CCSolutions®
Composite Cooling Solutions, L.P.

FM APPROVED

Phoenix®

Fiberglass Counterflow

Field-Erected Cooling Towers

We do things differently and it makes all the difference for you.™

At CCS we have designed an e on the market — provi

Superior Quality and Reliability

Up to 200% greater rigidity in our raw material
We custom manufacture our FRP material using a special glass lay-up and higher glass content with no fillers in our resin for increased tensile strength and shear resistance.

Greater UV protection and wider pH range for chemical resistance
Our resin coating is 2-4x thicker than our competitors' standard resin, making our towers better able to withstand the elements, including extreme temperatures and sun damage.

More durable structure made with custom components
CCS does not rely on "off-the-shelf" shapes. Our components are designed, engineered and tested specifically for cooling tower use.

Stronger connections and tighter joints
Our patented two- and three-bolt structural connections are stable without spacers or torquing, and we anchor every column to the basin.

More flexibility in performance
Our Multi-Flo™ distribution system allows the number, location and capacity of spray nozzles to be optimized to match tower dimensions and performance requirements. With Multi-Flo, turndown capabilities can be as low as 30-50% of total capacity for efficient tower operation through a wider range of load conditions.

Optimal Project Execution

ThermaFit™ for optimal design
CCS' ThermaFit software is a powerful sizing and selection tool that helps engineers and CCS representatives design and select the optimal tower design for the application from a range of possibilities. This saves valuable design time up front, matching size and performance requirements without being restricted by other manufacturers' "standard product" limitations.

Shorter lead time
We developed a proprietary software system to automate structural design and bill of materials, enabling industry-leading delivery time of materials to site.

Flexibility to fit any footprint
Only CCS uses 6 x 6-inch "power columns" that can be spaced at any increment up to 14 feet apart. That means our towers can be matched to the exact space available for improved efficiency and lower energy costs.

25-35% faster installation for less time on site
With larger columns and spacing, our structure requires 75-85% fewer columns, connections and hardware pieces than other providers' towers — significantly reducing the training and installation hours needed. Our lean assembly processes include pre-packaged/marked components and standardized hardware to eliminate guesswork and lower risk by reducing overall time on site.

Safer construction with fewer potential interruptions
Our stable, open-frame design allows the crew to tie-off anywhere on the structure and provides room in the basin to maneuver scissor lifts rather than working from ladders and scaffolding, increasing safety and efficiency.

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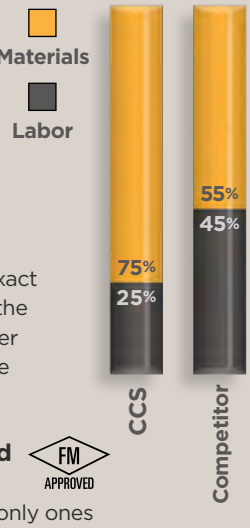
CCS Phoenix® fiberglass counterflow field-erected cooling towers serve mission-critical facilities such as data centers, hospitals and universities. The original 5-cell CCS Phoenix® FM Approved tower exceeded the university's expectations. To support a subsequent plant expansion, a second 5-cell FM Approved Phoenix® tower, shown in the foreground, was chosen.

exclusive tower structure that is unlike any other
ding real and lasting advantages for you.

Lower Lifecycle Costs

Better material-to-labor cost ratio
Our exclusive tower structure and streamlined build process typically equate to a 35% reduction in labor hours, so we can invest more of your budget into the high-quality materials that stay on site and create return value.



Reduced operating costs
Because our towers can be built to the exact footprint available, we are able to utilize the optimal motor size and lowest horsepower possible to increase efficiency and reduce utility bills.

FM 4930 Approved designs to avoid loss of production and expenses
CCS' FM 4930 Approved towers are the only ones on the market that incorporate all FRP material, including the basin, using our standard structure and components. We were the first company to obtain FM Approval without a sprinkler system, thereby eliminating its associated installation and ongoing expenses.

