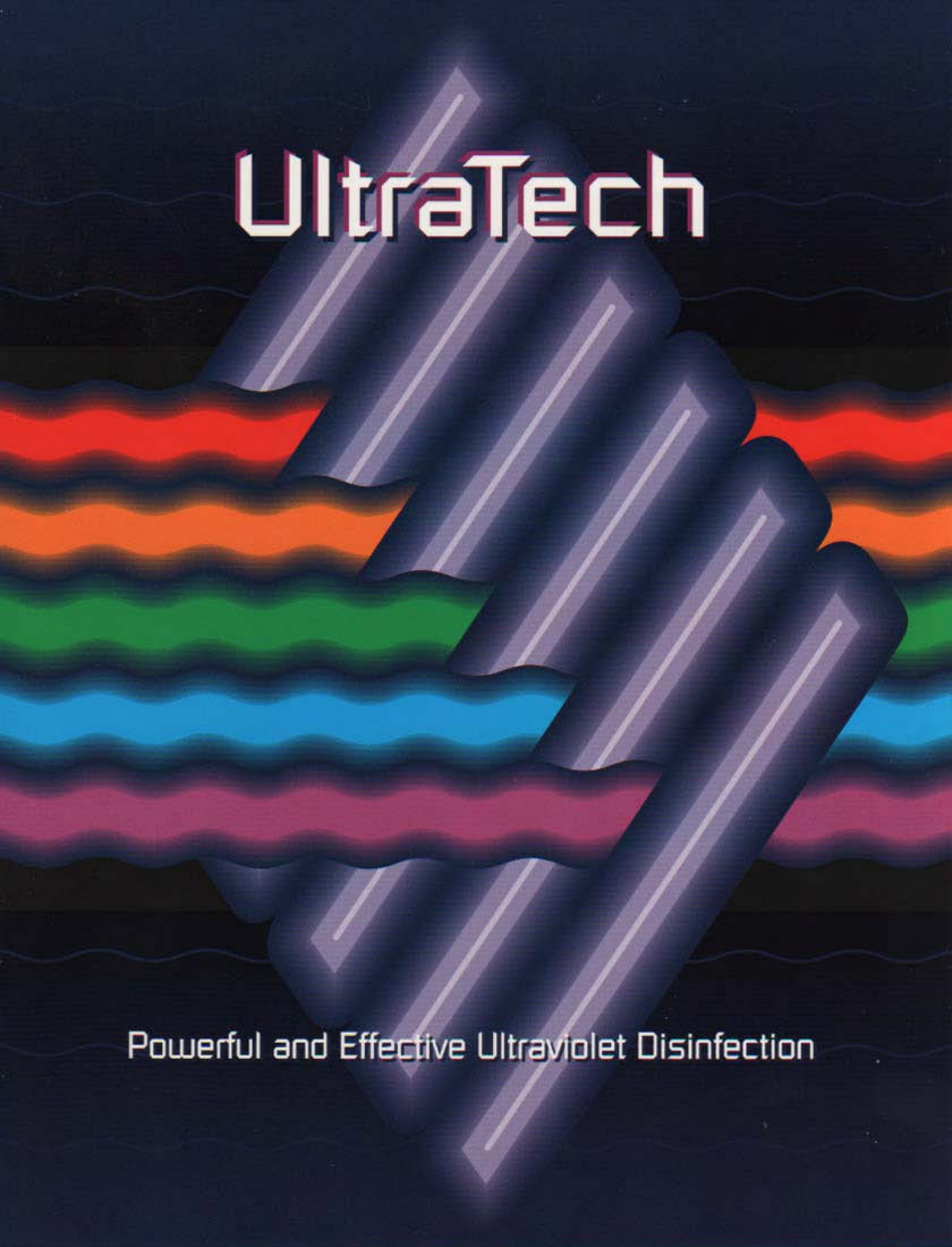

UltraTech
Powerful and Effective Ultraviolet Disinfection

UltraTech systems inc.

The Process, The Product, The People

Everyday, throughout the world, billions of gallons of wastewater are being reliably disinfected by ultraviolet (UV) light. As a proven technology, ultraviolet provides cost effective, low maintenance, and environmentally safe disinfection.

