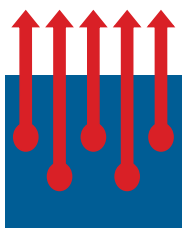




ACX Series Cross Flow Induced Draft Cooling Towers

Engineering Data



**AMERICAN
COOLING
TOWER, INC.**



Validation: C38C-18R02

Components & Features

Overview

The ACX series induced draft cross flow cooling tower, manufactured by American Cooling Tower Inc., is a factory assembled cooling tower designed of heavy gauge steel construction which offers a diverse range of construction materials and accessories to accommodate virtually any project requirement.

Capacity

The ACX series cooling tower line offers 84 unique single cell models ranging from 102 to 1,327 nominal tons which have all been certified under CTI Standard 201. Through multiple cell configurations, American Cooling Tower offers added flexibility in design considerations to effectively manage footprint requirements while minimizing power consumption.

Proven Performance

The ACX series cooling tower has been offered through local representatives across the United States for more than 15 years with numerous installations in operation. These installations in conjunction with extensive factory testing allowed us to develop a cross flow unit which has documented performance and superior service life.

Technology & Partnerships

The ACX series design incorporates not just American Cooling Tower in house design team and engineering expertise, but also engaged our major component suppliers and utilized their extensive knowledge and experience. This process provided a method of verification across multiple designers, engineers, and companies to ensure that every aspect of the tower design is looked at and that the components chosen offer the best performance available in today's marketplace.

Quality Control and Workmanship

American Cooling Tower has been providing custom designs for both packaged and field erect cooling towers for more than 30 years. Our team members are well experienced in the construction of cooling towers and have been thoroughly cross trained to maximize production efficiency and reliability. In conjunction with our highly experienced team members, American Cooling Tower also utilize a Total Quality Management (TQM) system when it comes to our purchasing, design, procurement, and quality control processes for all levels of operations. American Cooling Tower is able to closely monitor our entire system from start to finish to ensure the highest level of quality is always produced. Our TQM Process also include and encourage our customers, partners, and representatives to play an active role within our quality control processes so that all parties involved are able to actively participate within our management system.

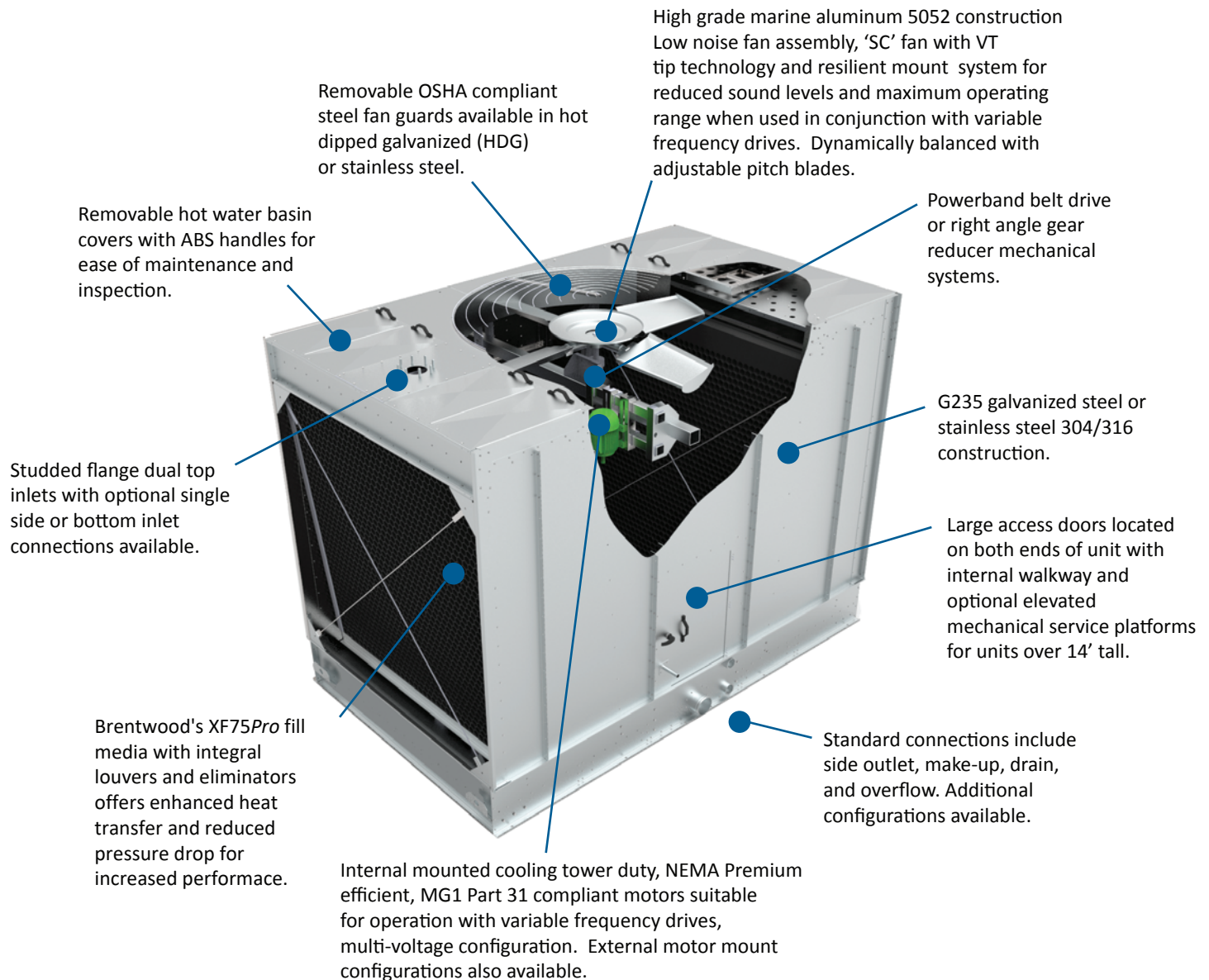
Sustainability

American Cooling Tower continues their effort in utilizing sustainable and recycled materials within our product lines whenever it is feasible without sacrificing quality or performance. Through our steel and PVC materials alone, the ACX line is comprised of more than 70% recycled materials. While more must be done on a global scale, American Cooling Tower is continuing our own efforts to increase the percentage of recycled content within our products while also ensuring that our facilities are outfitted with the most energy efficient equipment, lighting, and tooling a available.