Lower maintenance costs
The open-frame design of our towers allows easy access to the basin, making it faster and less costly to clean and inspect. Exclusive tower features like our patented connections with no annual torque requirements and our thicker, longer-lasting UV coating yield on-going maintenance savings.

Longer tower life
CCS towers are engineered for a minimum structural design life of 50 years, ensuring that your investment will pay off for years to come before a replacement is needed.

Affirming Customer Experience

Confidence of working with the FRP experts
From our founding leaders who developed the first fiberglass tower in 1981 to the construction of North America's largest crossflow FRP tower in 2010, CCS has more FRP tower experience than any other provider.

Solutions to your unique challenges
When you work with CCS, you benefit from the extensive knowledge and ingenuity of our people across all functions — from our engineers and sales team to our project managers and local representatives. As a custom tower provider, we work with each customer individually to design the best solution to fit the requirements.

Effective and efficient service
CCS provides responsive service and follow-up on initial inquiries and submittals, during project execution and for any post-installation issues. We have a solid reputation in the industry for delivering on our promises and producing quality results.

Accountable partner you can trust
More than just a vendor, we are a partner who stands behind the quality of our products and forms lasting relationships with our customers. In fact, 80% of them come back to buy from CCS again.

CCS Cooling Tower Capacities

The CCS Phoenix fiberglass counterflow field-erected cooling tower is custom designed to fit every footprint and flow requirement, and is an ideal choice for commercial, industrial and process applications where 1,000 tons and greater per cell is required.

Tons Per Cell	300	1000	2000	3000	4000
Counterflow	PermaLite™	Phoenix®			
Crossflow		3000XLF™		Titan™	

Phoenix Fits Your Footprint

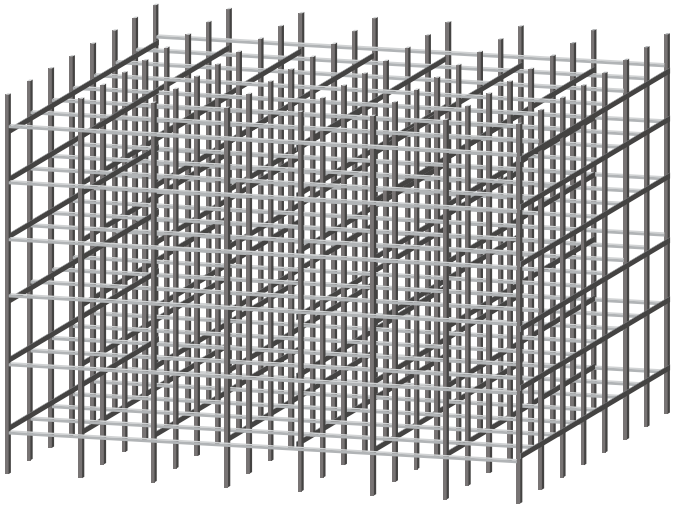
The flexibility of CCS' exclusive open structure enables our towers to fit your cubic jobsite footprint, exactly.

Design your project to meet your performance goals, and we'll build the cooling tower that fits. The Phoenix can be built to fit your design exactly, in both size and performance. Combining CCS' exclusive tower structure, our flexible Multi-Flo™ distribution system, and the design optimization capabilities of our ThermaFit™ software, you can select the tower design that is ideal for your project.