Ultratech Systems' beginnings can be traced back to the 1930's when the Ellner Technical group first applied the germicidal properties of ultraviolet light to disinfect waste water. Today the UV disinfection systems manufactured by Ultratech Systems, Inc. are truly state-of-the-art, featuring advanced computer controls, quality construction using 316 stainless steel, and fusion welding.

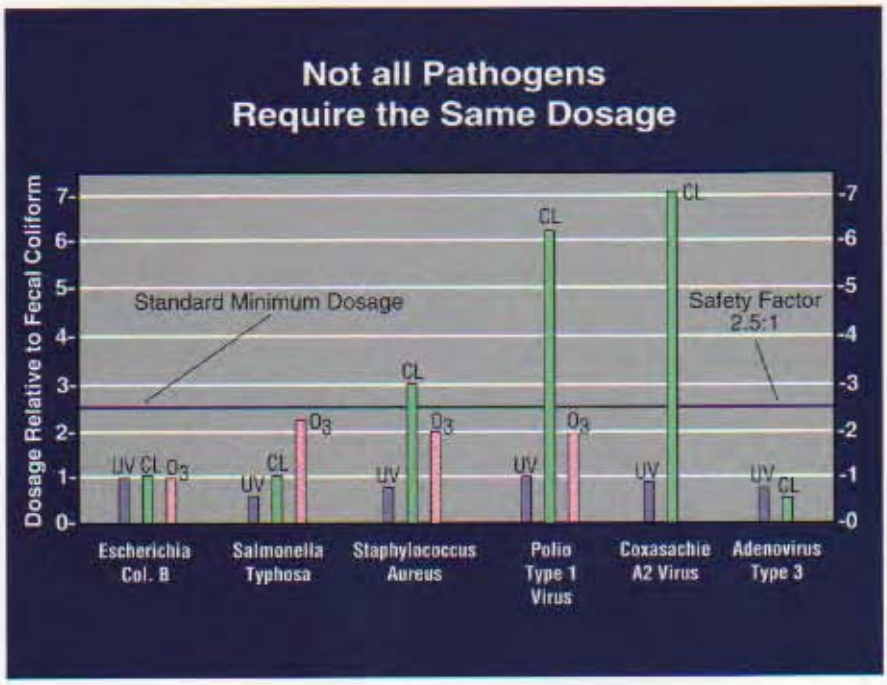
Wastewater treatment plants are rarely identical, therefore we offer a variety of UV systems customized to meet your requirements. The most popular products Ultratech Systems offers are the open channel modular disinfection systems.

Our systems include

- The TERMINATOR series of vertical disinfection modules.
- The ELIMINATOR series of horizontal disinfection modules.
- Closed Chamber Reactors (pressure vessel systems).

The ELIMINATOR series is also available in packaged versions, complete with stainless steel channel and flow level control—making it ideal for low flow rate applications.

Whether you need to treat 50,000 gallons per day or 500 million gallons per day, Ultratech Systems is your source for powerful, effective and environmentally safe ultraviolet disinfection.



The Process

Ultraviolet Light

Ultraviolet light forms part of the invisible spectrum of sunlight (range):

- 185 nanometer UV can convert oxygen to ozone.
- 254 nanometer UV destroys micro-organisms.
- 300 nanometer UV results in a suntan.

In the early 1900's, scientists created an economical source of germicidal light; the low pressure mercury arc

lamp. Today, Ultratech Systems produces systems featuring high levels of germicidal UV light (254 nm) with cost-effective low energy consumption.

Germicidal properties

Germicidal ultraviolet destroys micro-organisms by disrupting the components of their nucleo proteins (DNA). When an adequate dosage of ultraviolet light strikes the wastewater, microbes are destroyed:

- Bacteria
- Viruses
- Algae
- Molds
- Yeasts

Its effect on water

Ultraviolet light disinfects by directly attacking the microbes without altering the physical or chemical properties of the water. It provides for bacteria-free water without creating toxic compounds.

