Activated Carbon

D Direct Use Chemical

C (solid)

Source of Raw Material:
Naturally occurring coal, lignite, and organic plant matter

% of Total Domestic Consumption Attributed to Water Sector:
39%

Product Family:
Carbon

CAS No.: 64365-11-3

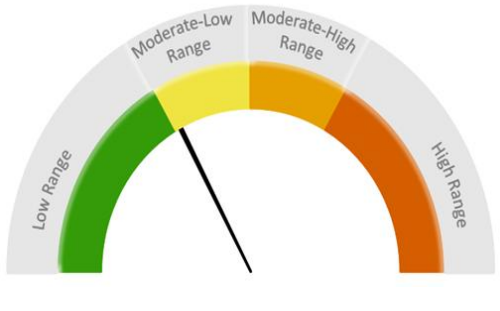
Derivative Water Treatment Chemicals:
None

Understanding Chemical Supply Chains

Shelf Life:
60+ Months

RISK OF SUPPLY DISRUPTION (Assessed in 2025)

RISK RATING: Moderate-Low



RISK DRIVERS

Use of activated carbon in water treatment is the leading domestic use. Increases or decreases in demand for activated carbon may periodically impact the availability and price, however activated carbon resources are abundant.

RISK PARAMETERS

Criticality: High. Used to remove a wide range of contaminants including VOCs, PFAS, and algal toxins.

Likelihood: Moderate-Low. While there were no shortages identified between 2005 and 2025, it is uncertain if manufacturing capacity is adequate to meet increased demand due to PFAS treatment.

Vulnerability: Low. Domestic production and raw materials are abundant. However, PFAS regulations may change dynamics of reactivation services.

PRODUCTION PROCESS

Mining/Harvesting → Activated Carbon

Water Treatment Applications

- Adsorption of organic compounds
- Removal of PFAS and other contaminants

Other Applications

- Air and vapor applications
- Precious metal recovery
- Food and beverage industry
- Solvent recovery in industrial applications

Input | End Use

DOMESTIC PRODUCTION AND CONSUMPTION, AND INTERNATIONAL TRADE

Domestic Production Locations (2025):
16, widely distributed across 13 states.

International Trade (2024)
Primary Trading Partner (Imports): India
Primary Trading Partner (Exports): Belgium

Product Description

Activated carbon is created from organic materials with high carbon contents and is used to remove contaminants from air and water through adsorption. The most common domestic uses are in water treatment, air purification, and food processing. Activated carbon is sold in three basic forms: powdered, granular, and pelletized.

Use in Water Treatment

Activated carbon is commonly used to adsorb natural organic compounds, taste and odor compounds, and synthetic organic chemicals, including per- and polyfluoroalkyl substances (PFAS), in drinking water treatment systems. The two forms of activated carbon most commonly used in water treatment are granular activated carbon (GAC) and powdered activated carbon (PAC) (EPA, 2018).

Use as a Precursor to Other Water Treatment Chemicals

Activated carbon is not used to manufacture other water treatment chemicals.

Other Applications

Activated carbon is also used in air and vapor applications, precious metal recovery, food and beverage processing, and pharmaceuticals. The primary use for activated carbon is in the separation of small concentrations of chemical species from liquid and gas streams. Because activated carbon has a low affinity for water but strongly adsorbs organic and sulfur-containing chemicals, it is widely used to remove undesirable tastes and odors from drinking water and to eliminate contaminants from industrial wastewater. In the processing of foods (e.g., sugar, corn syrup, and vegetable oils), pharmaceuticals, and alcoholic beverages, activated carbon is used to remove unwanted color and impurities. Chemical process industries use activated carbon for solvent recovery. Applications of activated carbon in gas-phase systems include air purification, automobile emissions reduction, and solvent vapor recovery (USITC, 2023).

Primary Industrial Consumers

In 2023, water treatment, including remediation, drinking water, wastewater, and process/industrial water, was the primary use of activated carbon in North America at approximately 38.9% of the market. Air purification is also a large percentage of the market share, with food and beverage processing, pharmaceutical and medical, and automotive consuming a smaller percentage (Grand View Research, 2025).

Manufacturing, Transport, & Storage

Manufacturing Process

Activated carbon can be made from a variety of raw materials, including coconut shells, wood, coal, and petroleum coke. These raw materials are selected based on their carbon content, density, and availability. The largest producers of these raw materials include Indonesia, the Philippines, and India (coconut shells); China, India, Indonesia, and the U.S. (coal); and the U.S., India, China, Brazil, and Canada (wood) (FAO, 2025; World Population Review, 2025; Maps of World, 2025).

