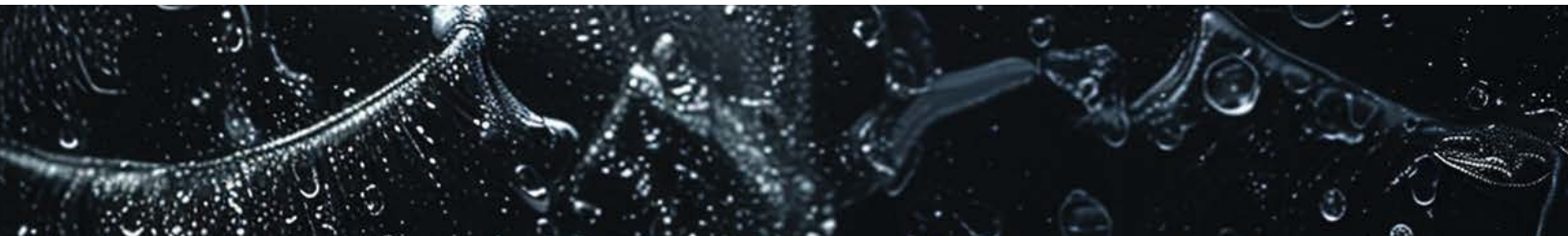




**AquaKnight™**  
**Water Treatment Equipment**  
*Drinking Water Solutions*

**CalgonCarbon**  
*A Kuraray Company*





# The Solution

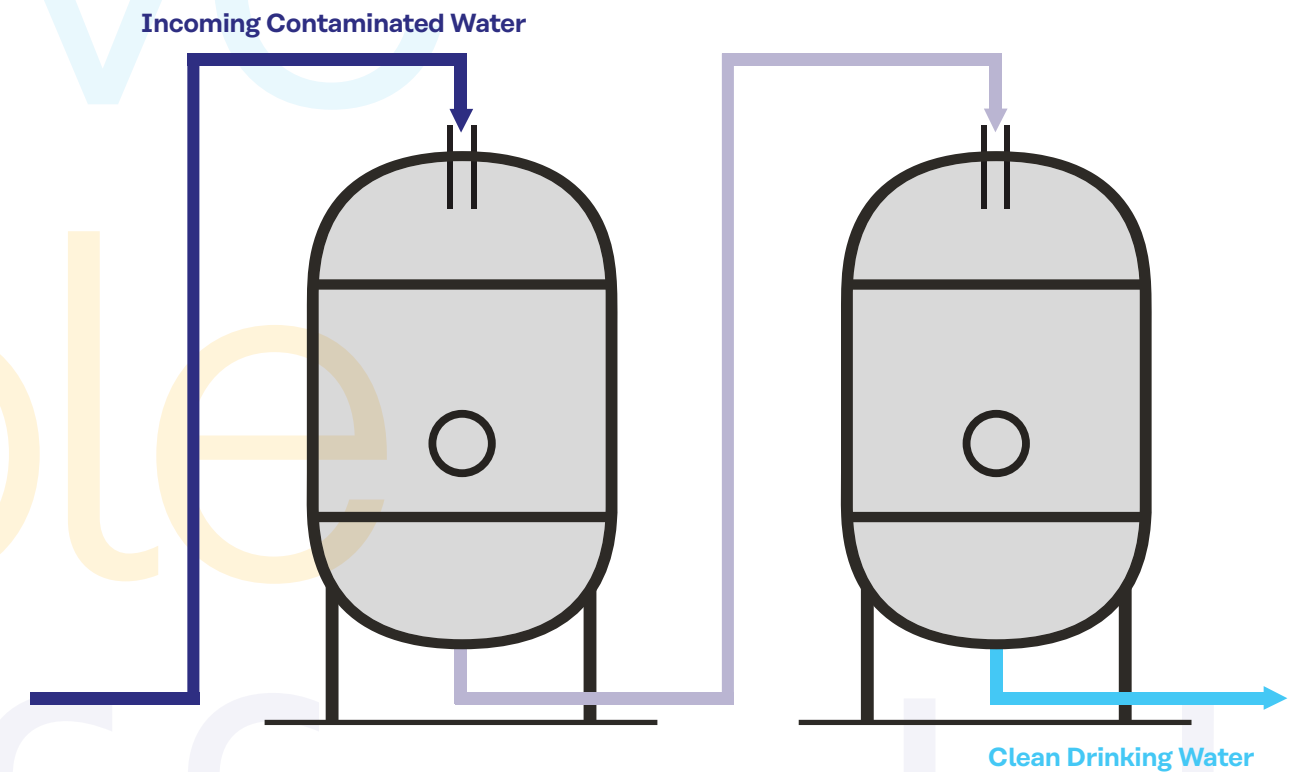
Calgon Carbon offers the industry's most extensive range of equipment solutions—including turnkey services for the delivery of fresh carbon along with removal, transportation and reactivation of spent carbon at one of their reactivation facilities—all designed to make the job of meeting your water treatment objectives easier than ever.

