



NORIT
ACTIVATED CARBON

Water Treatment Services

PFAS

HYDRODARCO® 4000 and NORIT® GAC 400

Activated Carbons demonstrate superior adsorption of PFOA and PFOS in water.

Benefits

- Enables the removal of PFOA and PFOS from ground and surface water to non-detectable levels
- Resists interference from Total Organic Carbon (TOC) for enhanced performance
- Demonstrates performance superior to coconut-based carbons
- Lowers operating costs by enabling the treatment of more bed volumes of water before change-out due to higher performance

Challenge & Solution

Per- and polyfluoroalkyl substances (PFAS) are a group of over 12,000 man-made chemicals that have been used in various industries since the 1940s. These chemicals are known for their resistance to heat, water, and oil, which makes them useful in many applications, including non-stick cookware, water-repellent clothing, and firefighting foams. However, their persistence in the environment and in the human body has raised significant health concerns.

Some of the main risks associated with consuming PFAS are cancer, hormonal disruption, immune system effects, cholesterol levels, liver damage, development issues, thyroid disease, and other health issues. Given these risks, regulatory agencies like the U.S. Environmental Protection Agency (EPA) and the European Food Safety Authority (EFSA) are actively working to establish guidelines and limits for PFAS in drinking water, food, and other consumer products to reduce exposure and protect public health.

When compared to coconut-based carbons in surface water and groundwater, actual third-party case studies¹ and our R&D studies found that HYDRODARCO 4000 and NORIT GAC 400 activated carbons demonstrated superior performance in the removal of PFAS molecules.

Unlike other types of granulated activated carbon (GAC), both our lignite and reagglomerated bituminous activated carbons resisted interference from Total Organic Carbon (TOC) that reduce the carbon's adsorptive capacity for contaminants like PFOA and PFOS. In other studies involving groundwater with low TOC, the performance of our activated carbons was also superior to other coal-based and coconut-based carbons.