The first step in the activated carbon manufacturing process is carbonization, where the raw material is subjected to a high-temperature treatment in an oxygen-free environment. Next, the material goes through either a physical or chemical activation process, which results in a highly porous structure and large surface area. The material is then washed, screened, washed again with an acid solution, and exposed to steam at high temperatures. Lastly, the material is dried, then packaged into containers for transport (AGICO Group, 2025).

Spent activated carbon can be thermally reactivated and reused. Heating spent carbon to the level required to remove PFAS from drinking water will likely reduce the number of cycles that the carbon can be reactivated before the carbon becomes overly degraded. It is estimated that carbon can be cycled five to six times under standard reactivation conditions compared to two to three times at the higher temperature required to remove PFAS of approximately 1750 °F (Carbon Activated, 2024).

Product Transport

Activated carbon is commonly transported by rail, truck, and waterway. Aluminum or steel tanker trucks are recommended when transported by truck (ACPA, 2025).

Storage and Shelf Life

Activated carbon is stable and can be stored for many years in its shipping container or package if protected from contaminating vapors and liquids. It should be stored away from sources of moisture and away from solvents and oxidants. Incompatible materials to be avoided include liquid oxygen, ozone, and powerful oxidants which can lead to rapid combustion. Air-tight containers are recommended for storage to minimize moisture uptake and adsorption of airborne molecules (ACPA, 2025). Formation of coal-based activated carbon dust should be prevented to protect against fire or explosion. Activated carbon has an almost indefinite shelf life if stored properly in airtight containers. Improper storage can lead to loss of efficacy, the severity of which would be dependent on the moisture and contaminant levels to which it is exposed.

Domestic Production & Consumption

Domestic Production

Production data was collected from the U.S. International Trade Commission (USITC) investigation of activated carbon (Publication 5474), while trade data was collected from the USITC Dataweb, as shown in Table 1. Both production and trade data are specific to activated carbon.

Table 1. Activated Carbon Production and Trade Data Sources

Production and Trade Data			
Category	**Data Source**	**Identifier**	**Description**
Domestic Production	U.S. International Trade Commission	CAS No.: 64365-11-3	Activated Carbon
Imports and Exports	U.S. International Trade Commission	HS Code: 3802.10	Activated Carbon

Total domestic production of activated carbon was approximately 163 million kilograms (M kg) in 2017 (USITC, 2023). More recent domestic production data is not publicly available, but marketing trends indicate the activated carbon manufacturing industry has grown gradually from 2020 to 2025 to support ongoing demand for activated carbon applications in environmental protection activities (IBISWorld, 2025).

Domestic commercial production takes place at approximately 16 facilities, not including regeneration sites, which are owned by six companies. It should be noted that activated carbon for drinking water treatment must comply with NSF/ANSI/CAN 61, and not all facilities produce that grade of product. While the highest concentration of manufacturing facilities is in the Southeast U.S., the facilities are located across 13 states. The top two domestic manufacturers, Ingevity and Calgon Carbon (owned by Kururay), own 10 of the 16 facilities and account for approximately 35% of industry revenue (IBISWorld, 2025). In 2023, ADA Carbon announced a $251 million expansion of a facility to convert coal waste to GAC (Grand View Research, 2025).

Domestic Consumption

U.S. consumption of activated carbon in 2017 is estimated at 192 M kg. This estimate includes production of 163 M kg, import of 94 M kg, minus export of 65 M kg (USITC, 2023; USITC, 2025b), as shown in Figure 1. National consumption comprises most of the domestically produced activated carbon and reactivated carbon, which reduces the demand for virgin activated carbon. EPA estimates that 8% of public water systems will need to take steps to comply with the maximum contaminant levels (MCLs) established in the Final PFAS National Primary Drinking Water Regulation, and 52-89% of those public water systems (PWSs) will install treatment and use GAC (EPA, 2024a). Although largely dependent on raw water quality, it is estimated that, on average, utilities using GAC for PFAS treatment will use 29,000 pounds per year (lb/year) of GAC per million gallons of treated water (EPA, 2024b). Following the initial GAC delivery, it is assumed that 70-90% of the demand can be fulfilled using regenerated GAC (20,300 – 26,100 lb/year/MG), while the remaining 10-30% will require replacement with virgin media (2,900 – 8,700 lb/year/MG).