Calgon Carbon has two ASME certified production facilities to fabricate large pressure vessels and continually strives to position itself to meet the rising demand for activated carbon equipment for municipal drinking water applications.

The world leader in providing technologically superior, cost-effective solutions for water treatment challenges



## Series/Lead-Lag System



## Treatment Applications

### Contaminants of Emerging Concern

- 1,2,3 -TCP
- Endocrine Disrupting Compounds (EDCs)
- Pharmaceuticals & Personal Care Products (PPCPs)
- Peroxide Quenching for 1,4-Dioxane

### Common Groundwater Contaminants

- Trichloroethylene (TCE)
- Polychlorinated biphenyl (PCE)
- Methyl tert-butyl ether (MTBE)
- Pesticides

### Common Surface Water Contaminants

- Algal Toxins
- Disinfection By-products (DBPs)
- Total Organic Carbon (TOC)
- Taste & Odor Compounds



# Water Treatment Equipment

## Most Commonly Supplied Vessels

### AquaKnight 6

Single or dual adsorber  
6,000 pounds of GAC per adsorber

### AquaKnight 8

Single or dual adsorber  
10,000 pounds of GAC per adsorber

### AquaKnight 10

Single or dual adsorber  
20,000 pounds of GAC per adsorber

### AquaKnight 12

Single or dual adsorber  
20,000 pounds of GAC per adsorber

### AquaKnight 12-40

Single or dual adsorber  
40,000 pounds of GAC per adsorber

### AquaKnight 14

Single or dual adsorber  
60,000 pounds of GAC per adsorber

Calgon Carbon's liquid-phase equipment systems provide utilities with compact, flexible, and cost-effective means to apply both granular activated carbon (GAC) and ion exchange (IX) technologies to treat even the most difficult water treatment challenges. Calgon Carbon has over 35 years of experience in equipment fabrication and installation.

AquaKnight adsorption systems are available in two distinct offerings, the AquaKnight Gold Certified (GC) and the AquaKnight Custom Certified (CC).

The AquaKnight GC series are the gold standard of adsorption systems. They are designed with the highest level of drinking water purification and safety in mind. Each system is formulated and certified to meet National Sanitation Foundation 61 drinking water standard, also referred to as NSF 61. The entire AquaKnight GC system is fully NSF 61 certified, providing a more cost-effective and timely approach than customizing and certifying each component. Each system incorporates two pressure vessels along with a compact pipe rack engineered to minimize space and cost while allowing for maximum operational flexibility.

The AquaKnight CC series is similar to the GC series, while also allowing for customizable options to suit specific design needs. The CC system can be customized and certified through an additional rigorous process.



## AquaKnight Models

Equipment	Design Pressure (psig)	Pounds of GAC per Vessel	Flow for 10 min EBCT* (gpm)	Cubic Feet of Resin per Vessel	Flow for 2.5 min EBCT* (gpm)
AquaKnight 6	125	6,000	150	106	320
AquaKnight 8	125	10,000	250	212	640
AquaKnight 10	125	20,000	500	353	1,060
AquaKnight 12	125	20,000	500	424	1,270
AquaKnight 12-40	125	40,000	1,000	na	na
AquaKnight 14	125	60,000	1,500	na	na

\*Empty bed contact time (EBCT) requirements vary by application. Contact a Calgon Carbon representative for equipment design information.