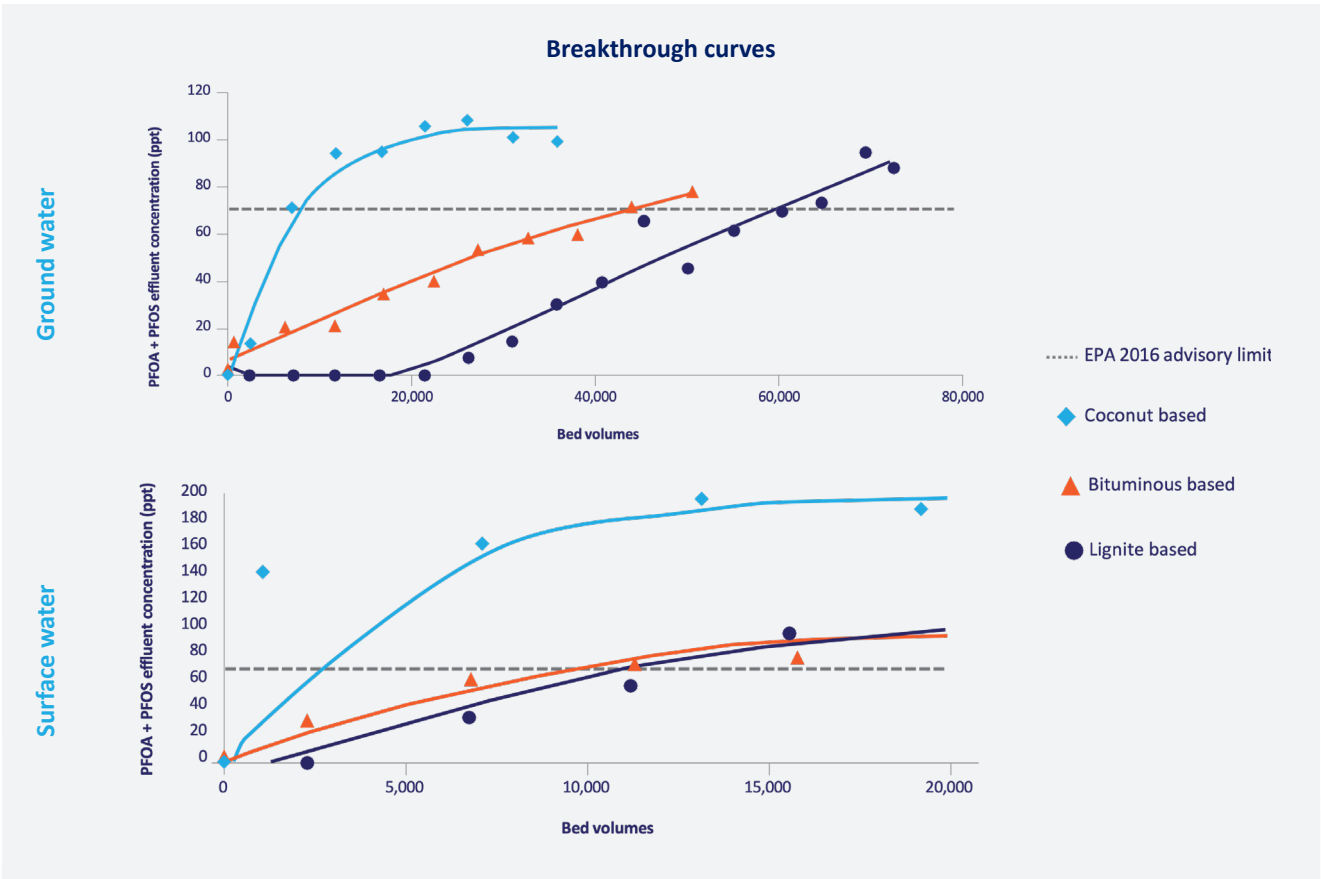
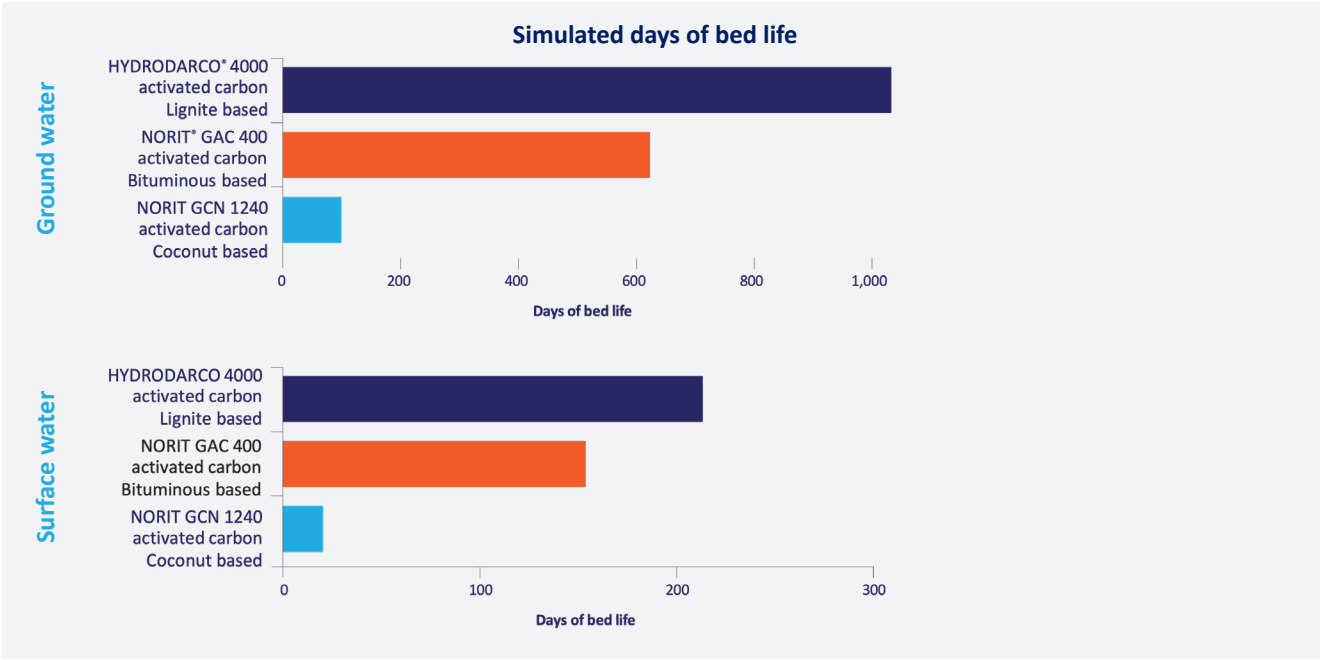
Small scale column tests for surface and groundwater were conducted with different activated carbons. Test water samples contained the following TOC concentrations and PFOA/PFOS influent concentrations:

- Groundwater – TOC Concentration of 0.8 ppm
- Surface Water – TOC Concentration of 7.4 ppm
- PFOA + PFOS Influent Concentration of 209 ppt

1. Dr. Detlef Knappe, Department of Civil, Construction, and Environmental Engineering, North Carolina State University, 2017

