

# Unilite<sup>®</sup> cooling tower

MARLEY<sup>®</sup> 



# Ceramic legacy brand



## THE INNOVATIVE SOURCE

In 2002 Ceramic Cooling Tower was acquired by SPX Cooling Technologies, an industry leader with a global reputation for high quality cooling tower design and construction. SPX Cooling Technologies is one of the world's premier manufacturers of heat transfer and thermal energy equipment for power generation, air conditioning, refrigeration, and industrial process cooling.

As an industry leader in research and development, SPX Cooling Technologies offers an extensive product line of cooling towers, several of which are CTI Certified.

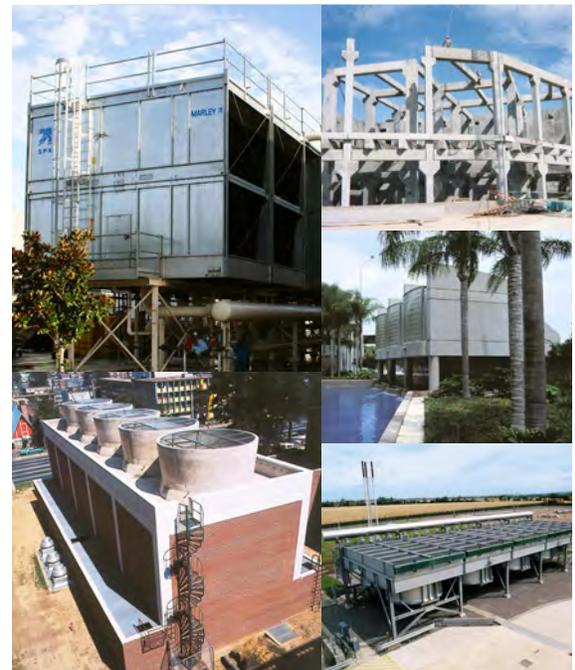
Founded in 1947, Ceramic quickly established the concept of the "permanent" cooling tower structure, while pioneering the use of non-clogging ceramic tile fill material. The successful marketing of this permanence concept evolved progressively to a family of long-life fiberglass cooling tower structures. This pioneering spirit, combined with years of research and development in materials and structures, led to one of today's state-of-the-art cooling tower structures composed of high-tech pultruded structural members. Offering many advanced features available only from SPX, the Marley Unilite solves many of today's cooling tower requirements.



# SPX Cooling Technologies

## DYNAMIC SYNERGY: A COLLABORATIVE APPROACH

SPX Cooling Technologies is the world's only full-line cooling tower, fluid cooler and air cooled condenser manufacturer. SPX Cooling Technologies designs, manufactures, and markets cooling products for global power generation, industrial, refrigeration and HVAC markets. With a focus on customer productivity, solutions and services, SPX Cooling Technologies offers complete design engineering, construction, and a wide range of services from repair, reconstruction, and performance contracting.



## Unilite features and benefits



Marley and Ceramic were industry leaders in pultruded composite structure technology when fiberglass was introduced to the cooling tower industry in the 80s as a structural material. Combined with superior composite fiberglass materials and advanced heat transfer technology, the result is a high quality, cost effective cooling tower that excels across a broad range of air conditioning and industrial applications. Benefits of the Unilite and Unilite L cooling towers include:

**Long Life** – Both towers use high-performance fill materials ( 25-year Permagrid® fill is available for the Unilite tower; and economical, lighter-weight PVC fill is used for both the Unilite and the Unilite L). The use of superior fill and mechanical components results in cooling towers with impressive lifespan advantages over conventional towers.

**Initial Cost Equivalence** – The patented Unilite system uses pultrusion, automated robotic fabrication, simplified design, and reduced site labor to bring the costs of a permanent cooling tower within the reach of conventional cooling tower budgets.

