# PFOA-APPLICATION BULLETIN

## *Media, Systems, Equipment and Services for PFOA Water Purification*

Perfluorooctanoic Acid (PFOA) is an emerging contaminant identified by the EPA as a material requiring monitoring and prevention of accumulation in the environment. This is because it is persistent, found at very low levels and has demonstrated developmental and other adverse effects in laboratory animals.

In 2009 EPA's Office of Water (OW) developed Provisional Health Advisories (PHA) for PFOA to protect against potential risk from exposure to this chemical through drinking water. The PHA value is 0.4 µg/L for PFOA. While this standard is not legally enforceable, proactive agencies and departments as well as municipalities have sought to control PFOA to low levels. One example of such a case is from a Mid-Atlantic city municipal commission that performed lab testing where wells were shown to contain from 0.094 to 0.44 ppb PFOA. Since this was higher than the provisional health advisory the wells were taken offline until a suitable solution could permit their use. This concentration range is common experience with municipal water treatment applications, as the concentration of PFOA is present at levels usually below 5 ppb.

Testing has been done with various technologies to look for cost-effective solutions for reduction of PFOA in groundwater and drinking water. Activated carbon has been shown to be an effective solution to reaching treatment goals and doing so with favorable surface loadings to warrant the technology. While ongoing evaluation of other technology occurs, activated carbon has become an accepted solution for this problem.

Historically coconut carbon has been acknowledged as a superior product for loading of weakly adsorbed species in water. In fact a coal-carbon product was manufactured to act like a coconut carbon for trace removal applications. This was seen in applications such as MTBE removal from water. At that time, market prices for coconut carbon exceeded common coal-based carbon products. However, much has changed in the past 10 years and currently the higher activity coconut products are found to be less expensive than high activity coal based carbons.

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***Purifying Air & Water***

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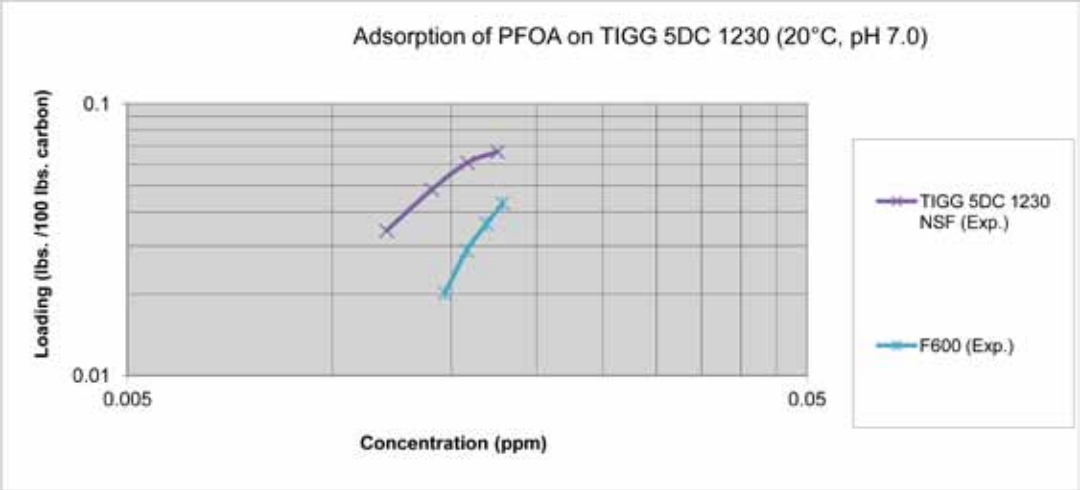
It was found that others had published information on comparison of coconut and coal-based (agglomerated bituminous) carbons (see attached information).

However, information was scant for loadings at less than 20 ppb. TIGG commissioned a study to conduct isotherm testing and comparing carbons which were commonly available for this testing. Results are shown the figure below comparing TIGG 5DC 1230 and F600 in the testing at low concentration:




Typical contact times for the application are consistent with municipal drinking water design with 10 minutes empty-bed contact time (EBCT) being suitable. This residence time will help accommodate the diffusion of this rather large molecule and anticipates the expected long mass transfer zones in this application, in spite of expected low consumption rate of activated carbon. While testing is often done at pH 7, the user should beware that higher pH will lead to lower than expected capacity as the dissociation constant for this material at common treatment conditions suggests better adsorption at lower pH. Furthermore, one should also consider, as always, background competing organics in capacity projections.

Overall, cost effective applications should be possible using CANSORB preengineered adsorbers utilizing TIGG 5DC 1230 virgin coconut carbon, utilizing the above design criteria and achieving better than PHA recommended effluent qualities.