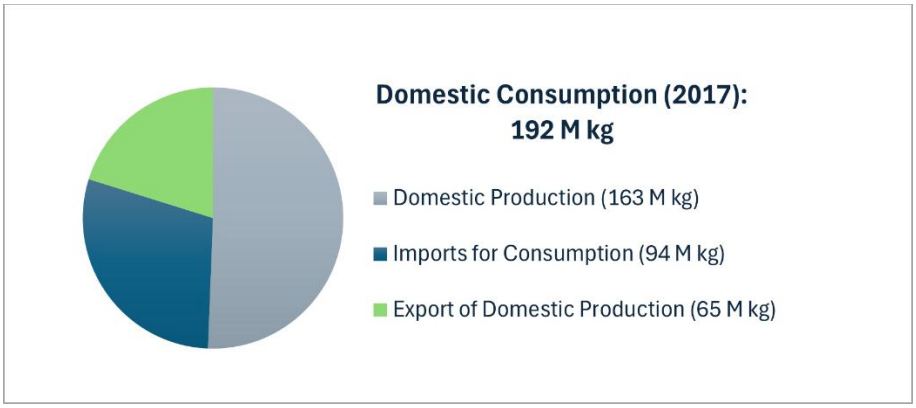


Figure 1. Domestic Production and Consumption of Activated Carbon in 2017

Trade &Tariffs

Worldwide Trade

Worldwide import and export data for activated carbon are reported through the World Bank's World Integrated Trade Solutions (WITS) software, as a category encompassing all activated carbon. In 2023, the U.S. ranked second worldwide in total exports and first in total imports of activated carbon. In 2023, China ranked first worldwide in total exports (WITS, 2025), as shown in Table 2.

Table 2. WITS Worldwide Export and Import of Activated Carbon in 2023

2023 Worldwide Trade Activated Carbon (HS Code 3802.10)			
Top 5 Worldwide Exporters		Top 5 Worldwide Importers	
China	302 M kg	**United States**	**85 M kg**
United States	*	Germany	82 M kg
India	142 M kg	Japan	81 M kg
Philippines	63 M kg	South Korea	68 M kg
Germany	54 M kg	Honduras	58 M kg

* Value not provided, but U.S. listed as second highest exporter based on trade value.

Domestic Imports and Exports

Domestic import and export data are reported by USITC in categories specific to activated carbon. Figure 2 summarizes imports for consumption[1] and domestic exports[2] of activated carbon between 2019 and 2024. During this period, the overall quantity of exports and imports remained relatively steady, with the volume of imports larger than the volume of exports. Over this five-year period, Belgium was the primary recipient of domestic exports while India was the primary source of imports (USITC, 2025b).