Dosage

Dosage is determined by:

- the number of UV lamps
- hydraulics
- retention time
- UV transmittance

UV transmittance is affected by suspended solids, color, turbidity and the presence of UV-absorbing compounds.

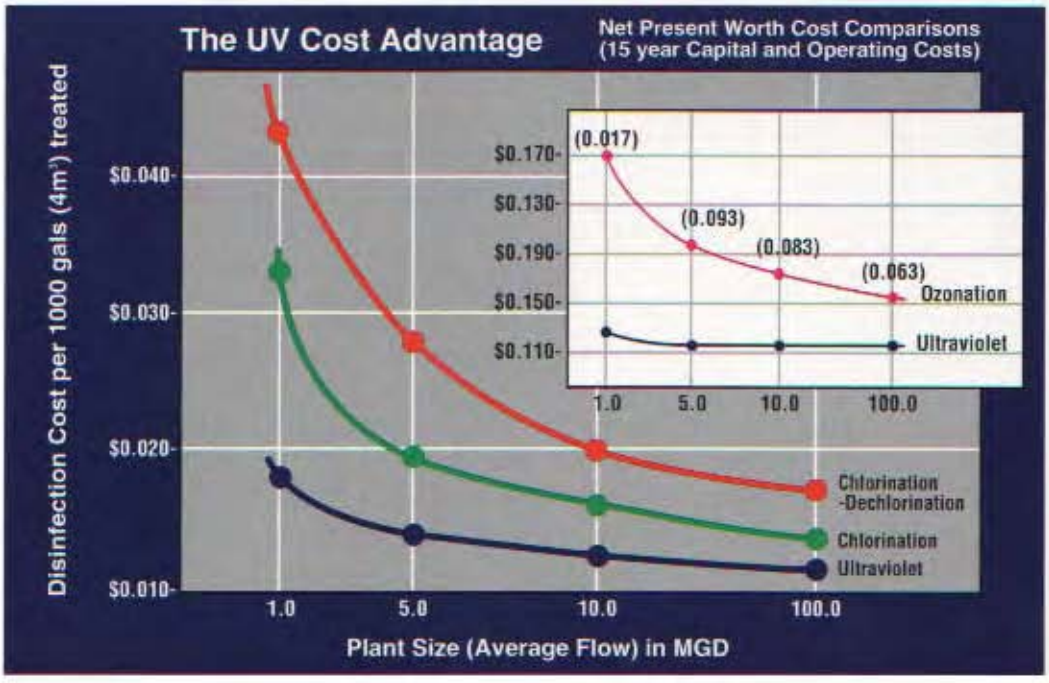
Since there is no danger of overdosing, Ultratech Systems's UV disinfection systems are designed with a liberal disinfection safety factor.

The designs take into account:

- peak effluent flow,
- lamp depreciation,
- formation of coating on quartz jackets,
- possible deterioration in quality of effluent.

The Safe Choice

Unlike chemically based systems, UV light is a completely safe method of wastewater disinfection for the environment, the treatment plant personnel and the surrounding community.



Safe for the Environment
Chlorine, even in low concentrations, is toxic to fish and other aquatic life. Dechlorination, *the process of adding another chemical to neutralize the toxic impact of chlorine,* may reduce the destructive impact on aquatic life, but has no impact on the carcinogens such as trihalomethanes (THMs) which are formed when chlorine combines with organic compounds in wastewater. UV does not alter the chemical or physical properties of the wastewater.

Safe for Operating Personnel and the Surrounding Community
Due to its toxic and explosive properties, chlorine requires specialized transportation and storage. In addition, personnel require special training and safety equipment. Ozone, another highly toxic compound, is expensive to operate and maintain, and under certain conditions can create ammonia in the effluent.

