

# TWT® “THE COMPETITIVE EDGE”

WATER CONDITIONING & PURIFICATION COMBINED for MAXIMUM EFFECTIVENESS

CHEMICAL-FREE HARD WATER CONDITIONING & TREATMENT WITH ULTRA VIOLET DISINFECTION & PURIFICATION TECHNOLOGY

CUSTOM ENGINEERED • DESIGNED • INTEGRATED • ASSEMBLED  
ST/ST SKID-MOUNTED HIGH VOLUME /HIGH UV DOSE WATER TREATMENT  
DISINFECTION & PURIFICATION SYSTEMS

TWT has extensive design, engineering, manufacturing, consulting and training ability to work with customer's worldwide, and to use its products and/or systems in whole or component form, as a component assembly for their industry specific use. Take advantage of our outstanding manufacturing and marketing expertise.

Let TWT custom design & build a water treatment system to meet your specific application (footprint), flow rate and and/or system integration requirements.

Custom Engineered Multi-Process Modular Water Treatment Systems, Designed and Built For High Volume or High Dose Applications To Customer's Specifications.



## TWT-UV-5007 (200 GPM)

- Rated Flow: 833 Liters per minute 200 Gallons per minute
- Rated Flow UV Dose: 40 mJ/cm<sup>2</sup> (40,000 uwsec/cm<sup>2</sup>) @ 95% T
- Number of lamps: 7 (110 Watts each)
- Electrical Supply: 120V/60Hz, 3 Amp
- Maximum Operating Temperature: 37°C (98.6°F)
- Maximum Operating Pressure: 125 psi - 8.6 Bar (tested to 500 psi)
- Plumbing: 3" flange In-Out
- Unit Dimensions: 56" L x 12.5" W x 20" H
- Controller Dimensions: 33.6" x 25.2" x 12"
- Unit Weight: 130 lbs (59 kg)
- Controller Weight: 60 lbs (27 kg)
- Body: 316 Stainless Steel
- **Skid Mounted Optional**



## TWT-SKD-5007X3 (Custom Built)

- High UV Dose Applications
- Rated Flow 100 GPM (375 LPM)
- UV Dose at Rated Flow >186 mJ/cm<sup>2</sup> at 95% UVT
- Number of UV Lamps 21
- Electrical 208V 3 phase 4 Wire



## TWT-SKD-5007X6 (Custom Built)

- High UV Dose Applications
- Rated Flow 250 GPM (950 LPM)
- UV Dose at Rated Flow >186 mJ/cm<sup>2</sup> at 95% UVT
- Number of UV Lamps 42
- Electrical 208V 3 phase 4 Wire

- Modular systems can process large volumes of water depending on UV configuration and UV dose required.
- System design, flow rates of up to 1800 gpm are achievable depending on application requirements and initial water quality. Can be designed for flow scaling.
- Custom configurations designed to meet high volume or high dose applications.
- Sanitary fittings as required, based on application type.

- Units may be configured for redundant operations.
- Specifically designed for applications that require a large UV dose in excess 200 mJ/cm<sup>2</sup> based on initial water quality and in excess of traditional industry standards for water treatment and disinfection.
- Units shipped to customer's ready to put in place, plumb into water feed line & operate (minimal maintenance requirements).

## Ultraviolet Sterilization Technology

Ultraviolet disinfection systems are mysterious to many people – how can “light” kill bacteria? But the truth is it can. Ultraviolet (UV) technology has been around for over 50 years, and its effectiveness has been well documented both scientifically and commercially. It is nature’s own disinfection/purification method. With consumers becoming more concerned about chlorine and other chemical contamination of drinking water, more dealers are prescribing the ultraviolet solution suitable for both small flow residential applications as well as large flow commercial projects.

Ultraviolet is a means of killing or rendering harmless microorganisms in a dedicated environment. These microorganisms can range from bacteria and viruses to algae and protozoa. UV disinfection is used in air and water purification, sewage treatment protection of food and beverages, and many other disinfection and sterilization applications. A major advantage of UV treatment is that it is capable of disinfecting water faster than chlorine without cumbersome retention tanks and harmful chemicals. UV treatment systems are also extremely cost efficient!

### What is UV and how does it work?

Ultraviolet is one energy region of the electromagnetic spectrum, which lies between the x-ray region and the visible region. UV itself lies in the ranges of 200 nanometers (nm) to 390 nanometers (nm). Optimum UV germicidal action occurs at 260 nm.

Since natural germicidal UV from the sun is screened out by the earth’s atmosphere, we must look to alternative means of producing UV light. This is accomplished through the conversion of electrical energy in a low-pressure mercury vapor “hard glass” quartz lamp. Electrons flow through the ionized mercury vapor between the electrodes of the lamp, which then creates UV light.