Components & Features

*Giving you the **ACT**vantage you deserve!*

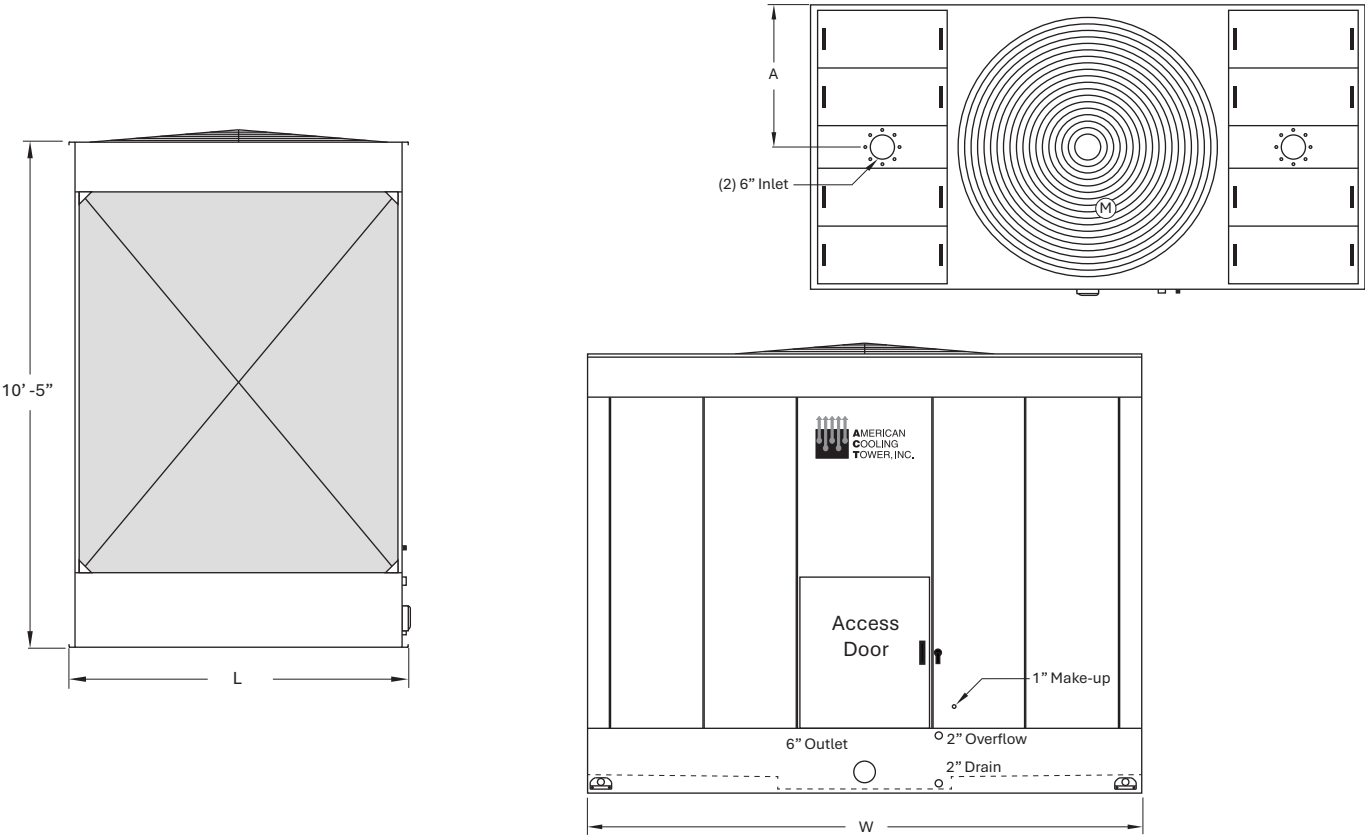


*The **ACX Series** offers a wide range of options and accessories along with multiple configurations to meet job specific demands.*

Contact your representative today to learn more!

Models 1011-1025
102 to 265 Nominal Tons

Physical Data



Model	Nominal Tons	Fan Motor (HP)	Air Flow (CFM)	Weight (lbs)			Dimensions		
				Shipping	Operating	Heaviest Section	L	W	A
ACX-1011-1	102	2	33300	4060	8480	4060	6'-10"	12'-10"	41"
ACX-1012-1	117	3	38000						
ACX-1013-1	139	5	45000						
ACX-1014-1	159	7.5	51500						
ACX-1015-1	175	10	57000						
ACX-1016-1	200	15	65000	4880	10830	4880	8'-5"	13'-10"	50 1/2"
ACX-1020-1	141	3	46000						
ACX-1021-1	168	5	54500						
ACX-1022-1	192	7.5	62500						
ACX-1023-1	211	10	68500						
ACX-1024-1	241	15	78500						
ACX-1025-1	266	20	86500						

General Notes:

Above drawings are for reference only. Data is subject to change without notice.

Nominal tons are based on 95°F HWT - 85°F CWT - 78°F AWB, 3 gpm/ton. 1 ton equals 15,000 BTU/HR.

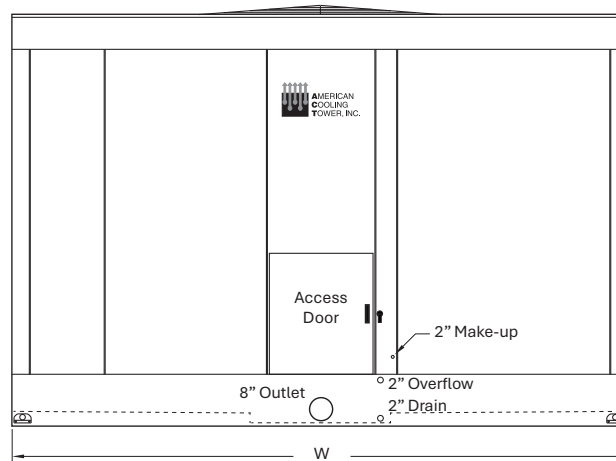
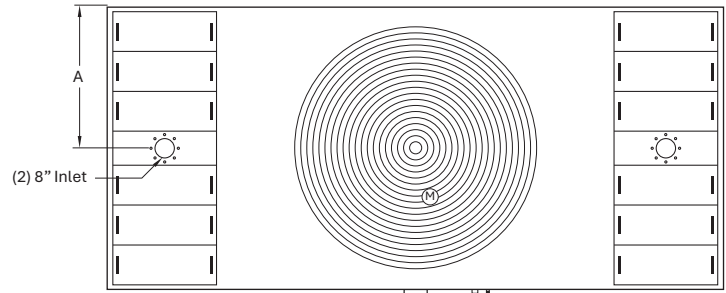
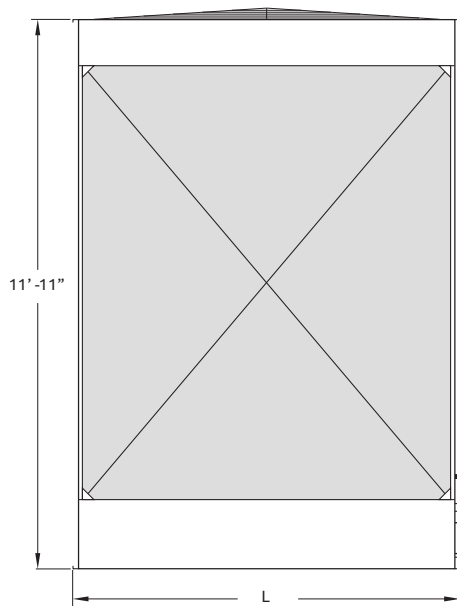
Standard pipe configuration and sizes shown. Inlet & outlet connection sizes may change based on design flow.