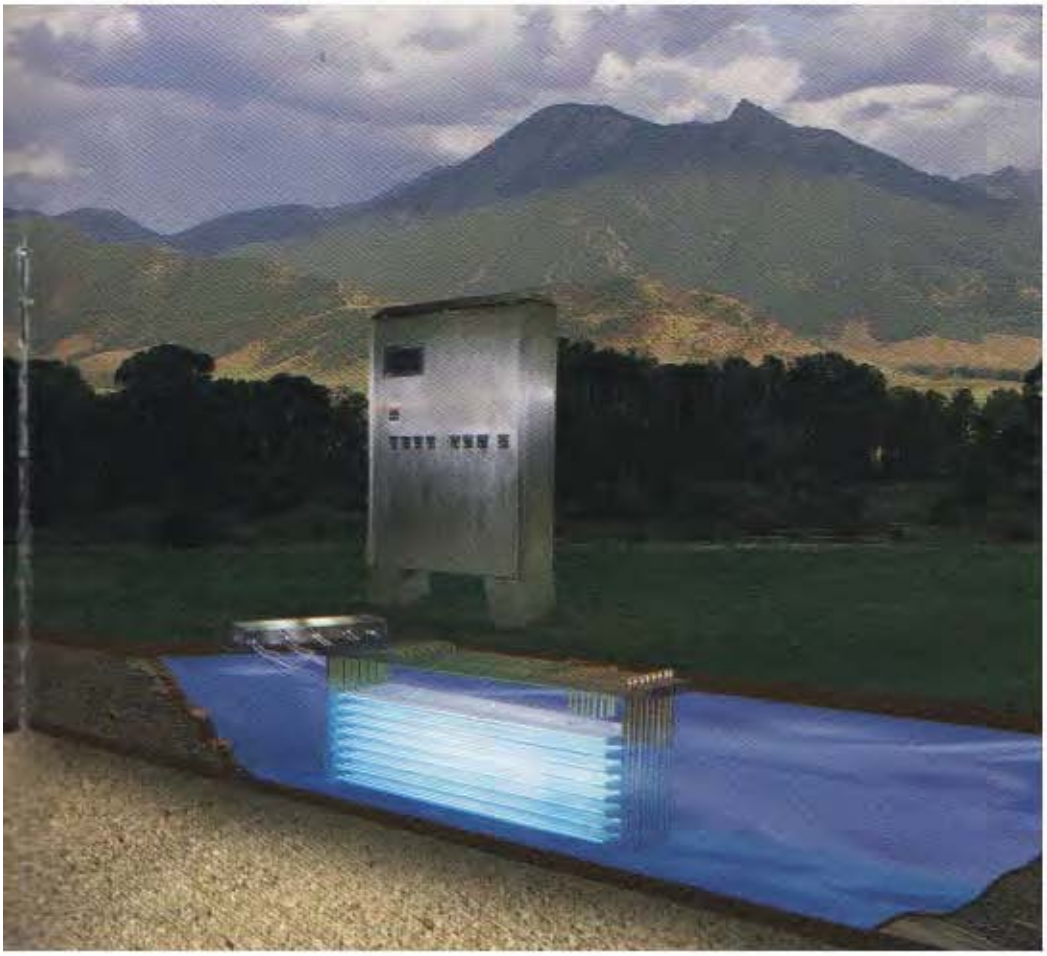
The ultraviolet systems designed and produced by Ultratech Systems provide for effective wastewater disinfection with none of these ill-effects, special handling requirements or exorbitant maintenance costs.

Cost Effective
Complete disinfection of wastewater by ultraviolet light takes place in seconds. Chlorine requires up to 30 minutes retention time in a large contact tank. *A 10 MGD wastewater plant would require a contact chamber of over 200,000 gallons.* UV systems do not require costly tank construction (with the prerequisite land requirements) nor do they require expensive safety equipment to guard against exposure to toxic compounds.

These attributes make ultraviolet today's method of choice for wastewater disinfection. Experience, innovation and cost-effectiveness make Ultratech Systems the manufacturer of choice for UV equipment.

The Product

The objective of a well designed UV system is to deliver the proper dosage of UV light to the microorganisms in the wastewater. This can be accomplished with an *open channel vertical design, open channel horizontal*



design, or a closed vessel reactor. Ultratech Systems has the planning and manufacturing facilities to offer quality, custom-designed, ultraviolet disinfection equipment in all three of these configurations. Our systems include efficient, low pressure UV lamps protected from contact with the effluent by quartz jackets. The lamps, provided in sufficient number and arranged in the appropriate pattern, are held in place by a 316 stainless steel module or chamber.