As UV light penetrates through the cell wall and cytoplasmic membrane, it causes a molecular rearrangement of the microorganisms DNA, which prevents it from reproducing. If the cell cannot reproduce, it is considered dead.



### Design and Dosage

The design of an ultraviolet sterilizer has an extremely important bearing on how the UV Dose is delivered and Dosage is the most critical function of UV disinfection. As individual UV lamps emit a set amount of ultraviolet energy, it is important that a system be sized correctly. Flow rates are the determining factor and must not be overstated. Contact time, which is the time the water is within the sterilization chamber, is directly proportional to Dosage, which is the amount of energy per unit area (calculated by dividing the output in watts by the surface area of the lamp), and thus the overall effectiveness of microbial

destruction in the system. This product of intensity and time is known as the Dose and is expressed in microwatt seconds per centimeter squared (uWsec/cm<sup>2</sup>). **Divide by 1000 to express the dose in mJ/cm<sup>2</sup>, the preferred notation. DOSE = time (sec) x output (watts) area (cm<sup>2</sup>)**

**The basic functions and components to be used for aquaculture, water bottling plants, breweries, waste water applications or any other type of liquid processing (fluid based) requiring high volume, high water quality applications, are as illustrated (front page) and as follows.**

- For waste water applications use, double flow rate equals GPM system requirements for maximum UV dose and efficiency

### Factory Assembled & Mounted Fluid Management Systems. These fluid management systems are compact, self-contained, skid-mounted unit for the treatment of water.

TWT systems applies all the needed elements for maximum fluid protection, management, and peace of mind in a simple packaged solution. Technologically advanced method for water & fluid management, Separator/Filtration (optional), TWT® Micro-processor Deposit Controller, Reaction Chamber, and UV Disinfection/Purification units are combined to provide a start-to-finish answer to simplified prevention, treatment and management of water line contamination dangers and equipment.

### Ultra-Violet (Unit Used in Skid Mounted Systems)

The UV disinfection/purification technology used in the system provides safe water, free of disease-causing pathogens. As water passes through the UV chamber, UV light will attack and render harmless any bacterial, viral or spore contamination present in the treated water. “High intensity UV light destroys these contaminants with a 99.9% kill rate or greater” The output water is thus disinfected and offers exceptionally high quality conditioned water.

All units are expertly constructed of # 316 stainless steel to high quality control standards. The units operate continuously, automatically and inexpensively. UV lamp replacement is easy. The germicidal lamp is effective for approximately 8,000 hours which means extremely cost effective water sterilization over the long term.

The industrial size TWT-UV-5007 sterilizers can assure a ready supply of safe, pathogen-free water for manufacturing processes or human consumption.

Applications include all types of liquid processing. With the capacity to remove disease-causing microorganisms effective to a 99.9% kill rate or greater at 200 G.P.M. (820 L.P.M.), you can eliminate the need for chemicals and reduce high overhead costs. TWT has the technical expertise to assess your water problems and when needed, pre-filtration systems may be added to the TWT-UV-5007 sterilizer. Environmental safety is our priority, therefore no chemicals are added and the PH balance of the water is unaffected by UV sterilization.

#### **Suggested UV lamp replacement for all skid mounted systems:**

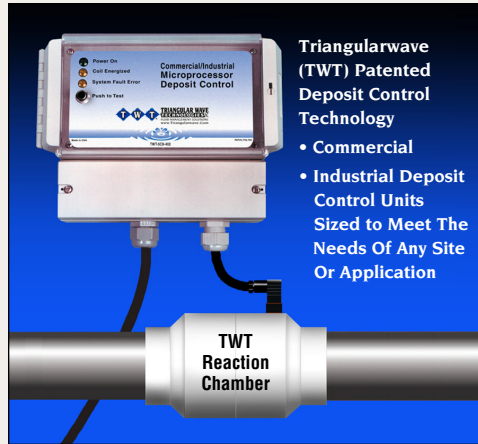
To ensure adequate disinfection/purification of water line contamination, replace UV lamps every 12 months (or sooner depending on water use, quality and conditions).

**Note:** TWT Inc. recommends that an initial supply of replacement products e.g., UV lamps etc. be stored at owners facility at all times, that will insure uninterrupted service and treatment.

# The basic functions & components of TWT, Inc. high volume, high dose fluid treatment systems can be designed, integrated and assembled to combine various treatment methods that meet your industry specific process needs.