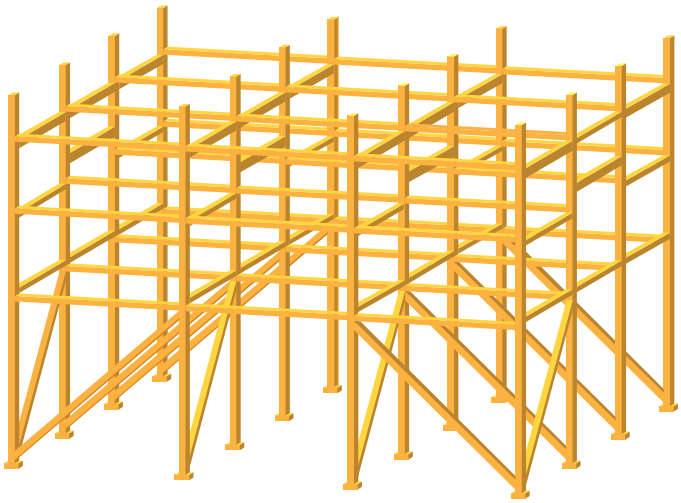
CCS Open Structure Advantages
The Phoenix uses open structure "power columns" that are 6 x 6 inches allowing support columns to be spaced as far as 14 feet apart. This structure yields tremendous design flexibility to precisely match your application, yet still provides superior rigidity with all columns anchored to the basin.

The illustration at the right shows the advantages of the open structure, including ease of access for serviceability, as well as fewer components and connections for faster installation. With the ability to adjust tower footprint design in 1-inch increments, we optimize column placement to achieve this open structure, regardless of finished tower size.

CCS Towers are engineered for a minimum structural design life of 50 years. Structural components manufactured and tested to our exact specifications deliver a longer service life, with greater UV protection and resistance to chemicals across a wider pH range.



Competitor's Structure
42′ x 42′ Cell
6′ x 6′ Bays
6 Levels



CCS Structure
42′ x 42′ Cell
14′ x 14′ Bays
3 Levels

86% Less Hardware

81% Fewer Connections

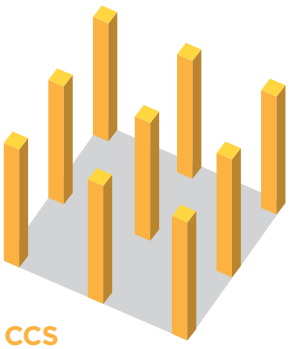
75% Fewer Columns

CCS Phoenix® Flexibility

1 Flexible Size

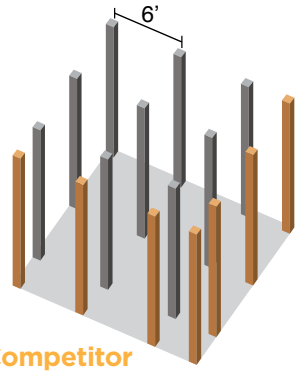
Spans between columns are variable in 1-inch increments up to 14 feet. For replacement projects, the tower can utilize the full span of an existing basin without oddly-spaced structural components that impede serviceability, eliminating the need for expensive site modifications. Unlike some competitors, all columns in a CCS tower are attached to the basin. That's standard for CCS — no special designs or extended lead times are required.

Comparative Footprint



CCS

Variable span — columns are ideally placed, anchored for perfect fit, strength, serviceability

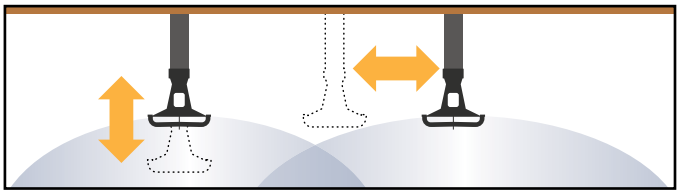


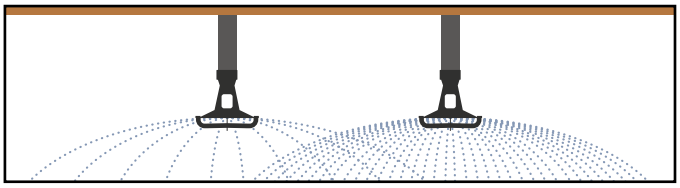
Competitor

Inflexible design — commercially available structure with reduced serviceability, support and rigidity

2 Flexible Performance

CCS standard design also provides more flexibility in performance than other tower designs. Our Multi-Flo™ distribution system allows us to optimize the number of spray nozzles, their capacity, and their placement to best match tower dimensions. We also have the ability to adjust the type and placement of fill. As a result, Phoenix performance can be tuned to deliver superior performance in any size, especially for situations where widely varying loads may be common. Turndown capabilities for Phoenix can be as low as 30-50%, allowing for a wider range of load conditions.