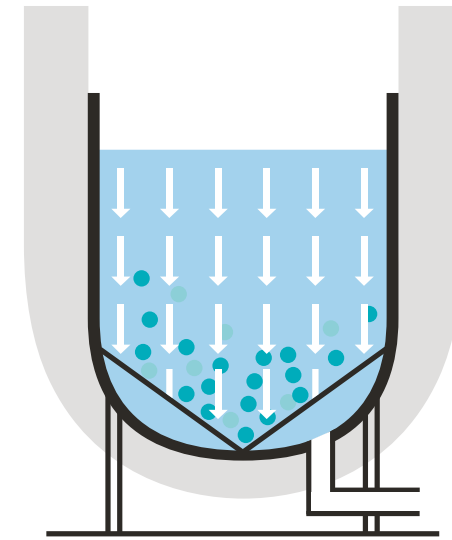
# Equipment Design



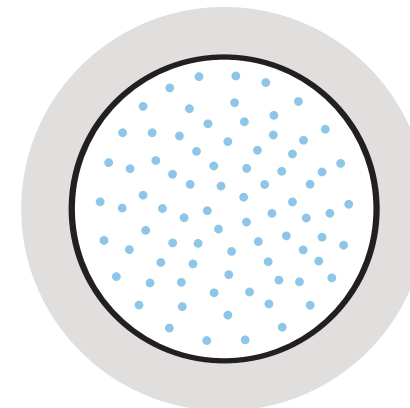
# Calgon Carbon Advantage

## INTERNAL CONE UNDERDRAIN

directs and distributes flow uniformly



**80-120 SMALL SEPTA**  
cross section of internal cone

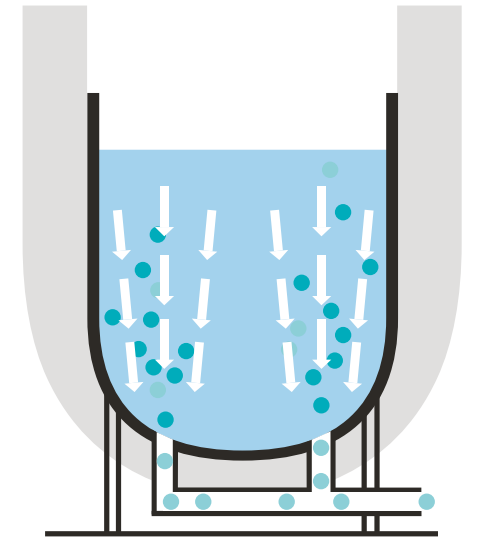


### Internal Cone Design Advantages

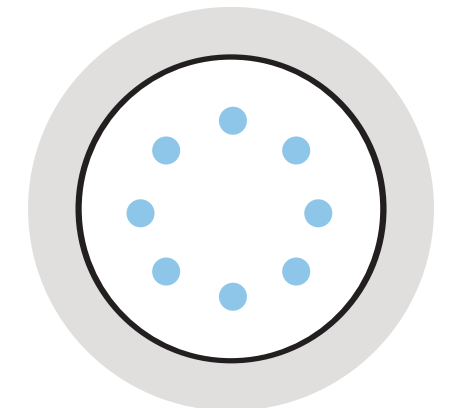
- Efficient media utilization
- Consistent, even flow distribution, which is critical when treating to low or non-detection levels
- Even bed expansion during backwash
- Less time/water required for exchanges
- Efficient and complete removal of the media without need to open the vessel

## EXTERNAL UNDERDRAIN

causes stagnant areas and uneven flow



**8 LARGE SEPTA**  
cross section of external underdrain



### External Underdrain Limitations

- Less efficient carbon utilization
- Increased likelihood for channeling
- Bed expansion may become uneven during backwash, leading to disruption of the mass transfer zone
- More time/water required for exchanges
- Vessel must be opened for spent carbon removal; disinfection may be required
- Spent carbon difficult to remove from vessel; some may remain after exchange