**Minimized Operating Cost** – The simple, open structure of the Unilite Cooling Tower streamlines the air flow path, reducing fan energy consumption. The low-pressure, non-clogging water distribution system provides energy savings by reducing pumping head. Thermal performance is lab-tested, field-proven, and backed by SPX's performance guarantee.

**Lower Maintenance Costs** – The Unilite tower's pultruded composite materials offer long life in the harsh cooling tower environment of aggressive chemicals and industrial water quality. Frequent inspections and repair due to corrosion and biological attack are virtually eliminated.

**Replacement Cost** – The Unilite cooling tower offers longer life expectancy than conventional wood, steel and concrete cooling towers, answering the need of engineers, architects, and industrial plant and utility plant owners for a permanent cooling tower.

**Fire-Retardant Construction** – With fire-retardant construction, sprinkler or wet-down systems could be eliminated from the design. The Unilite tower structure requires minimal maintenance.

**Reduced Basin Cost** – The tower's wide-spaced column layout simplifies the tower structure, minimizing the number of required piers or pilasters, and reducing basin costs.

**Quiet Operation** – Utilizing highly efficient fans, air noise has been greatly reduced in the Unilite cooling towers. These towers are designed with low air inlet velocities, and fan inlets are gently eased for a smoother air transition.

**Environmentally Friendly** – No hazardous preservative chemicals are required with the Unilite tower design.

**Factory-Trained Personnel** – SPX's large corps of dedicated company superintendents ensures the highest quality results for field-erected cooling towers. This highly-trained team provides consultation for all on-site cooling tower construction personnel, and supervises the cooling tower installation.

**MARLEY**®

# Unilite design

## Design Advantages of Unilite and Unilite L Cooling Towers

– Unilite towers utilize tile and/or PVC fill. The use of superior fill and quality mechanical components conveys impressive lifespan advantages over conventional towers.

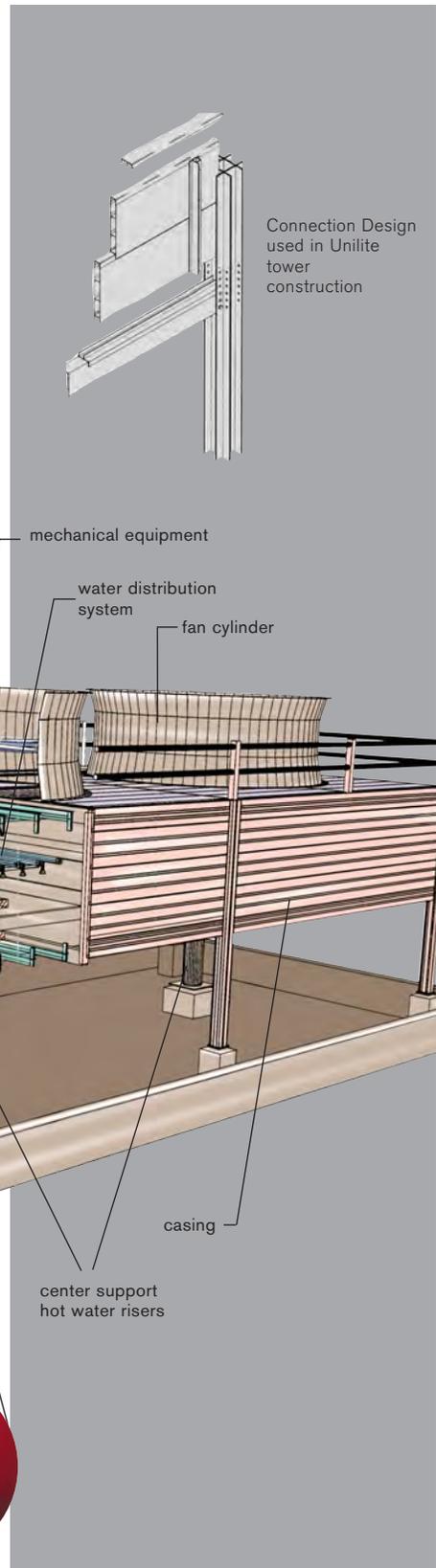
**Pultruded Composite Members** – An important advancement in materials technology, the pultruded composite fiberglass utilized in Unilite cooling towers is a man-made material possessing a superior strength-to-weight ratio compared to steel and concrete, and is endowed with high resistance to moisture and corrosive chemicals. The structural members also feature superior UV-resistant properties. Pultruded composite fiberglass includes a wide range of material grades and quality that is contingent on several variables, including the amount and type of glass fibers, glass mats, veils, resins, resin pigmentation, and resin ultraviolet inhibitors.