3 Best Performance and Lifecycle Cost with ThermaFit™

For any project there can be dozens of potential tower configurations that meet physical size and performance requirements. Determining which is really the most efficient or presents the best lifecycle cost can be difficult. CCS' ThermaFit solves the challenge. ThermaFit software is a powerful sizing and selection tool that utilizes the flexibility of CCS designs to produce multiple options in minutes. Engineers and CCS representatives can then quickly select a tower configuration that is the optimal fit for your project, from every perspective.

ThermaFit produces a full document package on the selected tower for your project, including a CTI data sheet; engineering specifications; tower and basin drawings; and performance curves and sound data.

CCS Phoenix® Counterflow Product Features

Engineered and Designed for Superior Quality and Reliability

For commercial, industrial and process applications where extended equipment life is required, the CCS Phoenix fiberglass counterflow field-erected cooling tower provides optimized footprint and performance solutions while delivering extended service life.

Optimized Design
- All-fiberglass structure can be designed for specific seismic and wind conditions per the International Building Code or ASCE-7
- Engineered to minimize structural air restriction
- Motor located outside saturated airstream
- Superior counterflow fill media
- Bottom-supported counterflow fill
- Patented hot water distribution system
- Increased safety with FRP distribution cover at same elevation as fan deck
- Designed to outlive the facility it serves

Non-Corrosive Construction Components
- Fiberglass structural components
- Rigid fiberglass fan deck and fan stacks
- FRP blade louvers standard
- Type 304 stainless steel hardware standard
- 100% locknuts on all structure hardware

Performance Benefits
- Aesthetically pleasing design
- Energy efficient
- Quiet operation
- Reliable year-round performance
- Extended service life
- Environmentally friendly

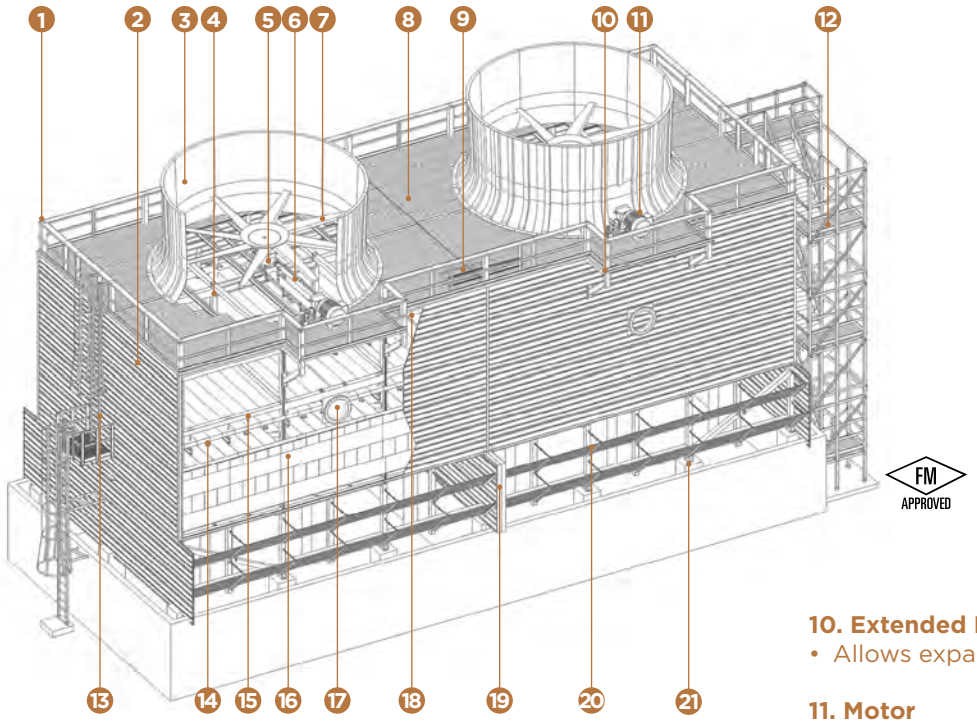
A. With CCS, safety and efficiency are always design mandates. Our exclusive structure with its large spans allows for crew members to work from the safety of scissor lifts rather than ladders.