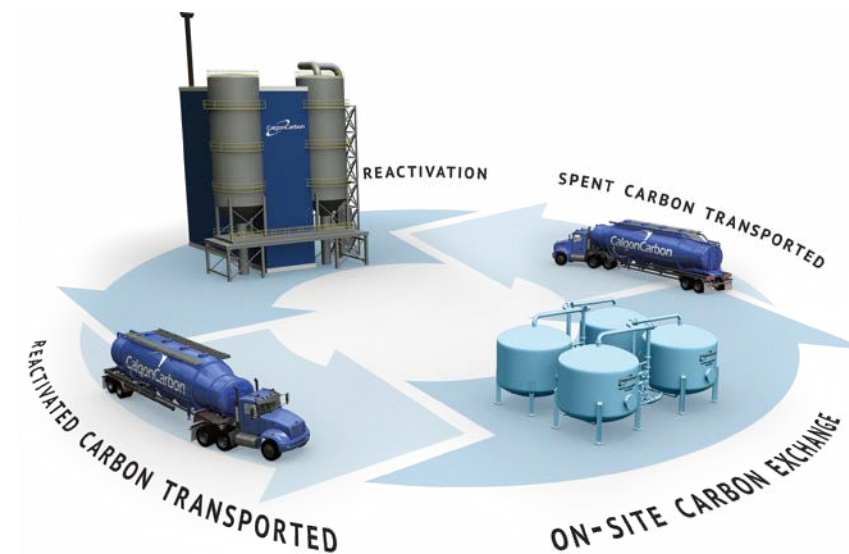




**Calgon Carbon's AquaKnight™ equipment is manufactured in the United States.**

**Calgon Carbon's Equipment and Assembly plant, located in Pittsburgh, PA, has manufactured, painted, and shipped over 3,000 vessels.**

# Reactivation



*Carbon reactivation is a high-temperature treatment process in which adsorbed chemical constituents are removed from spent activated carbon and thermally destroyed. The reactivated carbon is then reusable and can be returned to service.*

## Custom Municipal Reactivation (CMR)

CMR allows municipalities to recycle and reuse their own carbon. CMR reduces GAC-related operating costs by approximately 20% as compared to virgin GAC, with little to no sacrifice in performance. Calgon Carbon has three potable reactivation facilities in the United States, all of which are NSF 61 certified for the processing of potable spent carbon.

Carbon reactivation is a high-temperature treatment process in which adsorbed chemical constituents are removed from spent activated carbon and thermally destroyed. The reactivated carbon is then reusable and can be returned to service. A quality custom reactivated product starts with a quality virgin GAC product. GAC from bituminous coal manufactured via a reagglomeration process, like Calgon Carbon's FILTRASORB® GAC, provides the best starting material for a reliable CMR product. Other activated carbons made from less durable starting materials will break down in the reactivation process.

Calgon Carbon is fully positioned to handle spent carbon from a wide variety of applications. These applications range from potable GAC used for taste and odor removal to industrial GAC used for petrochemical groundwater clean-up.

