We are a leader in wastewater purification with products tailored to meet the treatment objectives for a range of wastewater applications. As a leading global manufacturer of activated carbon, we deliver consistently high quality, reliable products and offer services to help customers meet or exceed their environmental responsibilities.

Activated carbon plays a key role in improving the quality of water systems by removing impurities from wastewater before it is discharged to water bodies, applied to land, or reused. It is highly effective at removing hydrophobic and high molecular weight organic contaminants from a wide range of wastewaters.

In addition to offering high quality activated carbon products for applications in the wastewater industry, we also provide a comprehensive service offering including:

- Reactivation services
- Review of your activated carbon needs
- On-site carbon applications training
- Product testing
- Technical assistance through evaluations
- Process design/optimization support
- Samples for testing and analysis
- Rental equipment

PAC or GAC?
Whether powdered activated carbon (PAC) or granular activated carbon (GAC) is the preferred treatment option is determined by the contaminant loading levels of incoming wastewater, the treatment targets for treated wastewater, capital costs, and whether the activated carbon will be recycled, or reactivated (GAC applications only) after its useful life. Beyond meeting the purification requirements of your final product, selecting the right activated carbon can have a significant effect on your operational efficiency.

<table>
<thead>
<tr>
<th>Feature</th>
<th>PAC</th>
<th>GAC</th>
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</thead>
<tbody>
<tr>
<td>Low residual concentration of contaminants achieved</td>
<td><img src="image" alt="" /></td>
<td><img src="image" alt="" /></td>
</tr>
<tr>
<td>Achievable contaminant loading level of carbon</td>
<td><img src="image" alt="" /></td>
<td><img src="image" alt="" /></td>
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<tr>
<td>Capital costs</td>
<td>$9</td>
<td>$9/10</td>
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Industrial and Municipal Wastewater Treatment
Wastewater treatment plants (WWTPs) remove biological and chemical waste products from water, thereby permitting the treated water to be discharged or reused. WWTP operators must comply with strict regulations for maximum limits of contaminants in their discharge water, or effluent.

Industrial WWTPs treat wet waste from manufacturing industries, including chemical, refinery, paper, textiles, mining, and heavy manufacturing sites. Activated carbon plays a key role in adsorbing hydrophobic and high molecular weight compounds commonly found in these wastewater streams, including a range of organics, colorants, phenolic compounds and chlorinated organics.

- Synthetic organics/micro-pollutants
- Pesticides
- Benzene, toluene, ethylbenzene and xylene (BTEX)
- Overall organics
- Chemical oxygen demand (COD)
- Compounds that can inhibit biological wastewater treatment systems
- Toxins

Municipal wastewater treatment plants primarily treat human and household liquid wastes prior to discharging the treated water to surface water bodies. Activated carbon is used as an advanced treatment step when the discharge of secondary effluent would still degrade water quality. Here, GAC is typically used as a polishing step to remove compounds that are not biodegradable, such as synthetic organic chemicals that can be toxic to fish and aquatic life at low concentrations.

To help meet the wide range of industrial and municipal wastewater treatment needs, we manufacture both fresh and reactivated granular and extruded activated carbon that offer:

- Excellent adsorption
- High mechanical strength for thermal reactivation
- Low pressure drop
- A range of particle sizes to meet various backwashing requirements
BROCHURE - WASTEWATER

including:

This process delivers a number of benefits,

Biological PAC treatment refers to the use of activated carbon for adsorption of organic contaminants from wastewaters while creating a buffer to keep microorganisms alive and providing a surface where these beneficial microbes can attach.

This process delivers a number of benefits, including:

- Increased removal efficiencies
- Increased process stability
- Cost effectiveness
- Low capital cost required to retrofit an existing activated sludge plant

This process is used by both industrial and municipal wastewater treatment plants to treat wastewaters originating from the textile, dye and pigment, chemical, pharmaceutical and refinery industries as well as for coke production, tanker cleaning operations and leachate from waste deposits.

Our activated carbons enable:

- Improved removal of BOD, COD and total organic carbon (TOC)
- Greater removal of non-biodegradable organic compounds and toxicity
- Heightened stability of the process to highly concentrated contaminant loads
- Better sludge dewatering
- Reduced aerator foaming

Landfill leachate

Landfills are engineered pits that are filled with layers of solid waste that are compacted and covered for final disposal. They are designed to compact the waste to reduce volume and are monitored for the control of liquid and gaseous effluent.

