PFAS TREATMENT WITH GRANULAR ACTIVATED CARBON – USING RAPID SMALL-SCALE COLUMN TESTS TO PREDICT FULL-SCALE PERFORMANCE

Using granular activated carbon (GAC) to remove perfluoroalkyl substances (PFAS) from water is a widely applicable, cost-effective, reliable treatment method. GAC can serve as a stand-alone process or be combined with other treatment technologies. A growing use is pre-treatment ahead of other, more advanced technologies. For example, it can be used by itself to remediate water from soil washing, or as an additional step to enhance the performance of a treatment system including other (less effective) processes. GAC is seen as the 'base-line' for PFAS treatment, and new PFAS treatment methods are often measured against activated carbon performance. The key advantages and limitations of PFAS removal with GAC are listed below:

Advantages:

- Applicable at different scales (household to industrial)
- Efficiency PFOS removal of > 99%
- Effective at low concentrations
- Reactivation of activated carbon
- Proven, well understood method

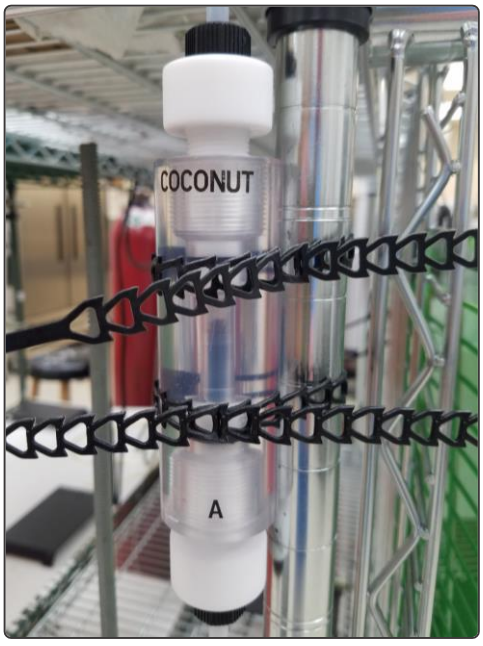
Limitations:

- Not as effective for short-chain PFAS and precursors as for longer chain PFAS.
- Competition of PFAS with other constituents
- Reactivation Costs

Because soil properties and remediation goals vary per case, rapid small-scale column tests (RSSCT) should be done prior to remediation. With these tests applicability of activated carbon can be determined, and the most suitable activated carbon can be selected. Additionally life-cycle costs can be analyzed.

Design of the test (materials, scale of the test, etc.) is highly dependent on the target contaminant and the goal of the tests. The designs should not be interfering with the test and expertise is needed to make sure the tests give the most reliable results. Arcadis has multiple experts who worked on PFAS RSSCT all over the world. We executed these tests for multiple clients in amongst others the USA, Germany and the Netherlands. The remediation can be tested using RSSCT, but exact procedures for these tests are dependent on national standards and regulations and on the task at hand.

Many people within Arcadis have employed RSSCTs to evaluate GAC performance, for clients all over the world. Several Arcadians with RSSCT experience are identified below.



Typical RSSCT apparatus
(source: Engineering Performance Solutions, USA)

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