Single cell models shown. Quantity of cells is indicated by the last number in model name.

Models 1030-1038

174 to 411 Nominal Tons

Physical Data



Model	Nominal Tons	Fan Motor (HP)	Air Flow (CFM)	Weight (lbs)			Dimensions		
				Shipping	Operating	Heaviest Section	L	W	A
ACX-1030-1	174	3	48000	7430	16550	7430	8'-5"	17'-10"	50 1/2"
ACX-1031-1	206	5	56500						
ACX-1032-1	236	7.5	65000						
ACX-1033-1	260	10	71500						
ACX-1034-1	297	15	81500						
ACX-1035-1	331	20	91000						
ACX-1036-1	352	25	96500						
ACX-1037-1	374	30	102500						
ACX-1038-1	411	40	113000						

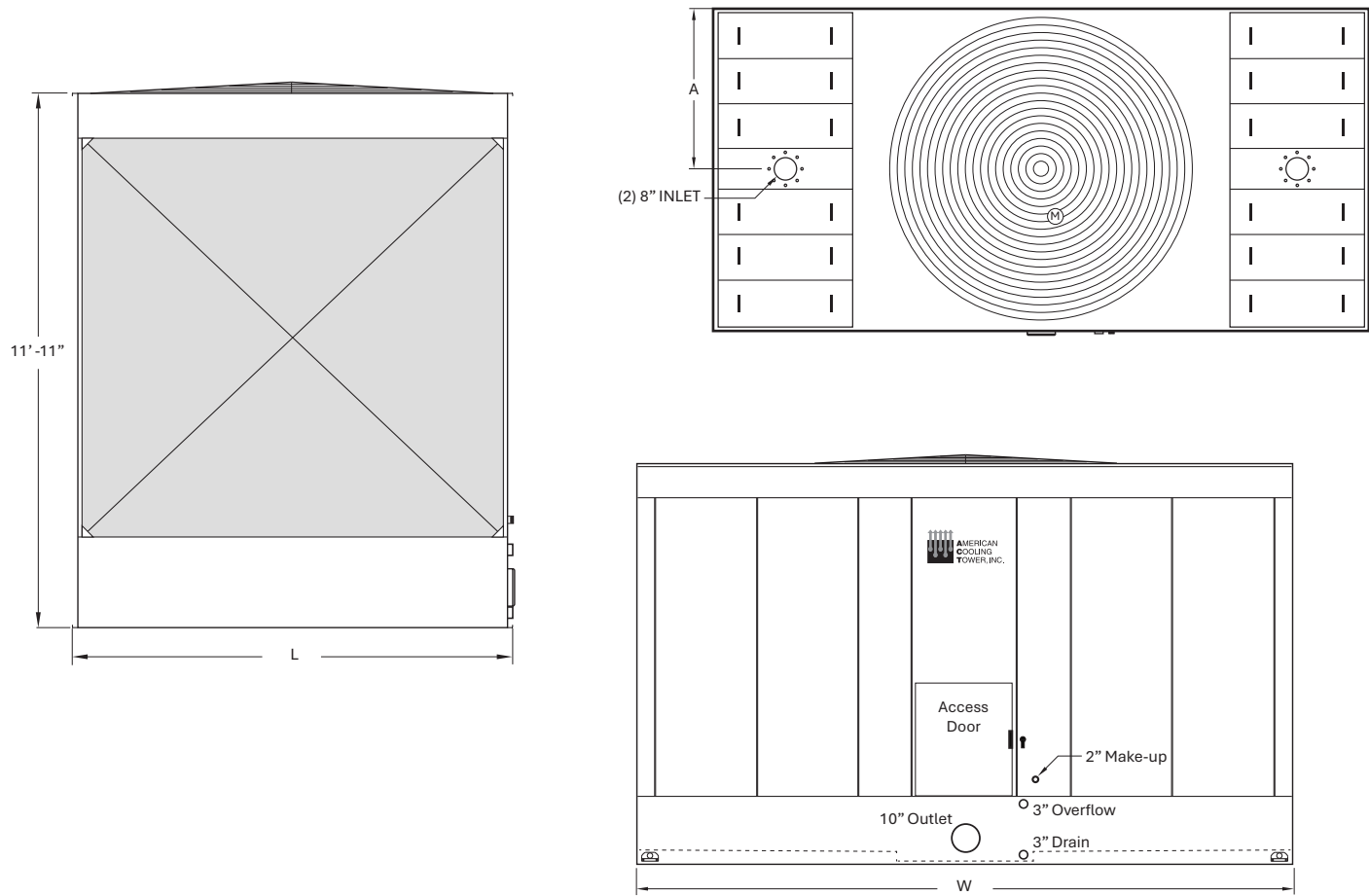
General Notes:

Above drawings are for reference only. Data is subject to change without notice.

Nominal tons are based on 95°F HWT - 85°F CWT - 78°F AWB, 3 gpm/ton. 1 ton equals 15,000 BTU/HR.

