



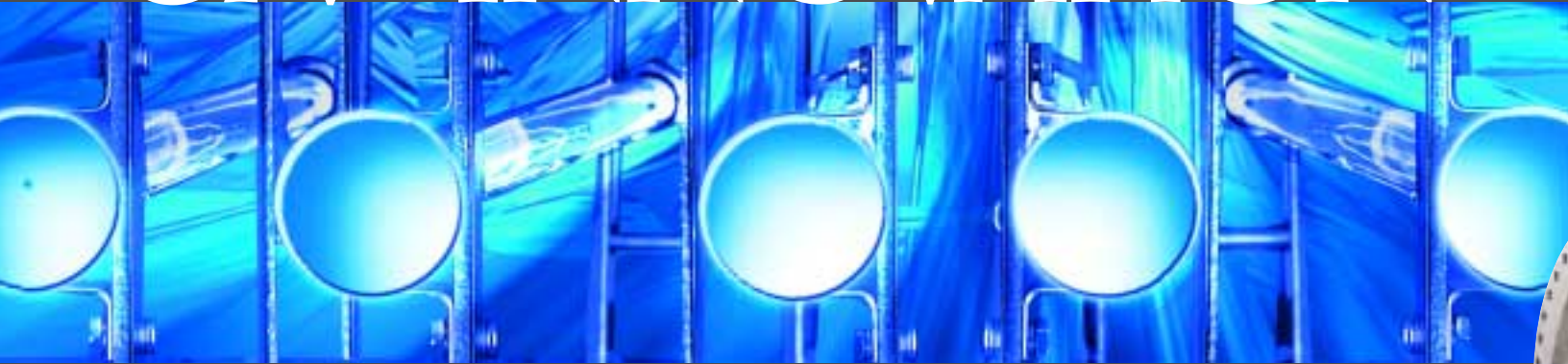
# ULTRAVIOLET LIGHT



Water Treatment Technologies  
*A Clear Commitment*



# UV INNOVATION



Calgon Carbon Corporation, already a world leader in granular activated carbon solutions, is also one of the world's foremost providers of ultraviolet light (UV) disinfection and oxidation technologies for water. From the initial introduction of our UV advanced oxidation systems to the continued development of drinking water and wastewater disinfection technologies, we have been delivering proven UV water treatment solutions for over 20 years. To demonstrate our commitment to these vital technologies, Calgon Carbon recently formed a UV Technologies Division devoted exclusively to delivering proven UV water treatment solutions.

**A History of Innovation** More than 20 years ago, Calgon Carbon introduced an advanced UV oxidation process to remediate contaminated groundwater. In 1998, we followed that up with the first radical breakthrough in the treatment of drinking water in decades. That's when our scientists invented a process that could be used to inactivate *Cryptosporidium* and other similar pathogens in surface water, rendering them harmless to humans. This inventive process placed Calgon Carbon on the leading edge of UV disinfection technology. We remain on the cutting edge today. As the world population grows, and the need for clean water becomes ever more critical, you can count on Calgon Carbon to deliver the very latest innovations in UV disinfection and advanced oxidation.



**Sentinel®**  
**UV Disinfection Systems**  
 For Drinking Water

If you're looking for experience with UV disinfection systems for drinking water, you've found the right partner. Not only are we the innovator of the technology, we have one of the industry's largest installed bases of drinking water UV disinfection systems.



Our Sentinel® System is the worldwide standard-bearer for the control of *Cryptosporidium*, *Giardia*, and other waterborne, pathogenic parasites, bacteria and viruses in drinking water.

Commercialized in 1999, the Sentinel® system proved that surface water could be protected at a fraction of the cost of other advanced treatment technologies, such as ozonation and membrane filtration. As a result of its effectiveness, design simplicity, and affordability, UV disinfection has been identified by the

Environmental Protection Agency (EPA) as a low-cost compliance technology to meet LT2 Enhanced Surface Water Treatment guidelines for the control of *Cryptosporidium* and *Giardia*.

Calgon Carbon currently has multiple reactor sizes handling the highest flows in the industry (up to 40 MGD per reactor) utilizing high intensity medium pressure lamp technology, and all of our reactors are validated under the EPA's LT2 protocol.

**The UV Advantage**

- Low-Cost Treatment
- Easy Design and Installation (including retrofits)
- Most Cost-Effective Advanced Technology for Control of *Cryptosporidium* and *Giardia*
- No Disinfection By-Products
- No Secondary Treatment Requirements
- Limited Service Requirements
- EPA-approved method for disinfection under the LT2 Rules

**Rayox®**  
**UV Oxidation Systems**  
 For Remediation, Process Water, and Industrial Wastewater Treatment

Calgon Carbon's UV disinfection systems offer municipal water plants an ideal solution for the safe and cost-effective treatment of drinking water. UV systems are similarly effective for groundwater remediation and the treatment of process water and industrial wastewater.

