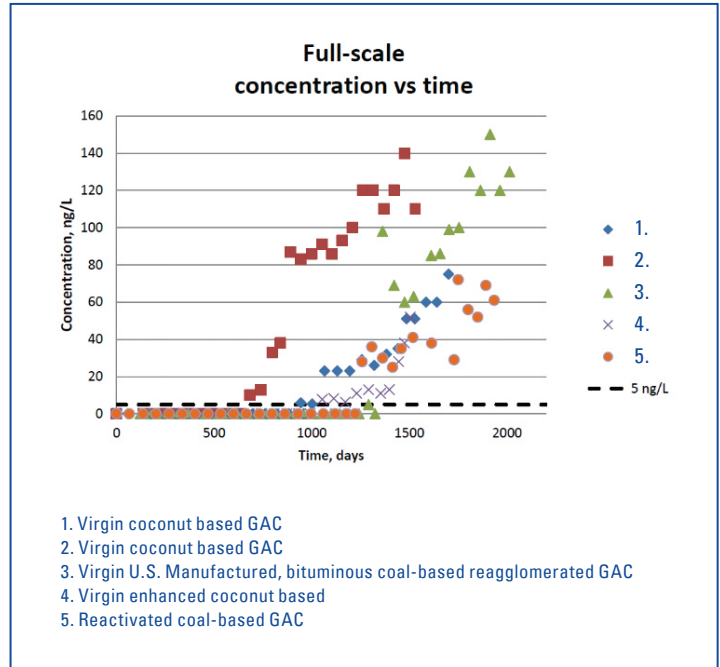
Dedicated Field Service



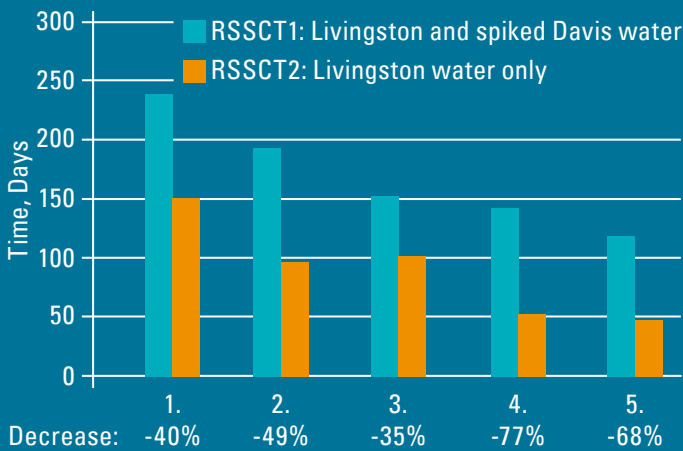
Research and Innovation Center



Financing Capabilities



Breakthrough comparison



1. Virgin U.S. Manufactured, bituminous coal-based reagglomerated GAC
2. Reactivated coal-based GAC
3. Virgin Enhanced coconut based GAC
4. Virgin coconut based GAC
5. Virgin coconut based GAC

First RSSCT 5 ng/L breakthrough

	Small column, days	Full scale, days	Bed volumes treated
1.	26.5	242	85,537
2.	20.6	188	72,792
3.	16.7	153	57,621
4.	15.5	141	55,514
5.	11.7	107	37,182

1. Virgin U.S. Manufactured, bituminous coal-based reagglomerated GAC
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3. Virgin Enhanced coconut based GAC
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5. Virgin coconut based GAC

Reference: Mital, J. (2013). Granular Activated Carbon Treatment of 1,2,3-Trichloropropane (master's thesis).