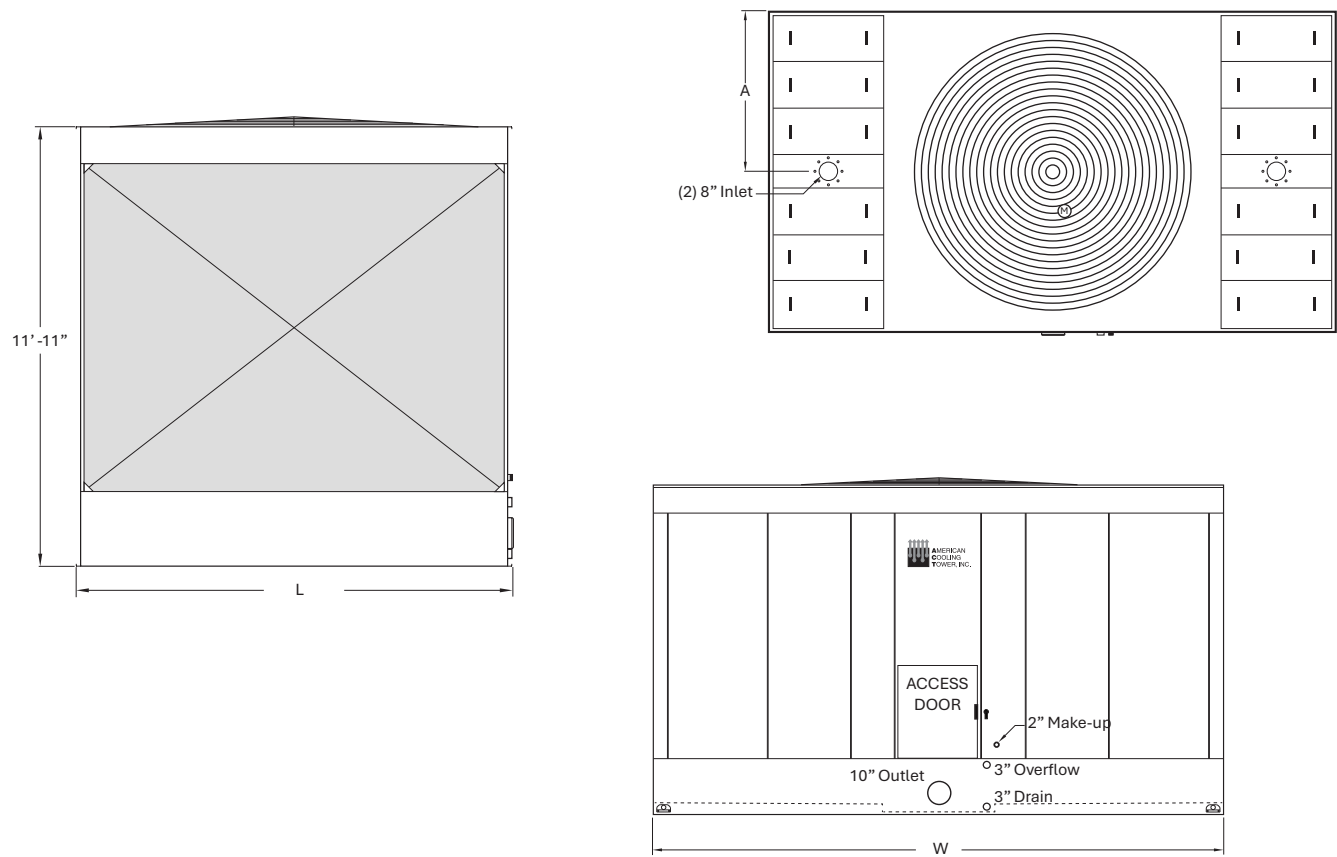
Standard pipe configuration and sizes shown. Inlet & outlet connection sizes may change based on design flow.

Single cell models shown. Quantity of cells is indicated by the last number in model name.



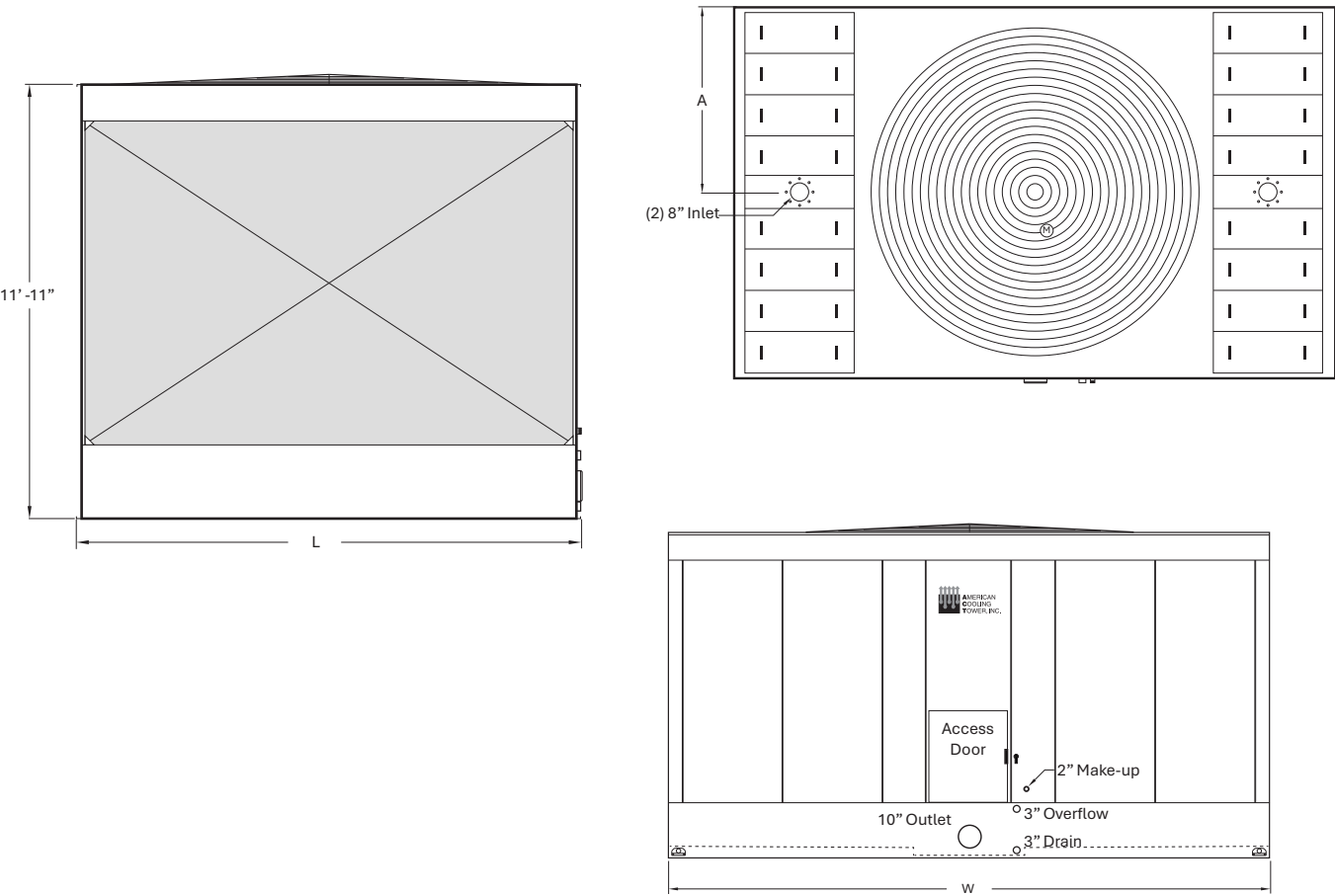
Model	Nominal Tons	Fan Motor (HP)	Air Flow (CFM)	Weight (lbs)			Dimensions		
				Shipping	Operating	Heaviest Section	L	W	A
ACX-1040-1	305	7.5	78000	8655	19230	8655	9' -10"	19' -6"	59"
ACX-1041-1	339	10	87000						
ACX-1042-1	394	15	101000						
ACX-1043-1	434	20	111000						
ACX-1044-1	463	25	118500						
ACX-1045-1	490	30	126000						
ACX-1046-1	537	40	138000						
ACX-1047-1	568	50	146500						