## TWT Patented Deposit Control System: Optional Application Prior to Ultra Violet Units

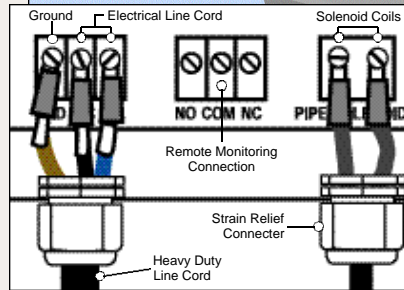
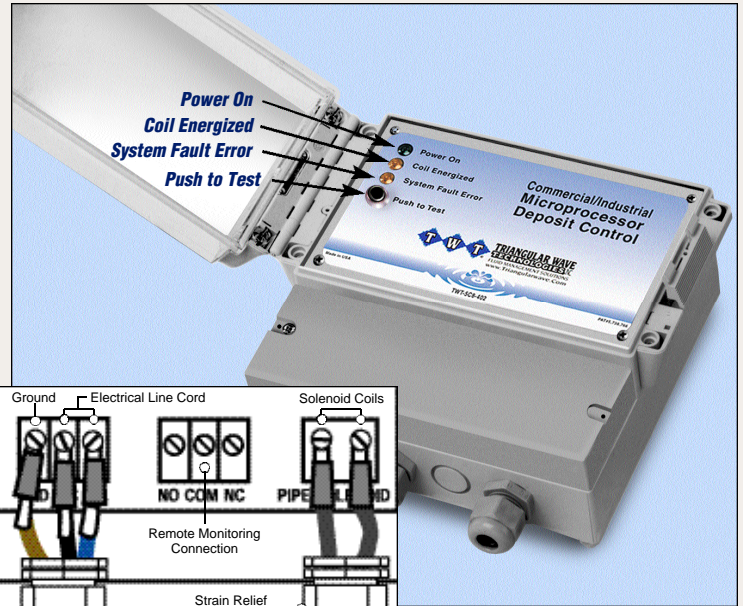
The basic component in the TWT systems is the deposit controller. It is comprised of a microprocessor, and reaction chamber. The microprocessor is a patented controller that functions like a computer to relay a continuous electrical power supply to the solenoid coil reaction chamber. The reaction chamber is plumbed into the main water in-take line and/or just before each piece of vital processing equipment, and provides a factory-wrapped wire coil forming a solenoid. The solenoid conveys the triangular wave signal at the appropriate power level (as allowed by the model chosen) to the water passing through the chamber.



This means that the breeding environments for bacteria, such as bio-film and corrosion, are eliminated. The agitation created in the reaction chamber also disrupts the

conditions essential for the normal reproduction of bacteria and they die, thus allowing them to be harmlessly flushed out of the system. If left untreated, scale build-up inside the reaction chamber and on the quartz sleeve containing the UV lamps may rapidly diminish the UV disinfection effectiveness by reducing the amount of UV light which is absorbed into the water stream. The TWT Deposit Control System will further condition the filtered water stream so as to prevent this scale-build-up inside the UV reaction chamber, helping to maintain maximum UV life cycle and penetration into the water stream.

TWT Systems have no moving parts and minimal maintenance requirements. The Triangularwave Deposit Control remain on all of the time. The control panels have indicator lights and alarm circuits



### Triangularwave (TWT) Generator Surpasses Other Wave Form Generators

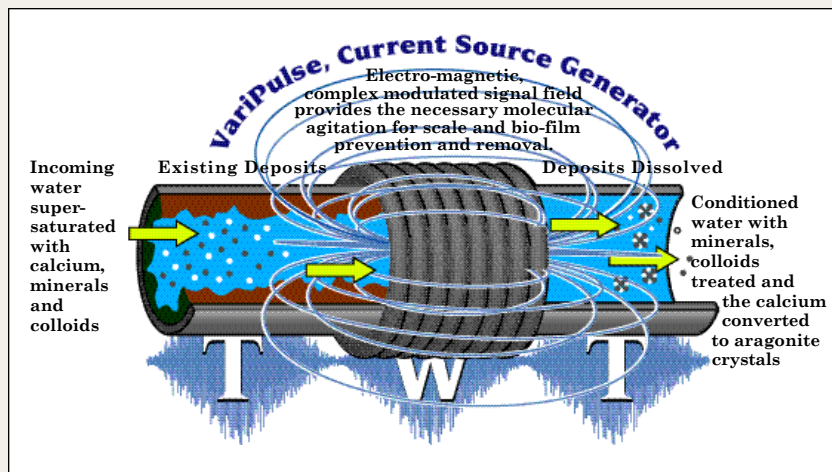


### The Difference In Technology Matters!

to show any problems caused by external forces; such as damage to the coils or insulation or damage to the electrical connections.