Calgon Carbon's Rayox® System is an industry staple for the destruction of organic compounds in groundwater, such as TCE, DCE, PCE, vinyl chloride, 1,4 dioxane, NDMA, and MTBE.

Rayox® is also used as a process water and wastewater treatment option for the removal of alcohol, phenol, acetone, TOC and COD/BOD.



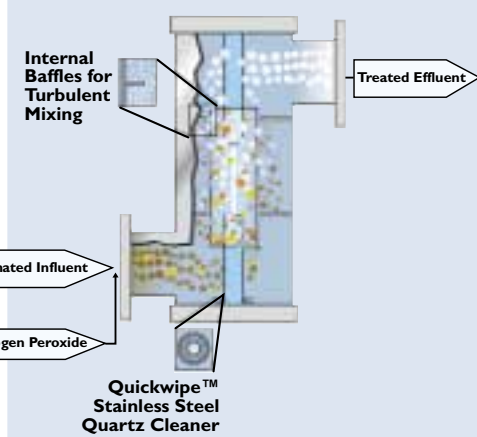
**Breakthrough Invention**

*In Milwaukee in 1993, the major outbreak of Cryptosporidiosis killed more than 100 people and sickened over 400,000. In 1997, Calgon Carbon's research proved that low doses of UV light energy effectively inactivate Cryptosporidium and similar pathogens in water. Calgon Carbon was granted a patent for this innovative process in 2000 and the installation of UV disinfection in drinking water treatment plants has skyrocketed due to its low cost and operating simplicity.*



## C<sup>3</sup> Series™

For Disinfection of Municipal Wastewater



### How It Works:

1. Proprietary high intensity, medium pressure lamps emit UV energy into contaminated water.
2. Hydrogen peroxide is added to the contaminated water, then activated by UV light to form hydroxyl radicals, which oxidize dissolved contaminants
3. The reaction produces harmless by-products that, if taken to completion, are converted into water, carbon dioxide, and, if the contaminant was chlorinated, residual chloride.
4. **The result:** High volumes of clean water produced safely and cost-effectively with no secondary wastes or off-gasses.

A proven leader in the UV treatment of drinking and groundwater, Calgon Carbon's UV Technologies Division proudly launches the C<sup>3</sup> Series™. This technology and process is recognized as "The New Standard in Wastewater Treatment."



### UV Disinfection vs. Chlorination/Dechlorination

- More cost-effective
- Cleaner and safer
- Highly efficient: A 99% reduction in fecal coliform is easily attained
- No formation of disinfection by-products
- No residual chlorine discharges

Calgon Carbon's new C<sup>3</sup> Series™ wastewater disinfection systems are designed to treat municipal wastewater with a cost-effective low pressure, high output lamp technology installed in an open channel, parallel to the flow of the wastewater.

The C<sup>3</sup> Series™ is a safer, more cost-effective alternative to chlorine disinfection that also protects local lakes, rivers, streams and coastal waters from disinfection by-products and residual chlorine discharges.

### Advanced Solution

Recently, there has been growing public concern associated with chlorination of municipal wastewater because of potential production of harmful disinfection by-products and aquatic toxicity levels in plant effluent. There are also increased risks and costs associated with chlorine handling at the plant level. With the C<sup>3</sup> 150™, Calgon Carbon offers an advanced, cost-effective UV disinfection solution for wastewater treatment worldwide.



# A CLEAR COMMITMENT

Calgon Carbon's commitment to UV Technologies stretches back to the early 1980's, with the formation of Solarchem Environmental Systems and Peroxidation Systems Inc., both innovative leaders in the use of advanced UV oxidation technology for water treatment.

In 1996, Calgon Carbon purchased both Solarchem and Vulcan Peroxidation Systems (formerly Peroxidation Systems). These two companies brought vital technical and professional expertise, expanding Calgon Carbon's capabilities beyond its stalwart activated carbon solutions for water and wastewater treatment.

Since that time, Calgon Carbon has dramatically increased its internal UV research and development capabilities. This resulted in the breakthrough development of UV treatment for drinking water, which, until that point, had been considered cost-prohibitive.

Today, Calgon Carbon's UV Technologies Division is more committed than ever to new product development and continued improvement of our existing UV systems.

Our research and development staff employs several of the industry's top experts. On a global level, their contributions enable Calgon Carbon to identify new challenges associated with new and existing contaminants and create technologies to meet the world's increasing demand for clean water.

On the local level, you can be sure that we're devoted to helping dedicated water treatment professionals find the exact combination of price, products, services and technologies that best suit your needs.

*That's our clear commitment to you!*





CALGON CARBON CORPORATION

MAKING WATER AND AIR SAFER AND CLEANER

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