General Notes:
Above drawings are for reference only. Data is subject to change without notice.
Nominal tons are based on 95°F HWT - 85°F CWT - 78°F AWB, 3 gpm/ton. 1 ton equals 15,000 BTU/HR.
Standard pipe configuration and sizes shown. Inlet & outlet connection sizes may change based on design flow.
Single cell models shown. Quantity of cells is indicated by the last number in model name.



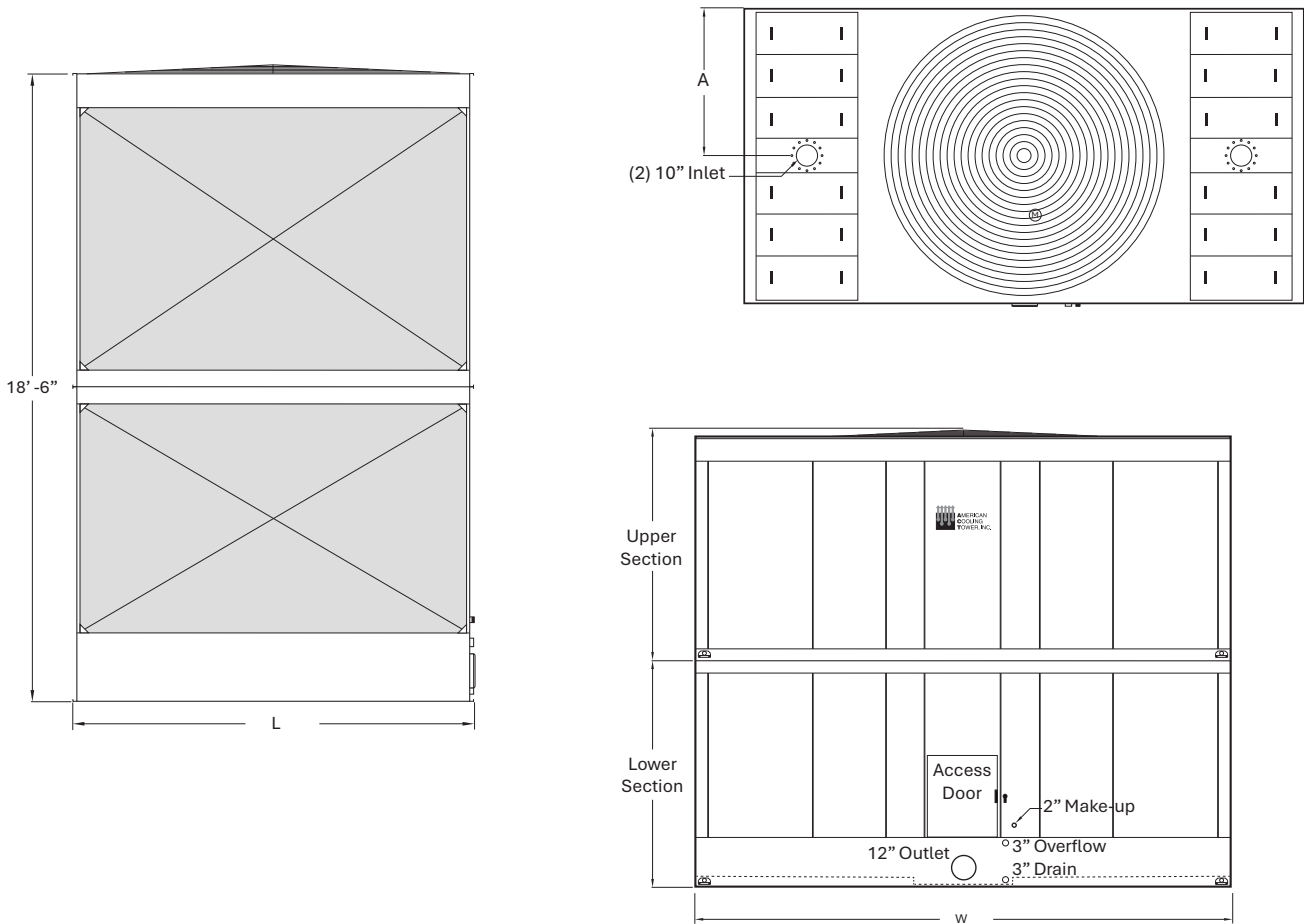
Model	Nominal Tons	Fan Motor (HP)	Air Flow (CFM)	Weight (lbs)			Dimensions		
				Shipping	Operating	Heaviest Section	L	W	A
ACX-1050-1	300	5	78500	11650	25300	11650	11'-10"	20'-6"	71"
ACX-1051-1	343	7.5	89500						
ACX-1052-1	378	10	98500						
ACX-1053-1	432	15	113000						
ACX-1054-1	475	20	124000						
ACX-1055-1	512	25	133500						
ACX-1056-1	544	30	142000						
ACX-1057-1	598	40	156000						
ACX-1058-1	645	50	166500						
ACX-1059-1	685	60	177000						

General Notes:
Above drawings are for reference only. Data is subject to change without notice.
Nominal tons are based on 95°F HWT - 85°F CWT - 78°F AWB, 3 gpm/ton. 1 ton equals 15,000 BTU/HR.
Standard pipe configuration and sizes shown. Inlet & outlet connection sizes may change based on design flow.
Single cell models shown. Quantity of cells is indicated by the last number in model name.