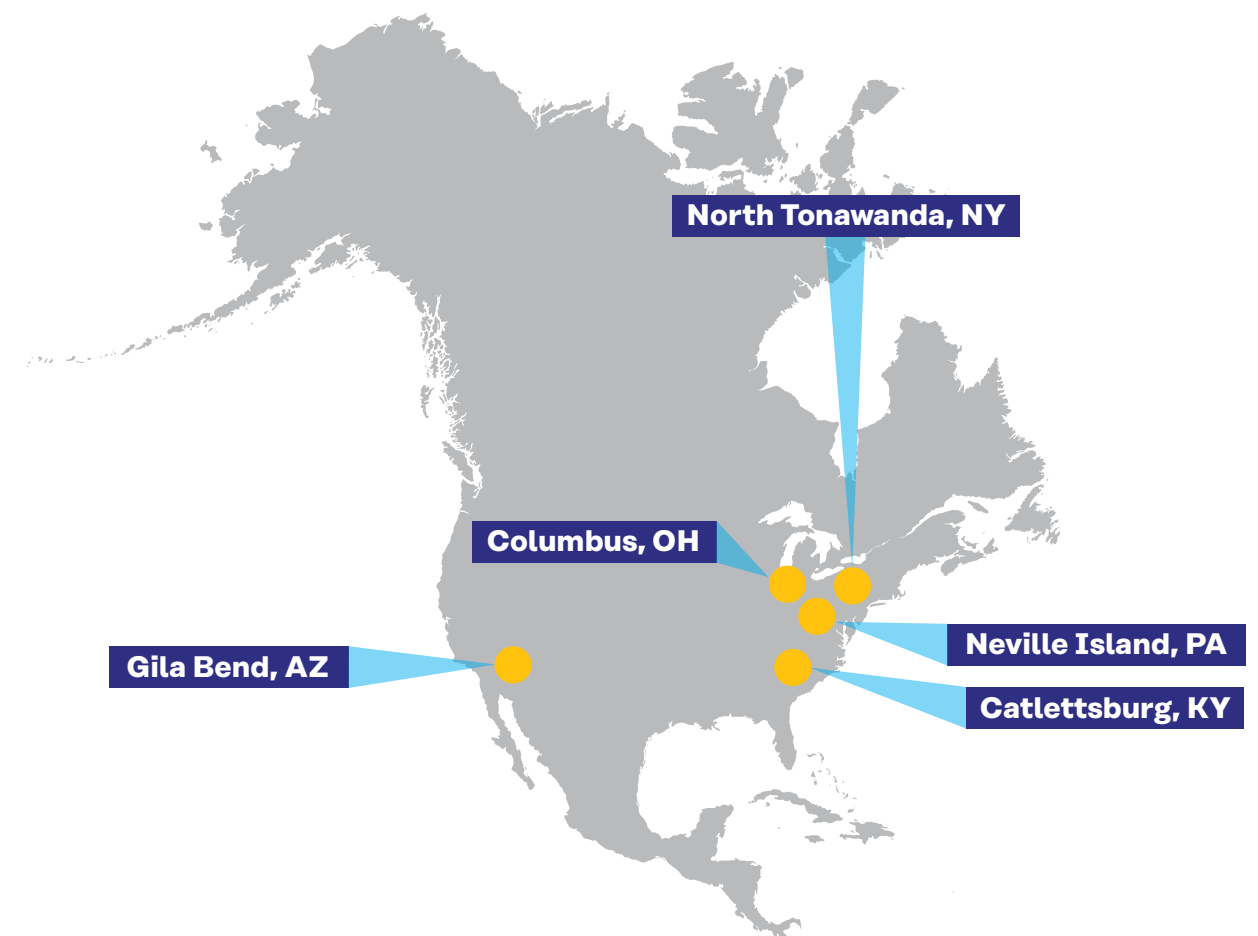
## Reactivation is a Sustainable Process

CMR utilizes high temperatures to destroy contaminants similar to incineration or other destructive technologies, but Calgon Carbon's proprietary reactivation process also maintains the integrity of the activated carbon so it can be reused and recycled. CMR is environmentally friendly and significantly lowers CO<sub>2</sub> emissions compared to virgin GAC manufacturing. In fact, reactivated carbon provides an 80% reduction in greenhouse gas emissions as compared to the production of virgin carbon. It reduces the use of non-renewable resources, minimizes waste, and eliminates landfilling or incineration of spent carbon.

## Reactivation for PFAS

Calgon Carbon conducted and published a peer reviewed study at their RCRA reactivation facility in 2022<sup>1</sup>. The study demonstrated that Calgon Carbon's proprietary reactivation process is capable of destroying PFAS to 99.99% removal efficiency. Additionally, the study showed that PFAS were removed from the spent GAC to below detectable levels.

1: DiStefano R., Feliciano T., Mimna R.A., Redding A. M., & Matthis J. (2022). Thermal destruction of PFAS during full-scale reactivation of PFAS-laden granular activated carbon. *Remediation*.





# Media & Services

## Granular Activated Carbon

Calgon Carbon is the largest manufacturer of granular activated carbon (GAC) in the United States. Additionally, Calgon Carbon holds a distinct advantage by producing a wide range of products, coupled with comprehensive expertise in GAC applications.

Calgon Carbon's FILTRASORB® line of products, developed for the removal of organic compounds from water and wastewater, is both NSF 61 certified and AWWA B604 approved for drinking water treatment. It can be effectively used in both pressure vessel and sgravity filter designs.

FILTRASORB is made from select grades of bituminous coal and manufactured through a process known as reagglomeration to produce a high activity, durable product capable of withstanding the abrasion associated with repeated backwashing, hydraulic transport, and reactivation for reuse. The raw coal is mined and manufactured into GAC in the United States to ensure the highest quality and consistency in the finished product.