**Unilite Structural Concept** – The Unicolumn – The Unilite structural concept is based on a state-of-the-art system that relies upon shapes designed specifically for cooling tower duty, to provide a cost-effective, superior alternative to wood, concrete, metal, or ordinary fiberglass. The basis of the Unilite structural system is the Unicolumn, distinguished by its unique “tic-tac-toe” profile and 360-degree structural stability that provides an extremely high load-bearing capability. The Unicolumn's strength thus minimizes the number of vertical columns required in the tower structure.

## Patented Center Support Hot Water Risers

– The patented center support riser independently transmits the majority of the dynamic and dead loads associated with the mechanical and drive equipment, and lateral wind and seismic forces. This steel center support member provides a direct load path to the tower's foundation, reducing the dynamic loads on the composite members and their connections.



Connection Design used in Unilite tower construction



Unicolumn design



## Unilite design

**Additional features found in Unilite cooling towers include:**

**Drift Eliminators** – High-efficiency XCEL TU cellular PVC drift eliminators which force three distinct changes in air direction, resulting in low drift rates with minimal obstruction to air flow.

**Water Distribution System** – The closed system is designed specifically for low pressure operation and simple, easy maintenance. Large-port, non-clogging NS nozzles assure maximum water breakup and fill coverage, and can be easily removed for maintenance.

**Mechanical Equipment** – All mechanical components are engineered for continuous industrial service. High-efficiency fans made of corrosion-resistant materials are driven by a right-angle spiral bevel Geareducer®, selected with a minimum AGMA service factor of 2.0. All mechanical components are mounted on a welded galvanized steel support assembly, which maintains the alignment of rotating parts, and in larger units, the fan and gearbox loads are transmitted directly to the foundation through a central structural support member.

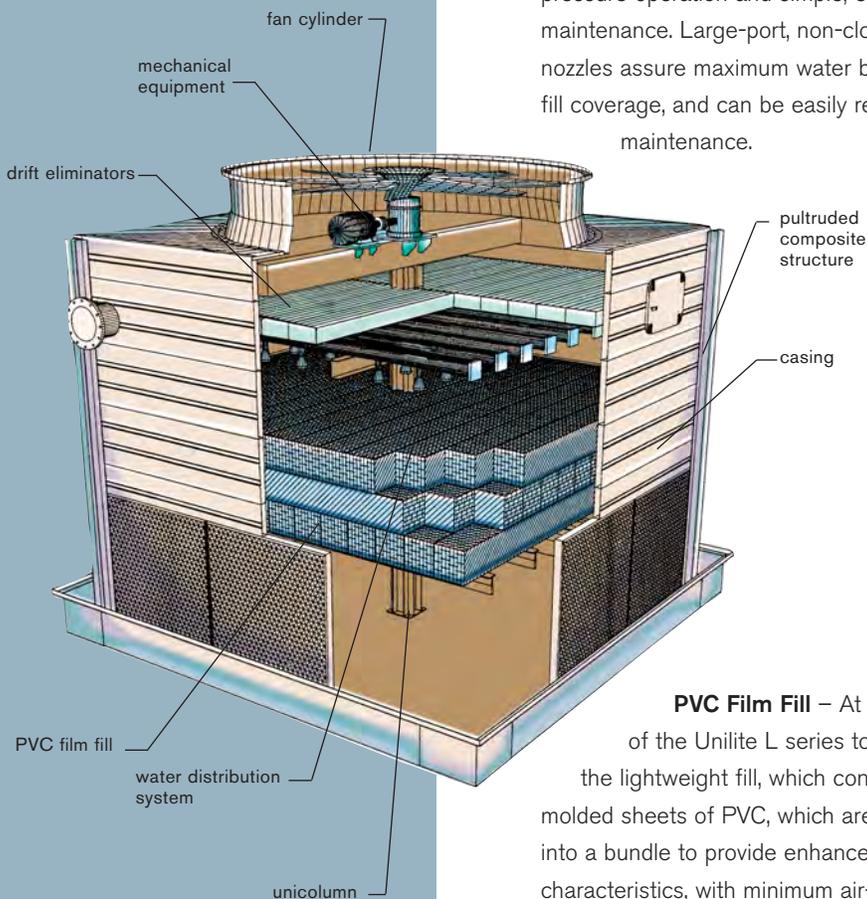
**Fan Cylinders** – These are venturi-contoured for smooth air flow, and are molded from heavy-duty, fire-retardant fiberglass-reinforced polyester (FRP), with integral stiffening ribs and reinforcing for impact resistance. On cylinders less than six feet in height, a heavy duty fan guard is included as standard equipment.