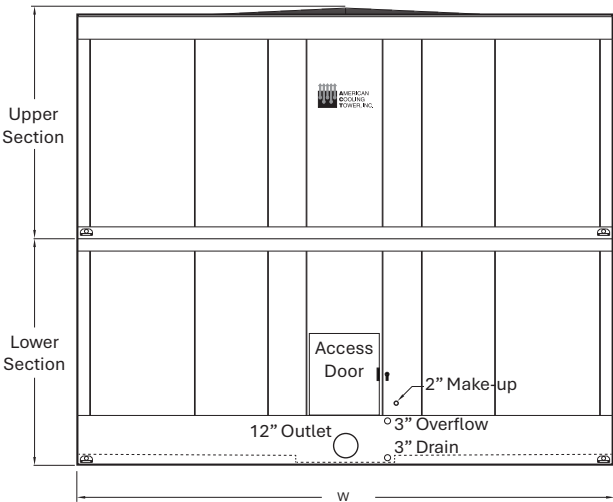
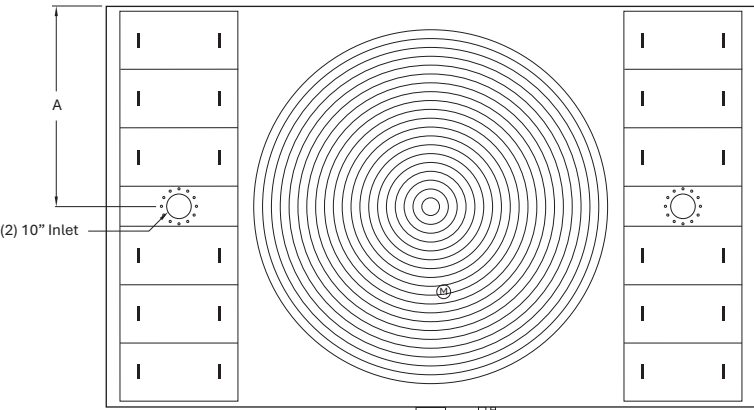
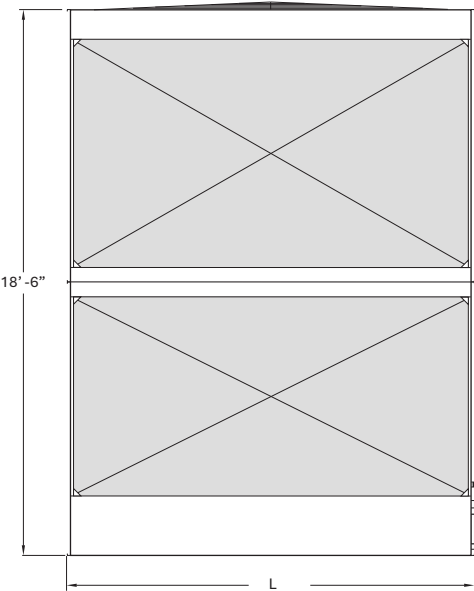
Model	Nominal Tons	Fan Motor (HP)	Air Flow (CFM)	Weight (lbs)			Dimensions		
				Shipping	Operating	Heaviest Section	L	W	A
ACX-1060-1	434	10	109000	13530	30610	13530	13' -10"	22' -0"	83"
ACX-1061-1	496	15	124500						
ACX-1062-1	544	20	142000						
ACX-1063-1	586	25	153000						
ACX-1064-1	622	30	162429						
ACX-1065-1	684	40	178500						
ACX-1066-1	737	50	192350						
ACX-1067-1	783	60	204500						
ACX-1068-1	841	75	211000						

General Notes:
Above drawings are for reference only. Data is subject to change without notice.
Nominal tons are based on 95°F HWT - 85°F CWT - 78°F AWB, 3 gpm/ton. 1 ton equals 15,000 BTU/HR.
Standard pipe configuration and sizes shown. Inlet & outlet connection sizes may change based on design flow.
Single cell models shown. Quantity of cells is indicated by the last number in model name.



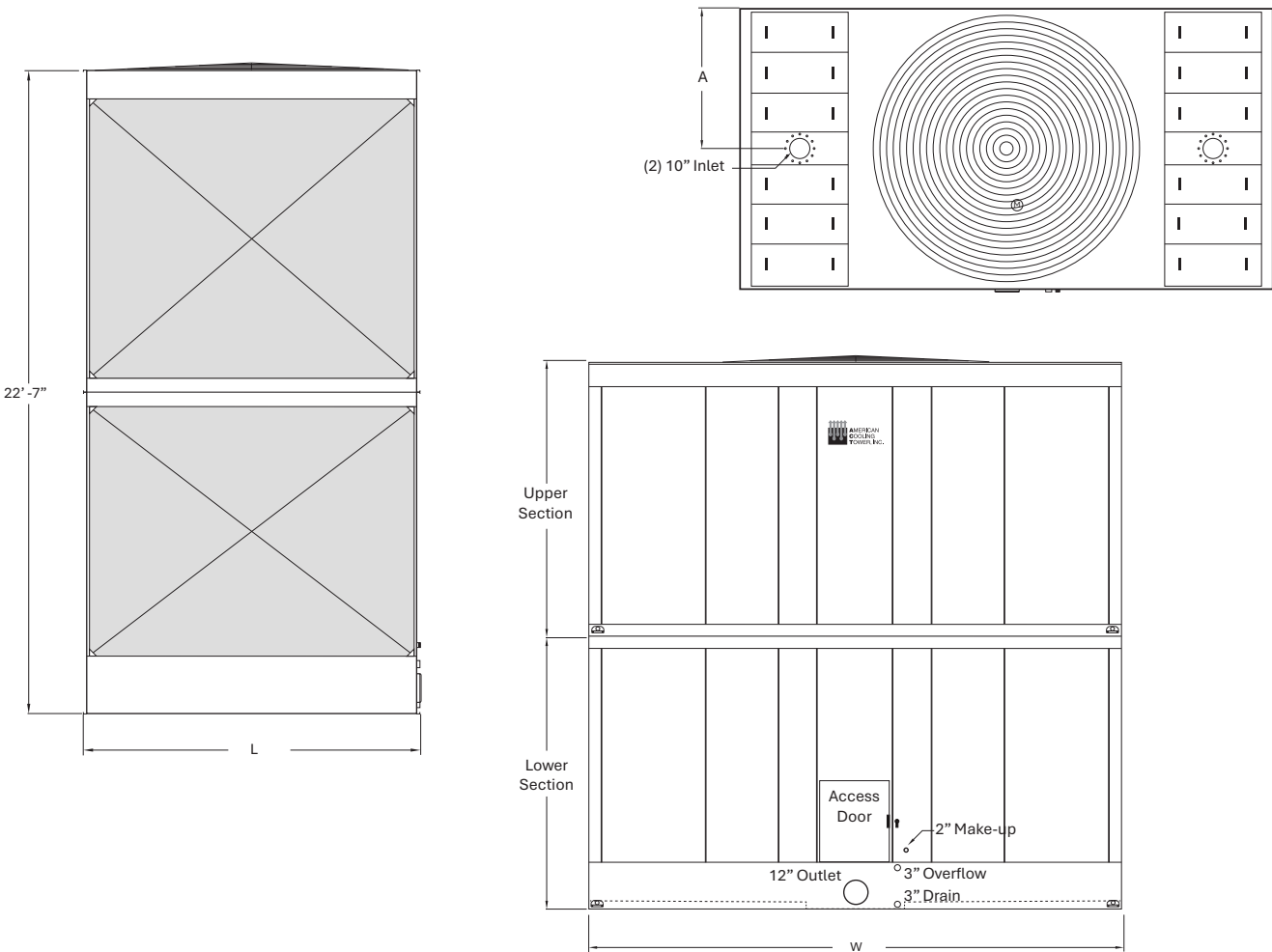
Model	Nominal Tons	Fan Motor (HP)	Air Flow (CFM)	Weight (lbs)			Dimensions		
				Shipping	Operating	Heaviest Section	L	W	A
ACX-2070-1	541	15	136500	17750	37630	11450	11' -10"	22' -0"	71"
ACX-2071-1	596	20	150500						
ACX-2072-1	641	25	162000						
ACX-2073-1	681	30	172000						
ACX-2074-1	750	40	189000						
ACX-2075-1	807	50	204000						
ACX-2076-1	857	60	216500						
ACX-2077-1	923	75	233000						