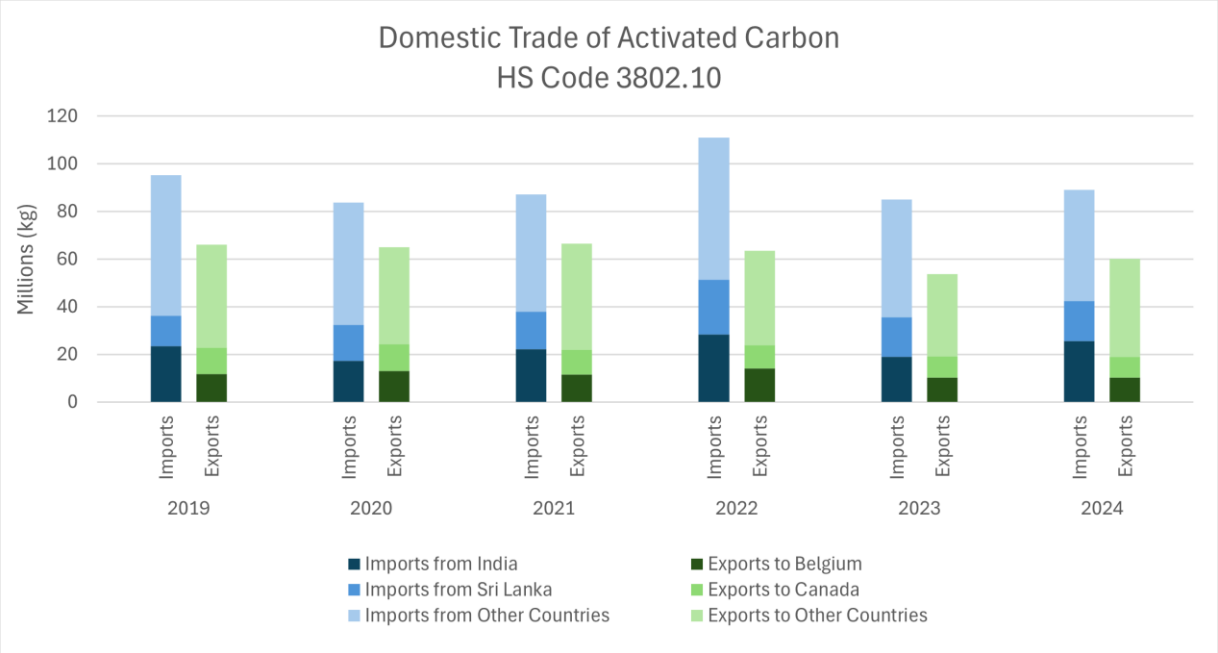


Figure 2. USITC Domestic Import and Export of Activated Carbon between 2019 and 2024

Tariffs

Imports of activated carbon are primarily supplied from India. Per the USITC Harmonized Tariff Schedule (HTS), there is a general duty of 4.8% for the import of activated carbon and an additional 20% duty on imports from China (USITC, 2025a), as summarized in Table 3. Note that the USITC HTS provides the base tariff rates but may not display the current tariff rate in effect due to recent trade agreements, special programs, or executive actions.

Table 3. 2025 Domestic Tariff Schedule for Activated Carbon

HTS Code	General Duty	Additional Duty – China (Section 301 Tariff List)	Special Duty
3802.10	4.8%	20%	Free (A, AU, BH, CA, CL, CO, D, E, IL, JO, KR, MA, MX, OM, P, PE, S, SG)

Source: USITC, 2025a. Data may not reflect the current tariff rate due to modifications from trade agreements, special programs, or executive actions.

[1] Imports for consumption are a subset of general imports, representing the total amount cleared through customs and entering consumption channels, not anticipated to be reshipped to foreign points, but may include some reexports.
[2] Domestic exports are a subset of total exports, representing export of domestic merchandise which are produced or manufactured in the U.S. and commodities of foreign origin which have been changed in the U.S.

Market History & Risk Evaluation

History of Shortages

The most significant current domestic use of activated carbon is for water treatment and air purification. These applications account for the consumption of most domestically produced activated carbon. Increases or decreases in demand from the water treatment and air purification industries may periodically impact the availability and price of activated carbon; however, activated carbon resources remain stable and there were no identified activated carbon supply chain disruptions between 2005 and 2025.

Risk Evaluation

The complete risk assessment methodology is described in *Understanding Water Treatment Chemical Supply Chains and the Risk of Disruptions* (EPA, 2022). The risk rating is calculated as the product of the following three risk parameters:

Risk = Criticality x Likelihood x Vulnerability	
Criticality	Measure of the importance of a chemical to the water sector
Likelihood	Measure of the probability that the chemical will experience a supply disruption in the future, which is estimated based on past occurrence of supply disruptions
Vulnerability	Measure of the market dynamics that make a chemical market more or less resilient to supply disruptions

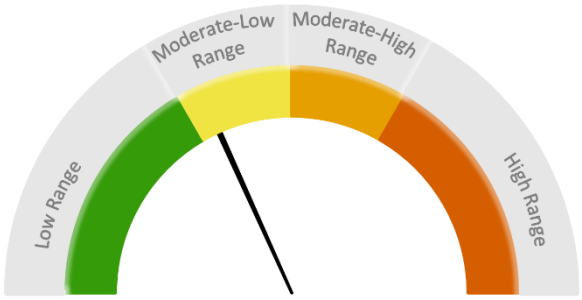
The individual parameter rating is based on evaluation of one or more attributes of the chemical or its supply chain. The ratings and drivers for these three risk parameters are shown below in Table 4.

Table 4. Supply Chain Risk Evaluation for Activated Carbon

Risk Parameter Ratings and Drivers

Criticality: High	Likelihood: Moderate-Low	Vulnerability: Low
Used in water treatment to remove a wide range of contaminants including VOCs and SVOCs, taste and odor causing compounds, and algal toxins. Activated carbon is most used intermittently in response to a change in influent water quality.	While no shortages were identified between 2005 and 2025, EPA estimates that 8% of PWSs will need to take action to meet requirements in the Final PFAS NPDWR, and 52-89% of those will install treatment and use GAC. However, there are uncertainties associated with potential NPDWR rule changes, which could lower demand, and the projections of the adequacy of activated carbon manufacturing to meet additional demand are highly sensitive to assumptions.	There is a robust and diverse domestic and international manufacturing base for activated carbon products, and the raw materials needed are abundant. However, PFAS regulations may change the dynamics of reactivation services, which will require an adjustment period.

Risk Rating: Moderate-Low



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