**Casing** – The heavy double-walled panel construction assures long-term structural integrity, and provides maximum corrosion resistance. At the same time, air bypass and water leakage is prevented with this type of construction. Tongue-and-groove joint connections insure maximum stiffness and minimum deflection.

**PVC Film Fill** – At the heart of the Unilite L series towers is the lightweight fill, which consists of molded sheets of PVC, which are assembled into a bundle to provide enhanced wetting characteristics, with minimum air-side pressure losses.

### Available Accessories

- Electric Water Level Control
- Basin Freeze Protection
- Air Inlet Louvers
- Access Ladder and Safety Cage
- Perimeter Handrails
- Two-Speed Fan Motors
- Vibration Cutout Switch



# Unilite design

## PERMAGRID® TILE FILL

The Permagrid tile fill is the most durable fill in the industry, with a guaranteed minimum of 25 years of service. Molded from domestic clay to strict specifications, the clay is heat fired to create a fill that is immune to traditional fill deterioration problems. Because this revolutionary tile fill is unaffected by ultraviolet exposure and fungal attack, Unilite towers are unusually well suited for harsh operating environments involving temperature extremes. Characterized by large openings, Permagrid tile is an excellent performer in the high-solid contents environment of dirty water applications.

## PVC FILM FILL

The PVC film-type fill is the heart of the Unilite L Series Cooling Tower's heat transfer system, and offers the highest performance in the least volume. The fill section consists of high-performance, heavy-duty, molded sheets of PVC film-type fill, the first choice for applications with moderate temperatures, and an environment where water quality will not result in fouling. The PVC fill has a flame spread rating of 15 or less per ASTM E84.