TERMINATOR Series Open Channel Vertical Design

In this configuration, the UV lamps extend vertically down into the channel from a self-supporting stainless steel enclosure. The UV lamps are arranged perpendicular to the horizontal flow of the effluent to maximize exposure of the effluent to the ultraviolet light. The vertical design extends the light contact area up to 5 feet both upstream and downstream of the module.

The advantages of the vertical design are:

- Lamps may be changed without removing the module from the channel.
- All electrical connections are above the water line.
- All seals are above the water line.
- Greater flexibility for flow pacing-*(operating lamps in relation to flow).*
- Optionally available plug & play expandability.
- Optionally available: fully automatic in channel cleaning system.

ELIMINATOR Series Open Channel Horizontal Design

In this configuration, the UV lamps extend horizontally into the channel from a self-supporting stainless steel rack. The UV lamp arrangement is parallel to the flow with all portions submerged. Open channel horizontal designs are selected for minimum head loss requirements and shallow channel configurations. Horizontal systems are ideal for package plant applications and are available equipped with a stainless steel channel.

Closed Chamber Reactors

A sealed disinfection chamber which can be

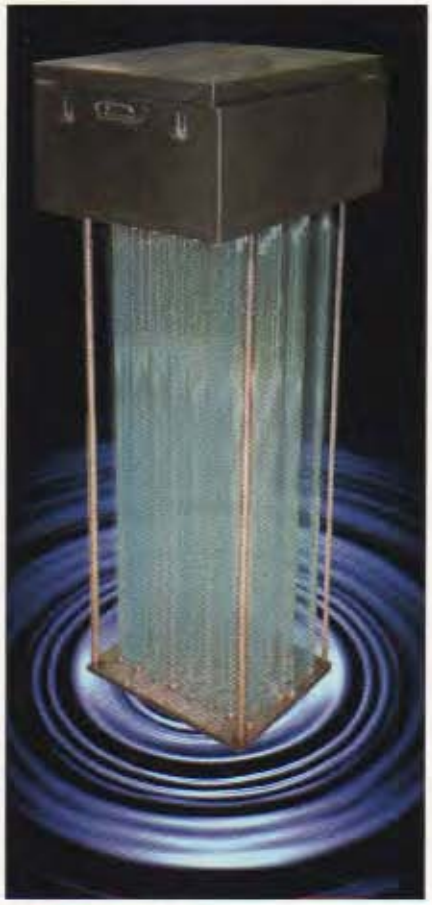
used in pressurized systems; the UV lamps are installed within a stainless steel chamber with removable ends for interior access, and include inlet and outlet pipe connections.

Monitoring Controls Ultraviolet intensity

A Spectrally selective continuous UV intensity sensor is installed in the wastewater stream opposite one of the UV lamps. Any changes in the UV intensity as a result of quartz fouling, depreciation in effluent quality or UV lamp output is immediately sensed and displayed on a monitor. Preset alarm signals are provided to alert the operator of conditions which would indicate the need to clean the quartz jackets, change the lamps or take other corrective action.

Individual Lamp Monitoring

The on/off status of each UV lamp is monitored and a signal is generated in the event of UV lamp failure. A display showing the status of the UV lamps can be remotely located in the control room of the plant. The display is typically arranged in the same geometric pattern found in the module and facilitates immediate location of the non functioning lamp.



TERMINATOR™

Elapsed Time Indicators

Ultraviolet lamps will continue to burn with a blue light even after the germicidal intensity has depreciated below an acceptable level. The ETIs record the total hours of operation for the system and for each individual bank of UV lamps. This feature allows for lamp replacement as needed for optimal disinfection.

State-of-the-Art Process Control

All monitoring functions and alarms are recorded and displayed by a computer-generated, real time graphic display. This enables complete monitoring of the UV system from a remote location. The programmable logic controller and/or computer also functions as a data acquisition unit continuously recording the status of the UV system for a historical print-out or display. The computer operates autonomously and can be interfaced with a plant control system. The system provides remote diagnostics to enable factory personnel to perform system checks.