B. CCS open frame design allows easy access to the basin, making it faster and less costly to clean. Wide column spacing enables a small utility vehicle to scrape silt and scale out of the basin. Competing towers' basins must be cleaned by hand, by wading and using shovels.

C. Each Phoenix tower's hot water distribution system is custom-engineered to ensure efficient, uniform flow of water over the fill. The CCS Phoenix is capable of achieving a 30–50% turndown flow rate.

D. Phoenix cooling towers utilize CCS's patented 2- and 3-bolt connection system, creating a stronger connection and a more stable structure.

CCS Phoenix® Counterflow Product Features



1. Fiberglass Reinforced Plastic (FRP) Handrails, Knee Rails and Toe Boards
- OSHA approved for tie-off (exceeds OSHA 5,000 lb. anchor point)

2. FRP Cladding
- Double-wall panel or minimum 12 oz.-or-greater fire retardant casing
- UV and corrosion resistant

3. FRP Fan Stacks
- Includes view port and access door

4. Patented Structural Connection
- US Patent 7,275,734 B2
- Standardized 2- and 3-bolt 304 stainless steel (SS) or 316 SS

5. Gear Drive
- Right-angle gear
- Epoxy coated
- Vibration cut-off and oil level cut-off switches pre-mounted

6. Hot-Dipped Galvanized (HDG) Steel Support Torque Tube
- Designed with safety lugs to facilitate lifting

7. FRP Manual Adjustable Pitch Fan
- Moment balanced at factory
- Corrosion resistant

8. FRP Non-Skid Fan Deck

9. FRP Plenum Access Hatch
- Safe access to plenum and inspection walkway

10. Extended Deck (some designs)
- Allows expanded access to motor

11. Motor
- Direct drive or traditional motor solution

12. Full Tower Access: Stairway
- FRP stairway with molded non-skid stair treads

13. Full Tower Access: Ladder
- Caged ladder provides safe access to roof deck

14. Multi-Flo™ Counterflow Nozzle
- Low-pressure counterflow nozzles that generates a uniform pattern providing superior distribution
- Allows a wide range of flow rate turndown

15. Drift Eliminators

16. PVC Fill
- Bottom-supported, facilitating installation and maintenance
- Superior to hanging fill systems

17. Header
- Standard sidewall entry or optional center riser or bottom inlet

18. FRP Inspection Walkway
- Facilitates access to mechanical equipment

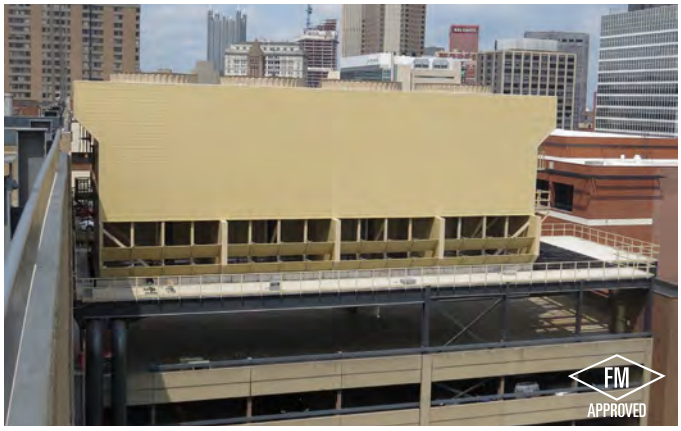
19. 20- or 30-Minute FRP Firewall Options

20. Louvers
- Cellular, blade and optional removable louver for access to basin
- Removable blade louver access optional

21. Column Anchors
- Every column anchored to basin
- 304 stainless steel
- 316 stainless steel (optional)

CCS Phoenix Fiberglass Counterflow Field-Erected Cooling Tower

A perfect fit for projects 1,000 tons per cell and greater in the commercial, industrial and process market segments.