HYDRODARCO® 4000 and NORIT® GAC 400

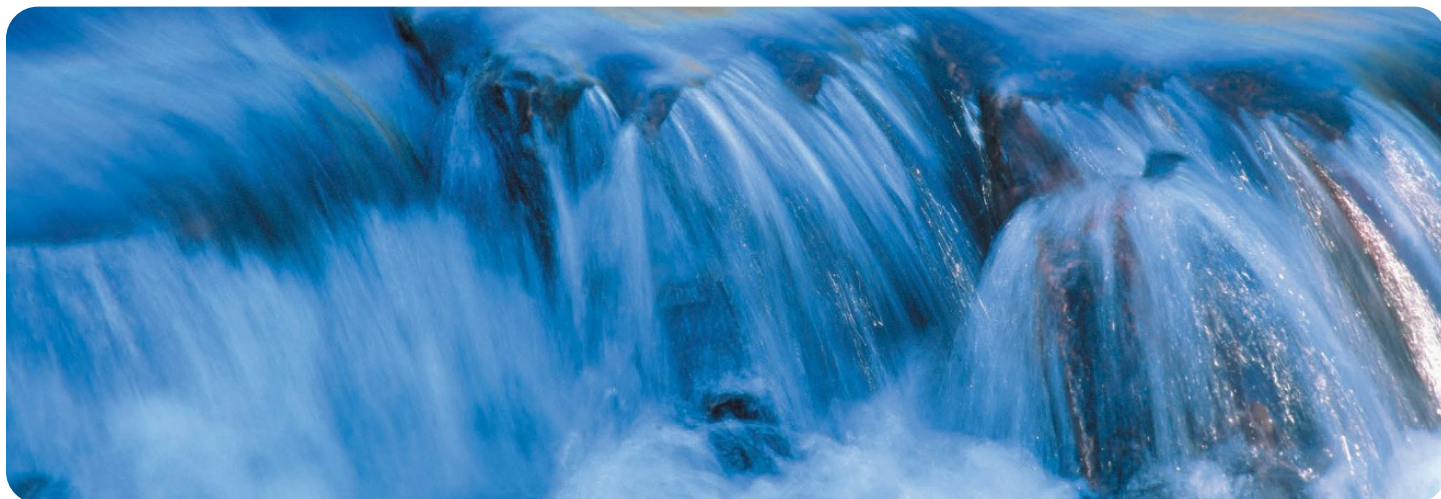
Test results are provided in the following tables.



Our NORIT® Activated Carbon Selection Guide

Our technical experts will consider your unique water source to help you choose the right activated carbon for your application. In most cases, HYDRODARCO® 4000, NORIT GAC 400 PLUS (acid washed), and NORIT GAC 400 (unwashed) activated carbons offer an excellent combination of high porosity and a large quantity of adsorption sites for PFAS with resiliency to background organics. These products are NSF certified and used in many drinking water applications worldwide.

Performance	HYDRODARCO 4000 Activated Carbon	NORIT GAC 400 Activated Carbon	NORIT GAC 400 PLUS Activated Carbon	NORIT GCN 1240 Activated Carbon
High PFAS Concentration	++++	+++	+++	+
Performance in High Organics >1 ppm	++++	+++	+++	-
Performance in Low Organics <1 ppm	++++	++++	++++	++
Characteristics				
Raw Material	Lignite Coal	Bituminous Coal	Bituminous Coal	Coconut
Mesh Size	12 x 40	12 x 40	12 x 40	12 x 40
Washing	Acid Washed	Unwashed	Acid Washed	Unwashed



NORIT® Activated Carbon Purification for Living



**Helping our
customers meet
their specific
purification
needs**

Building on our greater than 100-year history of innovation in manufacturing and product development, NORIT Activated Carbon is the world's most experienced and one of the largest producers of activated carbon.

Our products are used to remove pollutants, contaminants, and/or other impurities from water, air, food and beverages, pharmaceutical products, and other liquids and gases in an efficient and cost-effective manner.

In addition to our unparalleled product portfolio, we offer a full range of activated carbon services including rental systems, carbon reactivation, bulk delivery and change-out, some types of carbon evaluation, as well as technical service and support to help our customers meet their specific purification needs.

We provide our customers with a worldwide network of sales and service support. In fact, we manufacture activated carbon and reactivate carbon in multiple plants around the world. So whether you have one operation or many facilities around the globe, we have you covered.

NORIT

ACTIVATED CARBON



Our sales, technical service, and customer service teams are well prepared to serve customers around the world.

www.norit.com



EMEA REGIONAL OFFICE

Norit Nederland B.V.
Astronaut 34
3824 MJ Amersfoort
THE NETHERLANDS
T +31 33 464 8911
E info.emea@norit.com

AMERICAS REGIONAL OFFICE

Norit Americas, Inc.
3200 University Avenue
Marshall, Texas 75670
USA
T +1 903 923 1000
E info.americas@norit.com

ASIA/PACIFIC REGIONAL OFFICE

Norit Singapore Pte. Ltd.
101 Thomson Road
United Square #16-04
Singapore 307591
Singapore
T +65 6631 9386
E info.ap@norit.com

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