General Notes:
Above drawings are for reference only. Data is subject to change without notice.
Nominal tons are based on 95°F HWT - 85°F CWT - 78°F AWB, 3 gpm/ton. 1 ton equals 15,000 BTU/HR.
Standard pipe configuration and sizes shown. Inlet & outlet connection sizes may change based on design flow.
Single cell models shown. Quantity of cells is indicated by the last number in model name.



Model	Nominal Tons	Fan Motor (HP)	Air Flow (CFM)	Weight (lbs)			Dimensions		
				Shipping	Operating	Heaviest Section	L	W	A
ACX-2080-1	607	15	153500	20105	43450	12870	13'-10"	22'-0"	83"
ACX-2081-1	668	20	168500						
ACX-2082-1	719	25	181500						
ACX-2083-1	764	30	193000						
ACX-2084-1	840	40	212000						
ACX-2085-1	905	50	228500						
ACX-2086-1	961	60	242500						
ACX-2087-1	1035	75	261500						
ACX-2088-1	1138	100	287500						

General Notes:
Above drawings are for reference only. Data is subject to change without notice.
Nominal tons are based on 95°F HWT - 85°F CWT - 78°F AWB, 3 gpm/ton. 1 ton equals 15,000 BTU/HR.
Standard pipe configuration and sizes shown. Inlet & outlet connection sizes may change based on design flow.
Single cell models shown. Quantity of cells is indicated by the last number in model name.



Model	Nominal Tons	Fan Motor (HP)	Air Flow (CFM)	Weight (lbs)			Dimensions		
				Shipping	Operating	Heaviest Section	L	W	A
ACX-2090-1	585	15	145500	20530	42395	13250	11'-10"	22'-0"	71"
ACX-2091-1	643	20	160000						
ACX-2092-1	693	25	172500						
ACX-2093-1	736	30	183000						
ACX-2094-1	810	40	201500						
ACX-2095-1	872	50	217000						
ACX-2096-1	926	60	230500						
ACX-2097	998	75	248000						
ACX-2098-1	1097	100	273000						

General Notes:

Above drawings are for reference only. Data is subject to change without notice.

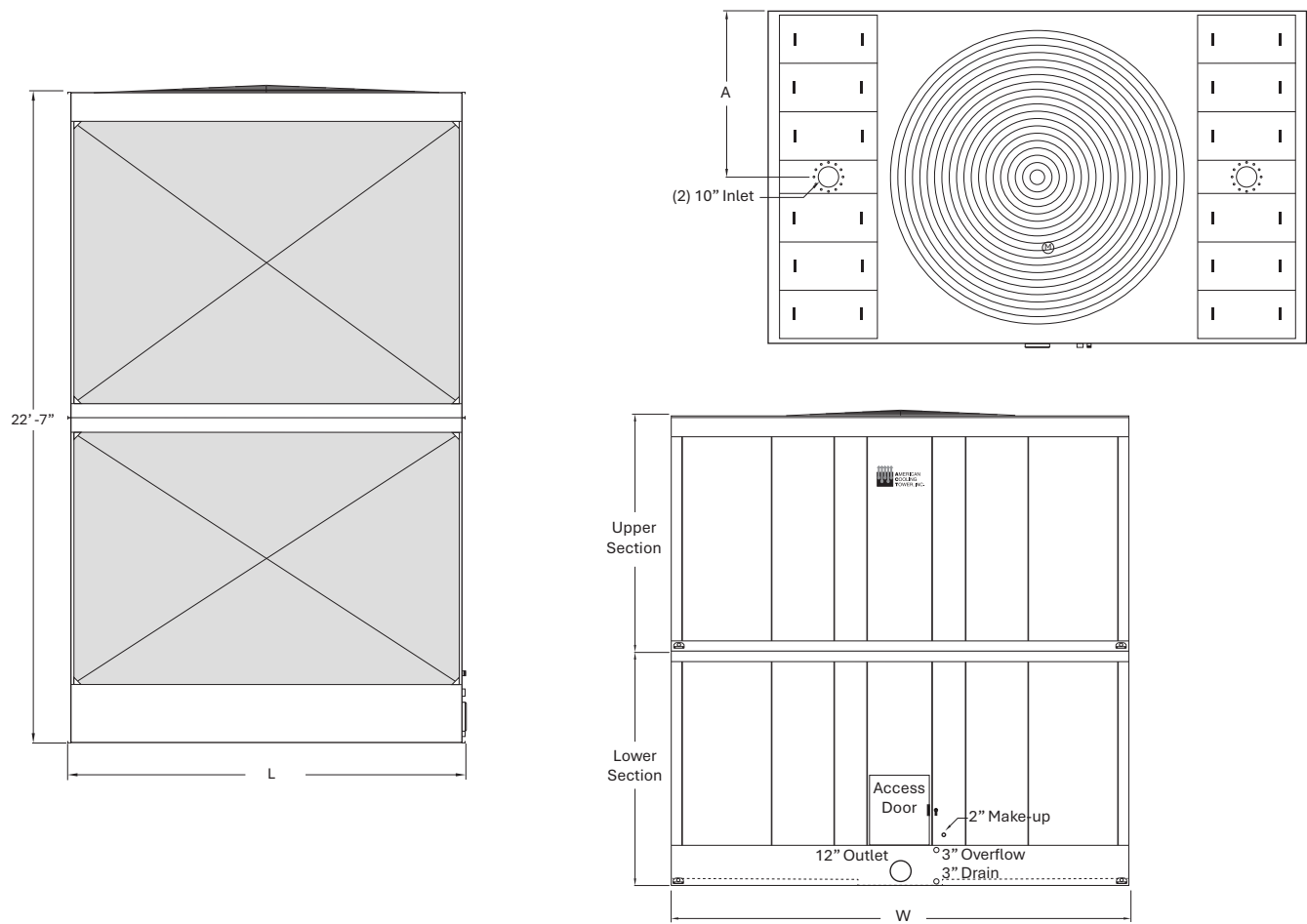
Nominal tons are based on 95°F HWT - 85°F CWT - 78°F AWB, 3 gpm/ton. 1 ton equals 15,000 BTU/HR.