CCS Phoenix® Counterflow Market Segments

Column 1
University Campus - Las Cruces, NM
University Campus - Pittsburgh, PA

Column 2
Processing Plant - Cedar Rapids, IA
Pharmaceutical Company - Durham, NC
University Campus - Austin, TX

Column 3
Medical Center - Winston-Salem, NC
University Campus - Cambridge, MA

Column 4
Resort Hotel Complex - Las Vegas, NV

CCS FM 4930 Approved Phoenix® Cooling Towers

For the Safest and Most Reliable Cooling Tower Available, Specify CCS and FM 4930 Approval

FM 4930 Approval means the cooling tower design has been tested and certified to meet tough design and performance standards. It will both contain fire and withstand certain wind or seismic events, while continuing to provide cooling. This adds a marked measure of security for your facility, especially when operations are essential for business continuity and life safety.

According to FM Global*, the most common cause of tower failure is fire due to maintenance mishaps. Building owners may believe that cooling towers with water flowing through them are safe from fire, but most towers contain materials that can burn under certain conditions, such as when maintenance is being performed and the towers are not operating.

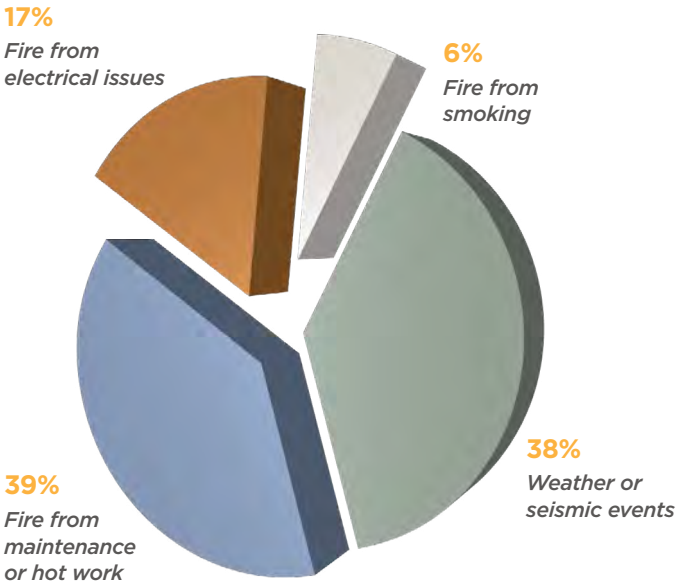
Damage from wind events (high winds or hurricanes with flying debris) is more common than fire from means other than maintenance, and another cause is the possibility of damage from earthquakes. FM 4930 Approval encompasses all of these potential causes of failure. Because there are risks from wind and seismic events, in addition to fire, simply adding a sprinkler system to a tower will not provide protections similar to FM 4930 Approval—but will increase first and long-term cost.

CCS is the industry expert, with more FM Approved cooling towers in operation than all other manufacturers combined.

Our standard Phoenix tower meets FM 4930 Approval with our FRP basin. No modifications, no steel or concrete basin like other manufacturers must provide, and no sprinkler system required. Where other manufacturers need to substitute materials, fastening methods and other components to gain approval (driving production costs and lead times up), CCS can deliver the safety and reliability you want with our standard product.

*FM Global provides insurance solutions and property loss and risk prevention engineering services, including equipment certification, worldwide.