PVC Film Fill

## PULTRUDED COMPOSITES

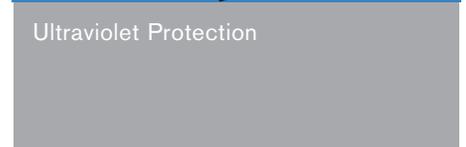
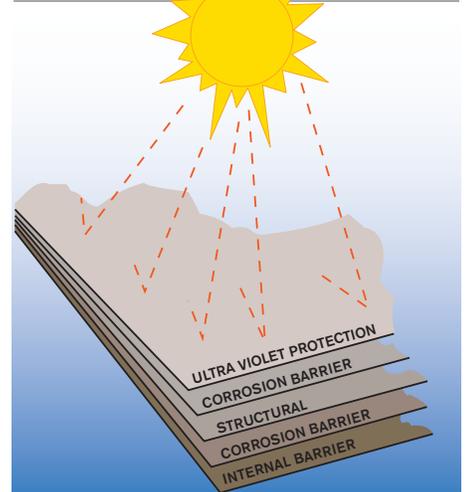
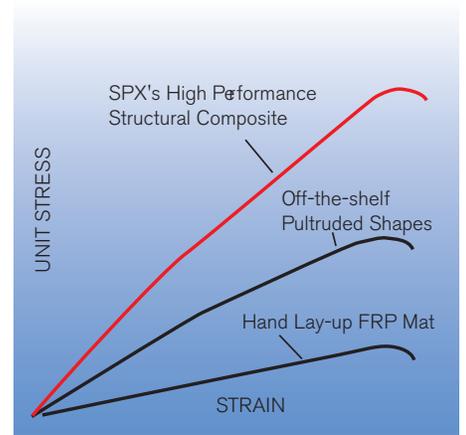
Because pultruded composites have definite predictable and measurable performance characteristics, extensive testing in the laboratory and in the field for long-term effects of deflection, loading, creep, bending, shear, tension, compression and temperature variation have enabled Marley to simulate and evaluate with confidence the performance of pultruded structural composites.

Ordinary commercial fiberglass shapes do not have this history of extensive testing and documentation and have not been designed and selected for demanding cooling tower applications in the heavy industrial market.

## ULTRAVIOLET PROTECTION

A crucial element in the design of structures using composite materials is the protection of the structural resins against the destructive effects of ultraviolet radiation. Knowing that cooling tower duty requires continuous exposure to sunlight, Marley designed its composite members to have the protection built in by means of an opaque surfacing veil molded in as each part is pultruded.

The surfacing veil, in combination with UV inhibitor and color pigment in the resin system, presents an opaque barrier to ultraviolet rays, preventing them from penetrating to the interior of the matrix where strength and long-term durability might be affected. Ordinary commercial fiberglass has not been designed for cooling tower applications, and does not possess this degree of protection and durability.



## aftermarket



SPX Cooling Technologies possesses a well-earned reputation as a leading provider of comprehensive engineering services to many industries, including power generation, chemical and petrochemical, and the comfort cooling sectors. Our service operations benefit from our combined international resources and expertise, providing our customers with rapid, flexible, and efficient service.

Our service expertise encompasses:

- Expert inspections
- Performance testing and evaluations
- Structural repairs
- Thermal upgrades
- High-performance, clog-resistant film and splash fill replacements
- Drift eliminator replacements
- Water distribution system upgrades
- Mechanical component replacements
- Full range of spare parts available for all OEM equipment

### SERVICE

Most cooling towers lose efficiency every year through normal wear. Eventually, the tower requires repair, upgrade, or replacement to meet modern standards.

Our mission is to provide the most advanced, cost-effective solutions for all cooling tower service requirements. Regardless of manufacturer, builder, or date of construction, SPX possesses the material resources to restore and enhance your cooling operations.

SPX's experienced, capable staff provides clients great benefit, derived from a 100-plus year legacy of service and construction. Manufacturing resources located around the world assure customers of prompt technical assistance and equipment availability.

### REPAIR

SPX Cooling Technologies has provided repair services for all situations for over 80 years. Experienced reconstruction specialists are strategically stationed for superior response to your cooling tower needs. After inspecting and assessing your tower's condition, these specialists identify the required repair and provide a time and cost estimate for returning the tower to appropriate operation. Regardless of the manufacturer of your tower, natural or mechanical draft, counterflow or crossflow, Marley can ensure that you meet the demands of reduced water temperature or lower power consumption requirements.

### PARTS

With plant operation relying on your cooling tower performance, selecting Marley / Ceramic OEM parts for your cooling tower makes long-term sense.

The potential long-term reduction in performance and reliability—as well as increases in costs and risks of losing FM and CTI ratings—could quickly undermine any initial savings that other part manufacturers may offer.

Because we design and manufacture exclusively for cooling towers, Marley parts are among the highest quality replacement products available, providing many years of service with minimal maintenance.

**MARLEY**® 



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