Cleaning Options

Periodically the quartz jackets protecting the UV lamps from the effluent will become coated. These coatings prevent maximum UV energy from entering the wastewater and reduce system disinfection effectiveness. Ultratech Systems offers both in channel and out of channel cleaning methods. The preferred method provides a portable cleaning station where modules are removed from the channel. Modules are cleaned in a chemical solution with optimum agitation being provided by the cleaning station. Typically food grade citric acid or another environmentally safe cleaner is utilized. For in channel cleaning we offer

either an air scrubber or a mechanical wiping system. This method serves only to extend the time between module removal and chemical cleaning.

Level Control

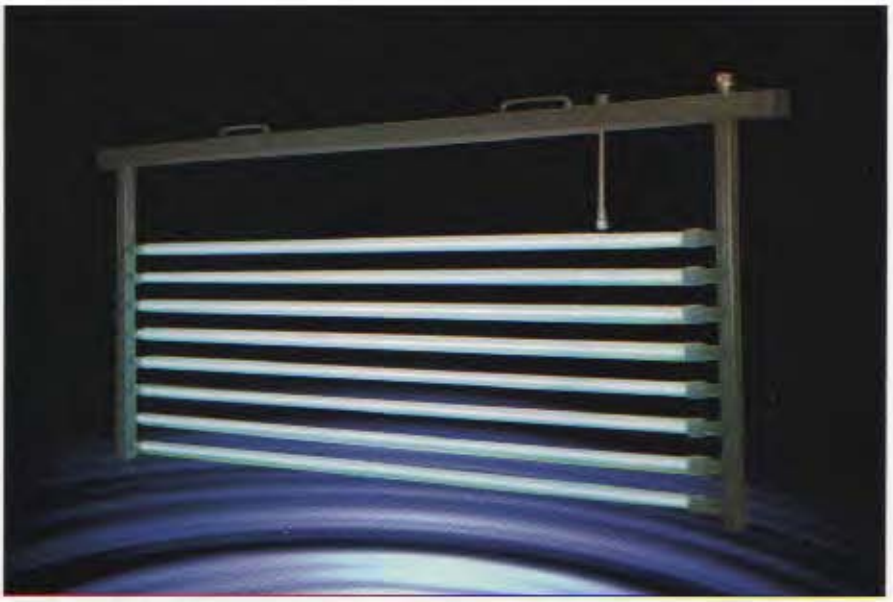
In all open channel UV systems the effluent level in the channel must be controlled within a specified range, regardless of the flow rate. In many cases, this can best be accomplished by utilizing a fixed weir. Ultratech Systems' technical staff can provide assistance when fixed weirs are not practical. Ultratech Systems can also provide alternate level control devices such as an adjustable flap gate when required.

Power Supplies

Ultratech Systems' engineers will select the correct power supply for your specific requirements from electronic ballasts or standard electromagnetic ballasts. The ballasts can be remote mounted or integrated with the UV disinfection module.

Indoor or Outdoor Installations

Ultratech Systems is aware that some geographic areas are best served when sections of the entire ultraviolet system are installed indoors. All our components are constructed and rated for outdoor installation. Our technical team is available to assist you in making this determination. Ultratech Systems' designs provide indoor/outdoor flexibility.



ELIMINATOR™

The People

Ultratech Systems Inc. is an American corporation comprised of the most experienced and talented individuals in the ultraviolet industry. The technical group has over 100 years of experience and leadership in ultraviolet technology. Ultratech Systems personnel were directly involved in many significant UV developments such as: *bioassay method for dose determination, the first open channel wastewater system, in place cleaning, portable cleaning stations, the single ended UV lamp, and the first UV wastewater disinfection system to treat over 100 million gallons per day.*

Ultratech Systems maintains an in house design and manufacturing facility with controls for raw materials, the manufacturing process and on-site start up projects. The Ultratech Systems' manufacturing staff only produces ultraviolet equipment. Our engineers, scientists and sales representatives will be pleased to work with you on the design and development of a UV system to meet your specific performance requirements.