



CARBOCHEM

DELIVERING GLOBAL VALUE

INNOVATION | OPTIMIZATION | SUSTAINABILITY

ACTIVATED CARBON

Activated carbon can be produced from a variety of carbonaceous raw materials, such as coal, coconut shells, wood and lignite. The intrinsic properties of the carbon are dependent on the raw material source. The unique pore structure of carbon produces a very large surface area: 1 lb. of carbon typically contains a surface area of 125 acres (1 kg. = 1,000,000 sq. m.).

The carbon surface is non-polar which results in an affinity for non-polar adsorbates such as organic compounds. Adsorption is a surface process in which an adsorbate is held onto the surface of the carbon by short-range London dispersion forces and saturation is represented by an equilibrium point. These forces are physical in nature, which means that the process is reversible (using heat, pressure, etc.). Carbon is also capable of chemisorption, whereby a chemical reaction occurs at the carbon interface, changing the state of the adsorbate (dechlorination is an example of a chemisorption process).

PARAMETERS INFLUENCING ADSORPTION PROPERTIES



CAPACITY VS. KINETIC (RATE)

(a) Capacity parameters determine loading characteristics of carbon and the service life. Maximum adsorption capacity of carbon is achieved at equilibrium.

(b) Kinetic parameters only determine the rate of adsorption and have a negligible effect on adsorption capacity.



SURFACE AREA

Adsorption capacity is proportional to surface area which is determined by degree of activation.



PORE SIZE

Correct pore size distribution is necessary to facilitate the adsorption process by providing adsorption sites and the appropriate channels to transport the adsorbate.



PARTICLE SIZE

Smaller particles provide quicker rates of adsorption.

Note: Total surface area is determined by degree of activation and pore structure and not particle size.



TEMPERATURE

Lower temperatures increase adsorption capacity except in the case of viscous liquids



CONCENTRATION OF ADSORBATE

Adsorption capacity is proportional to concentration of adsorbate.



pH

Adsorption capacity increases under pH conditions which decrease the solubility of the adsorbate (normally lower pH).



CONTACT TIME

Sufficient contact time is required to maximize adsorption capacity.



TYPES OF CARBON

PROPERTY	COCONUT	COAL	LIGNITE	WOOD (PAC)
Micropore	High	High	Medium	Low
Macropore	Low	Medium	High	High
Hardness	High	High	Low	N/A
Ash	5%	10%	20%	5%
Water Soluble Ash	Medium	Low	High	Low
Dust	Low	Medium	High	N/A
Reactivation	Good	Good	Poor	None
Apparent Density	0.48 g/cc	0.48 g/cc	0.3 g/cc	0.35 g/cc
Iodine No.	1100	1000	600	1000

TYPICAL PROPERTIES OF CARBOCHEM® GRADES

GRADE	A.D.	IODINE NO.	MESH	APPLICATION
CA-50	0.30	1020	-325	Decolorizing
DC-40	0.48	1050	12 x 40	Decolorizing
DC-50	0.48	1050	12 x 40	Acid Washed
GS-75	0.44	1150	4 mm	Solvent Recovery
LQ-900S	0.50	950	8 x 30	Water Treatment
LQ-1240	0.50	950	12 x 40	Water Treatment
PC-900	0.35	1000	-325	Food Processing
PS-HD	0.50	1100	12 x 30	PSA
P-1000	0.60	1000	-325	PAH



CARBOCHEM® ACTIVATED CARBON

Carbochem offers a complete range of activated carbon (pellets, granular, powder) based on bituminous coal, coconut shells, and wood.

Carbochem® Carbon has been certified and approved for the following QC standards: ISO 9001, ANSI/NSF Standards 61, 42 and 372, Food Chemicals Codex, National Organic Program established by the USDA, Kosher and Halal. In addition, Carbochem Manufacturing facilities have been registered under the Bioterrorism Regulation as required by the U.S. FDA.

ION EXCHANGE RESINS

Ion exchange resins are prepared from synthetic polymers such as styrene – divinylbenzene copolymers that have been sulfonated to form cation exchangers or aminated to form anion exchangers. Carbochem offers a full line of Ion Exchange Resins (cation, anion, mixed bed, adsorption resins and selectives) for applications in household and industrial water softening, boiler feed water, food and beverage, sugar processing, electronics, and wastewater treatment. IonPlus™ resins are produced under ISO 9001 certification and can be tailor made to meet a customer's requirements. Several of the IonPlus™ resins are certified for ANSI/NSF Standards 61 and 44.

