

# C<sup>3</sup>500™ D

## Ultraviolet Disinfection System

### Description

The C<sup>3</sup>500D open channel series is an advanced, cost effective solution for the ultraviolet (UV) disinfection of wastewater using high powered (500W), low-pressure lamps. The C<sup>3</sup>500D was specifically designed for water reuse and low effluent quality applications, such as combined and sanitary sewer overflows (CSO & SSO). The system also offers advantages for conventional secondary and tertiary wastewater applications.

Computational Fluid Dynamics (CFD) was utilized to optimize the germicidal efficiency of the reactor by varying the size, shape and quantity of the Delta mixing devices as well as the lamp spacing. The patent-pending design increases the hydraulic efficiency of the reactor by uniformly exposing the water to the required UV dose while minimizing head loss. Validation testing per National Water Research Institute guidelines has confirmed the increased germicidal efficiency of the system. It uses fewer lamps than other low-pressure high-output UV systems, which means a smaller footprint, decreased installation and O&M costs.

Calgon Carbon designed the C<sup>3</sup>500D open channel, parallel flow UV disinfection series to meet the demands of the treatment plant operators with simple operation and maintenance.

The UV system includes: lamp racks, power distribution centers, system control center, automatic level control device, automatic cleaning system, and all interconnecting cables. It is designed for simple installation and trouble-free operation throughout the life of the system. The C<sup>3</sup>500D is designed to operate at ambient air temperatures ranging from 14° – 104°F (-10° – 40°C) with 5-95% relative humidity (non-condensing). System options are available for conditions outside of this range.

### Design Features

#### Modular Design

- Modular components are preassembled with quick-connect cables for simple installation and system start-up
- Components are designed to comply with NEMA 4X (IP55) ratings

#### Lamp Technology

- Low-pressure, high-output (LPHO) amalgam lamp technology
- Pre-heat start and continuous heat configuration

#### Ballast Technology

- Efficient, high frequency electronic ballast
- Variable output
- Each ballast powers one LPHO lamp

#### Automatic Cleaning System

- Mechanical, non-chemical cleaning
- Automatic or manual initiation

#### Innovative Control System

- Dose or flow pacing
- Self-diagnostics
- Individual lamp status indication
- Elapsed time counter
- Remote annunciation of alarms and bank status

#### UV Intensity Sensor

- Monitors the average intensity within the lamp bank array
- User adjustable setpoints for low and low-low UV intensity alarms

#### Level Control Devices

- Stainless steel serpentine weir, counterbalanced stainless steel level control gate or motorized stainless steel weir

#### Input Power Options

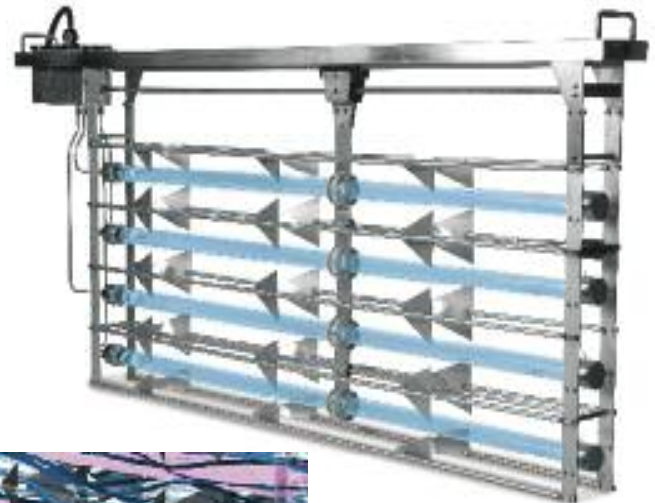
- 400/230VAC, 3 Phase, 4 wire and GND, 50/60 Hz
- 480/277VAC, 3 Phase, 4 wire and GND, 60 Hz

#### Power Demand

- 565 watts/lamp including ballast (nominal)

#### Power Quality

- System Power Factor is 0.98 minimum
- System complies with IEEE519-1992 current Total Harmonic Distortion guidelines



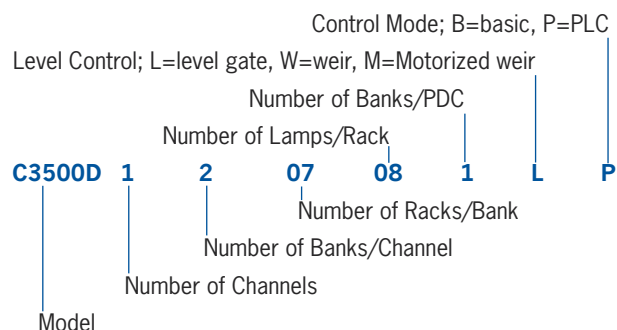
Mixing generated by Delta Wings (CFD simulation)

Portable Photometer (Model # UV-254)

- ### Service Trolley

- Portable trolley ideal for servicing lamp racks

The C<sup>3</sup>500D open channel series is identified by a combination of letters and digits by which the system's size, both mechanically and electrically, is designated.



The technical drawings illustrate the 1000-gal. water treatment unit. The **Plan View** shows the top-down layout of the unit, including the inlet gate, flow direction, and the arrangement of lamp racks and access doors. **View A-A** is a cross-section showing the internal components, including the lamp racks (7 racks, 8 lamps per rack), the level probe, the operation station access, the access door with padlock, the lamp rack connector, and the level control gate. **View B-B** is a cross-section showing the operator station, power distribution center, and multi-conductor cable.



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