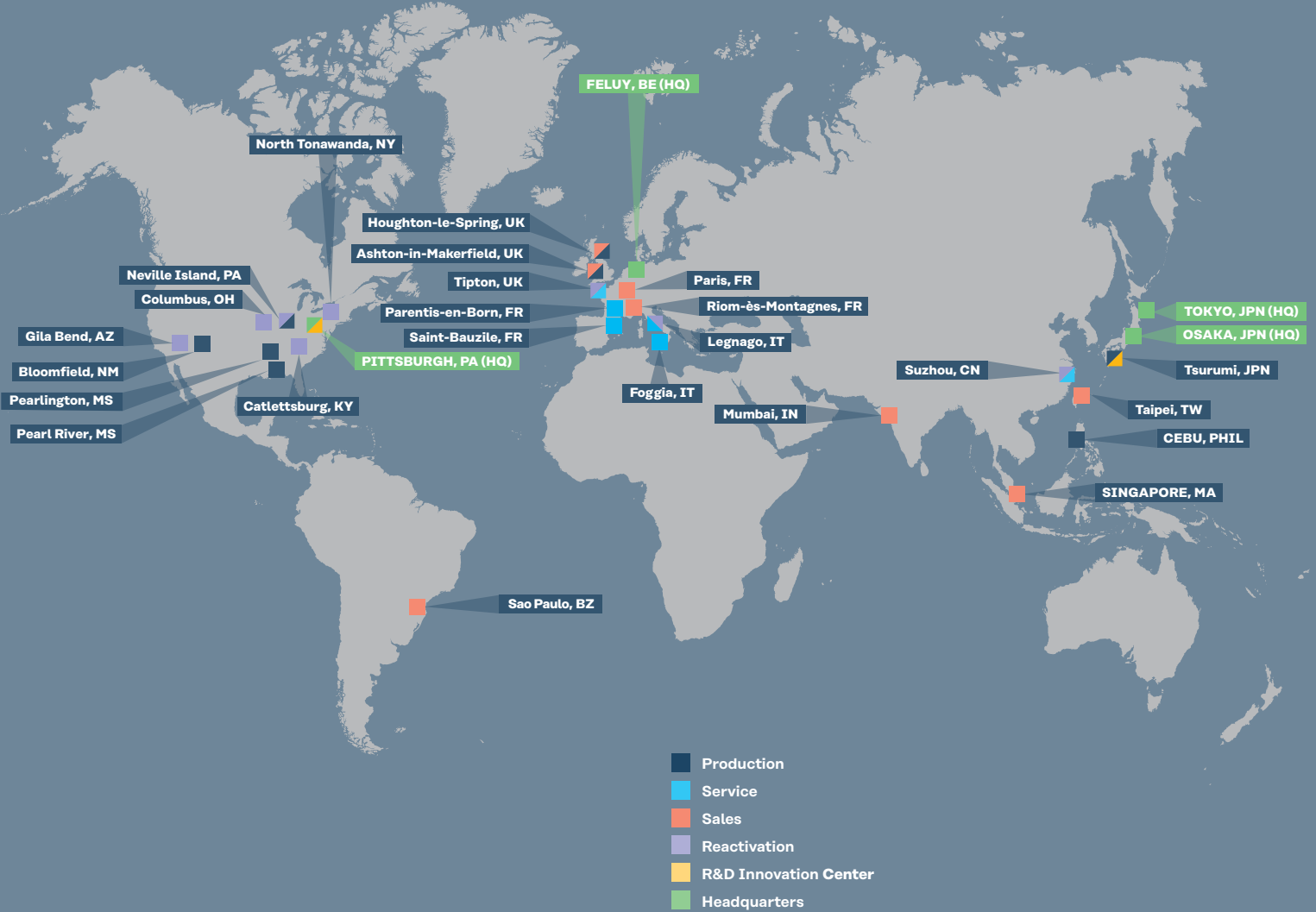
## Field Service

Calgon Carbon has Regional Field Service teams located across the United States, which have been providing on-site GAC-related services for over 60 years. Calgon Carbon's field service representatives are OSHA certified and fully trained to provide safe and expert oversight for equipment installations, repair and maintenance, and turnkey activated carbon exchanges.





# Your Global Partner



[calgoncarbon.com](http://calgoncarbon.com)

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