TYPICAL PROPERTIES OF IonPlus™ GRADES

PRODUCT	TYPE	IONIC FORM	TOTAL CAPACITY	TOTAL CAPACITY	APPLICATION
CA-10	Strong Acid Cation (8%)	Na	43-48%	2.0	Water Treatment
CA-11	Strong Acid Cation H	H	50-56%	1.8	Water Demineralization
CA-12	Strong Acid Cation (10%)	Na	40-44%	2.2	Water Treatment
CA-14	Strong Acid Cation	Na	45-55%	1.8	Water, Sugar, Chemical
CA-15	Weak Acid Cation	H	45-50%	4.5	Water Industrial and Wastewater
AN-21	Strong Base Type I Anion	Cl	42-48%	1.4	Water Demineralization
AN-22	Strong Base Type II Anion	Cl	37-44%	1.5	Water Demineralization, Nitrate
AN-25	Weak Base Anion	Free	50-58%	1.4	Water, Sugar, Pharmaceutical
MB-30	Mixed Bed	H/OH	N/A	H-1.8/ OH-1.3	Water Deionization

CATALYST

COMPANY PROFILE

Carbochem Inc. is a privately held, U.S. corporation that was established in 1984 and is headquartered in Philadelphia. Our product portfolio consists of activated carbon, ion exchange resins and specialty industrial chemicals based on zirconium, tungsten and isocyanuric acid, which are supplied to the following markets: food and beverage, water treatment, glucose, sugar, sweeteners, fruit juice, wine, catalysts, ceramics, pigments, paint and coatings, personal care and pharmaceuticals, oil and gas purification, pollution control, air purification, chemical processing, pulp and paper, and automotive.

The guiding principle of Carbochem is to provide value to customers by developing proprietary products that can offer a performance cost benefit and improve efficiency. A key component of the value is to reduce total cost by providing technical support with the goal of solving production problems and optimizing process conditions. We focus on developing long-term partnerships by providing dedicated customer service, technical innovation, consistent product quality and reliable supply.

In 1987, we established a manufacturing base in China to produce a complete line of activated carbon products based on U.S. technology. Carbochem supplies proprietary activated carbon products derived from bituminous coal, coconut shells and wood that are available in granular, powder and extruded forms. With quality being a primary focus, our products have achieved the following certifications and quality standards: ANSI/NSF Standards 61, 44 and 372, ISO 9001 and 14001, Food Chemicals Codex, USDA National Organic Program, GMO, Halal and Kosher. In addition, Carbochem® products are registered under the Bioterrorism Regulation as required by the U.S. FDA to confirm their integrity and traceability.

Carbochem has developed proprietary grades of activated carbon for decolorizing applications such as sugar, glucose, fructose, apple juice, grape juice; pressure swing adsorption for gas purification, solvent recovery, removal of taste and odor compounds such as Geosmin, MIB and TOC. We have also developed a proprietary design for activated carbon filters used by beverage companies to prevent microbial contamination and improve operating performance and efficiency.

We have established a regional office in Shanghai to provide the communication channel with each factory and to coordinate the shipments and optimize logistics. In addition, we have established offices in South Africa and Mexico to support our business in these important regions. Carbochem® products are supplied to customers in more than twenty countries, including Fortune 500 companies such as Coca-Cola, Pepsi-Cola, Chevron, General Electric, ADM and Ingredion.

OUR MISSION

To be a dynamic, global company focusing on the needs of customers and supplying products based on technical innovation that provide value on a long-term basis.

SUSTAINABILITY

Carbochem is committed to protecting the environment and fulfilling our civic duties and responsibilities. Our most significant contribution is to promote the efficient use of raw materials as part of our business model: we have developed processes, in conjunction with the products we supply, to minimize water and energy consumption in bottling plants and to facilitate the use of lower quality sugars to expand supply chain options. IonPlus™ resins are certified for ANSI/NSF Standards 61 and 44.



MAJOR MARKETS

- Catalysts
- Pigments
- Pharmaceutical
- Automotive
- Ceramics
- Water Treatment
- Food Processing
- Beverage
- Sugar/Glucose
- Chemical Processing
- Oil Refineries
- Air/Gas Purification
- Paper
- Personal Care
- Pollution Control
- Coatings



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