Landfill leachate contains complex mixtures of chemical contaminants which vary by site, age of the landfill, types of waste present, and treatment processes used at the location. The amount of activated carbon required depends on the treatment objectives, organic load of contaminants, and flow to be treated. Once the activated carbon has been used and is loaded with contaminants, the spent or exhausted GAC can usually be thermally reactivated and reused, enabling customers to minimize disposal costs and enhance their recycling programs.

We offer fresh and reactivated GAC that deliver proven and cost-effective solutions for the removal of the two principal contaminants commonly found in leachate:

- Chemical oxygen demand (COD) - the sum of all oxidizable organic compounds and an indicator of how much oxygen is needed for the complete chemical oxidation of an existing organic impurity (expressed in mg/l O2)
- Adsorbable halogenated organic compounds (ADQ) - the total amount of halogenated organic substances in water that can be adsorbed by activated carbon; most are chlorine-containing compounds, including both simple volatile compounds and complex toxic organic molecules.

Groundwater remediation

In the past few decades, awareness has grown of the potential health hazards caused by the accumulation of industrial contaminants in surface and groundwater. Groundwater can become contaminated by complex mixtures of unidentified compounds through industrial land use, spills, or leaks.

Typically, groundwater remediation projects entail in situ flushing on a zone of contaminated groundwater or soil. Clean water or an extraction fluid is injected into the contaminated zone and extraction wells are used to remove the solution and impurities. Whether used in pump-and-treat or funnel-and-gate methods, activated carbon readily removes a broad range of organic contaminants from groundwater.

We manufacture both fresh and reactivated granular and extruded activated carbon to meet challenging groundwater remediation objectives, including the removal of chlorinated solvents, mineral oil and BTEX. We accomplish this by developing and manufacturing activated carbon grades with properties critical to performance, including:

- Excellent adsorption
- High mechanical strength for thermal reactivation
- Low pressure drop
- A range of particle sizes to meet backwashing requirements

Norit Reactivation Services (NRS)

When it comes to purifying wastewater streams, we know you’re focused on complying with regulations in the most cost-effective manner possible. That’s why it’s important to know that we offer both fresh and reactivated carbon worldwide to help meet your treatment objectives. Using reactivated carbon can not only help to lower costs, but can also help you work toward your sustainability goals.

Due to the adsorption process, GAC becomes exhausted after a certain service period. In many cases, this spent GAC can be thermally reactivated, making it suitable for reuse. During thermal reactivation, the spent GAC is heated in dedicated kilns to temperatures over 900°C. Adsorbed organics are thermally destroyed in a highly specialized process under strict environmental control. Following reactivation, the adsorptive properties of the GAC are restored to a level close to fresh GAC quality.

In most cases, spent activated carbon from many wastewater customers can be pooled and then reactivated, providing logistical flexibility to customers operating GAC adsorption systems.
Founded in 1918, we are the world’s largest and most experienced producer of activated carbon, used to remove pollutants, contaminants and 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, 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 in seven plants and reactivate carbon in four plants around the world. So whether you have one operation or many facilities around the globe, we’ve got you covered.

Contaminants of Emerging Concern (CEC)
Endocrine-disrupting compounds, which enter surface waters mainly via wastewater discharges from WWTPs, can have adverse effects on aquatic organisms and water quality, and pose risks to environmental and human health, even at extremely low concentrations.

To protect drinking water resources as well as aquatic organisms, some countries are moving forward with a goal to remove 80% of these micropolllutants from wastewater treatment plant effluent.

Micropolllutants include:

- Endocrine disruptors
- Pharmaceutical and medicinal residues
- X-ray contrast agents
- Synthetic and natural hormones

WWTPs can meet this goal in one of two ways, both of which have been shown to remove greater than 80% of these micropolllutants.

- PAC treatment followed by downstream filtration
- Ozonation followed by GAC filtration

Water reuse
As natural water sources become scarcer in certain regions of the world, a trend toward greater water reuse is emerging. In this application, activated carbon is used to purify wastewater for reuse in industrial processes, in agriculture for irrigating land, and for the recharging of surface water bodies and aquifers – supporting sources of potable water.

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Our sales, technical service and customer service teams are prepared to serve customers around the world. Contact us at cabotcorp.com/activatedcarboncontact