### Benefits of TWT® Deposit Control Technology:

TWT chemical-free deposit control (hard water conditioning & treatment) systems enhance other treatment technologies as well, including chemicals, ozone, ultraviolet, separators and other filtration systems, keeping them clean and enhancing their operation. In this way, their full treatment benefits are realized, with reduced maintenance requirements.



Simply Said... a clean, corrosion-free delivery system is restored and maintained in an environmentally safe and chemical-free manner. The result is clean pipes and tubing with no biofilm and reduced bacterial contamination.

Test proves Triangularwave Technologies, Inc. (TWT) Deposit Control System reduces the fouling effects caused by "hard water" on the quartz sleeve and UV lamps inside the disinfection/purification unit and enhancing UV operation while maintaining the residual effects downstream chemically free.



## Features & Benefits of Custom Engineered, Designed, Integrated and Assembled St/St Skid-Mounted High Volume /High UV Dose Water Treatment Disinfection & Purification Systems.

- Short payback period (pays for itself) • Prevents scale buildup • Eliminates toxic chemicals
- Reduces corrosion • Controls algae and bacteria • Less downtime for equipment repairs and maintenance • Unpolluted discharge-environmental compliance

**TWT treatment equipment is a reusable investment and retains its value – if you move your facility or re-engineer your plumbing system, TWT equipment moves with you.**

### Easy to ship anywhere in the world

The system is fully self-contained and mounted on transportable skid. The total dimensions are within allowable limits, making it possible to ship by air-freight to any international airport.

Easy to follow care, maintenance & operational procedures and other basic informational labels will be permanently affixed to the TWT system. This information will ensure owners of a long and reliable lifecycle if system is properly cared for (system requires minimal maintenance).

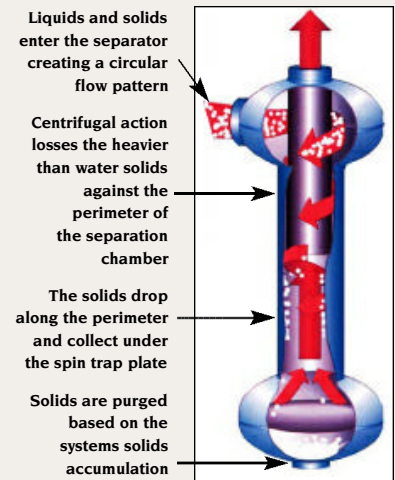
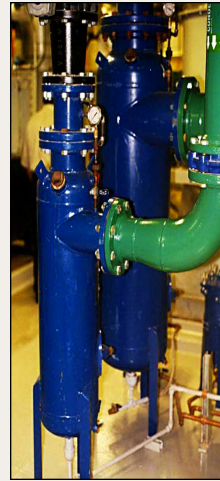
### Separator/Filtration: Optional System Integration

Filters/separators are designed to trap various kinds of debris, dirt and organic particles that will otherwise enter your equipment and/or plumbing system, restrict your water flow and create a breeding ground for bacteria.

#### **Please Note: Custom built to order only**

System engineering design, weight, size and system component assembly will vary based on TWT engineering review, water conditions, application, industry and/or customer specific needs. Pumps, piping, fittings, valves, and other material needed to and from system owners responsibility. Current/voltage source to be determined at time of purchase

System specifications may be subject to change and are based on industry specific application requirements.



**Custom Engineered Multi-Process Modular Water Treatment System, Designed to Customer's Specifications.**

**Integrated Modular Fluid/Water Treatment & Conditioning – All-In-One Packaged Solution. Efficient, Cost Effective & Reliable**

In order to ensure the greatest level of performance and satisfaction working with TWT products and systems, we recommend that you contact our engineering staff, [info@triangularwave.com](mailto:info@triangularwave.com) who will be pleased to work closely with you to determine the optimal treatment requirements, system selection, installation and application for your industry specific project.

### Partial List Prospective Markets & Applications

- Agriculture • Laundry & Cleaning Industry • Condensers & Chillers • Hotel/Motel Restaurants
- Health Care • Beverage Bottling Industries • Emergency Water Systems • Food Processing & Supermarkets
- HVAC/Cooling Towers • Irrigation • Marine Industry • Medical/Dental • Pharmaceuticals • Potable Water
- Pollution Remediation • Power Generation • Swimming Pools & Spas • Waste Water Treatment
- Well Water Treatment and Anywhere The Need For Cleaner Softer Water is Required

TWT\* has the versatile, efficient, cost-effective methods to solve your water/fluid management problems end to end.

**TWT The Ultimate in Water Treatment & Conditioning**

**TWT® "The Competitive Edge"**

**Go Green-Save Green**