Cooling Tower Cause of Loss



Source: FM Global Client Loss Analysis 1979-2005

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Certificate of Compliance

This certificate is issued for the following:

Phoenix Cooling Towers

Prepared for:

Composite Cooling Solutions LP
4150 International Plaza, Suite 500
Fort Worth, TX 76109
United States

FM Approvals Class: 4930

Approval Identification: 3040030 Approval Granted: March 13, 2015

To verify the availability of the Approved product, please refer to www.approvalguide.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

Richard B. Dunne
Manager - Fire Protection Group
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062

FM Approvals

CCS' Certificate of Compliance to FM Class Number 4930, from FM Global

The CCS Phoenix Fiberglass Counterflow Field-Erected Cooling Tower is an ideal choice for the commercial, industrial and process markets.

Project

Project Name _____
City _____
Engineering Firm _____

ENGINEERING CONTRACT

Name _____
Phone _____
Email _____

TIME REQUIREMENTS

Budget Workup Needed _____
Projected RFP Bid _____
Pre-bid Meeting _____
Projected Start _____
Projected Completion _____

	YES	NO
Site Photographs Available	☐	☐
Project Drawings Available	☐	☐
Project Specifications Available	☐	☐
Load Drawing Required	☐	☐
Proposal Drawings Required	☐	☐
Proposal Specifications Required	☐	☐

Project Design Criteria

No. of Towers _____ **No. of Cells** _____

APPLICATION
☐ Industrial
☐ Process
☐ Power
☐ Commercial HVAC

TOWER TYPE
☒ Counterflow

CELL ARRANGEMENT
☐ In-Line
☐ Individual
☐ Back-to-Back

AIR INLET TYPE
☐ Single
☐ Double
☐ Triple

MAXIMUM TOWER AREA SPACE PROVIDED
Length _____ ft x Width _____ ft = _____ ft^2

MAXIMUM BASIN AREA
Length _____ ft x Width _____ ft = _____ ft^2

Basin Depth _____ in From basin floor to top of curb

Elevation _____ ft EL AMSL

TOWER MATERIAL
☒ Fiberglass

BASIN MATERIAL
☐ Concrete
☐ Fiberglass
☐ Stainless Steel

	YES	NO
FM Approved	☐	☐
Buy America Act	☐	☐

TOWER LOCATION
☐ On Grade ☐ Rooftop

Number of stories _____ Height above roof _____ ft

ACCESS
Number of Ladder(s) _____
Number of Staircase(s) _____

DESIGN CONDITIONS
Total GPM _____
HWT _____ °F
CWT _____ °F
WBT _____ °F

OWNER CONCERNS

	YES	NO
Fire	☐	☐
Cost of Ownership	☐	☐
Aesthetics	☐	☐
Drift	☐	☐
Energy	☐	☐

Special Design Considerations

HEIGHT LIMITATION FROM GRADE
_____ ft

SOUND
_____ dBa _____ ft from tower

WATER QUALITY
_____ ppm suspended solids in circulating water

CCS Phoenix® Fiberglass Counterflow Field-Erected Cooling Towers

Composite Cooling Solutions (CCS) is a custom cooling tower solutions provider specializing in the design and build of field-erected fiberglass and concrete cooling towers. Our exclusive tower structure is unlike any other on the market — using custom-engineered components and a flexible, open-frame design to enable faster and safer project execution and lower costs over the life of the tower. From our founding leaders who pioneered the cooling tower industry to our experienced and responsive teams, you can rely on CCS to deliver a lasting solution for your cooling needs.

We do things differently and it makes all the difference for you.™

CCSolutions®
Composite Cooling Solutions, L.P.

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Fort Worth, Texas 76109-4826
817.246.8700 phone
817.246.8717 fax

www.compositecooling.com

Front cover: This FM Class 4930 Approved CCS Phoenix counterflow cooling tower serves a major data center. FM Approved designs are certified by FM Global for quality and added protection against fire, wind, and seismic events.

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FM 4930 Approval certifies quality and protection. There are more CCS field-erected FM Approved cooling towers in operation than all competitors combined.

Member

ISO 9001:2008

Lit.# B 105 A 01 /16