Standard pipe configuration and sizes shown. Inlet & outlet connection sizes may change based on design flow.

Single cell models shown. Quantity of cells is indicated by the last number in model name.

Models 2100-2109
657 to 1327 Nominal Tons

Physical Data

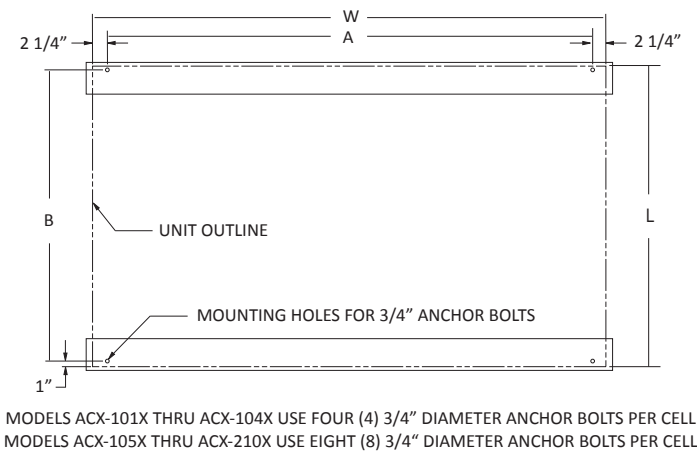


Model	Nominal Tons	Fan Motor (HP)	Air Flow (CFM)	Weight (lbs)			Dimensions		
				Shipping	Operating	Heaviest Section	L	W	A
ACX-2100-1	657	15	163500	22640	48330	14620	13' -10"	22' -0"	83"
ACX-2101-1	722	20	180000						
ACX-2102-1	778	25	193500						
ACX-2103-1	826	30	205500						
ACX-2104-1	909	40	226000						
ACX-2105-1	979	50	243500						
ACX-2106-1	1040	60	258500						
ACX-2107-1	1120	75	278500						
ACX-2108-1	1232	100	306000						
ACX-2109-1	1327	125	330000						

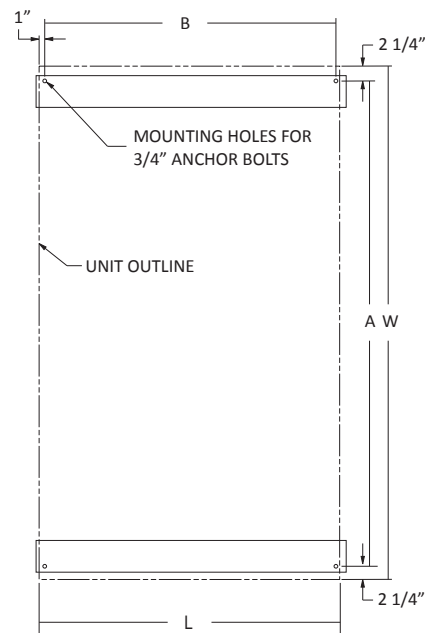
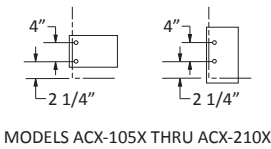
General Notes:
Above drawings are for reference only. Data is subject to change without notice.
Nominal tons are based on 95°F HWT - 85°F CWT - 78°F AWB, 3 gpm/ton. 1 ton equals 15,000 BTU/HR.
Standard pipe configuration and sizes shown. Inlet & outlet connection sizes may change based on design flow.
Single cell models shown. Quantity of cells is indicated by the last number in model name.

Models 101X - 210X
Single Cell Recommended Support
Layout

Physical Data



SINGLE CELL LAYOUT



Model	(L) LENGTH	(W) WIDTH	'A'	'B'	ANCHOR BOLT DIA	# ANCHORS	OPERATING WEIGHT	OPERATING LOAD PER ANCHOR
ACX-101X	6' -10"	12' -10"	12' -5 1/2"	6' -8"	3/4"	4	8480	2120
ACX-102X	8' -5"	13' -10"	13' -5 1/2"	8' -3"			10830	2708
ACX-103X	8' -5"	17' -10"	17' -5 1/2"	8' -3"			16550	4138
ACX-104X	9' -10"	19' -6"	19' -1 1/2"	9' -8"			19230	4808
ACX-105X	11' -10"	20' -6"	20' -1 1/2"	11' -8"		8	25300	3163
ACX-106X	13' -10"	22' -0"	21' -7 1/2"	13' -8"			30610	3826
ACX-207X	11' -10"			11' -8"			37630	4704
ACX-208X	13' -10"			13' -8"			43450	5431
ACX-209X	11' -10"			11' -8"			42395	5299
ACX-210X	13' -10"			13' -8"			48330	6041

General notes:

Above drawings are for reference only and preliminary layout. Data is subject to change without notice. Weight shown does not include options or accessories

Alternative support material may be used. Please consult your representative.

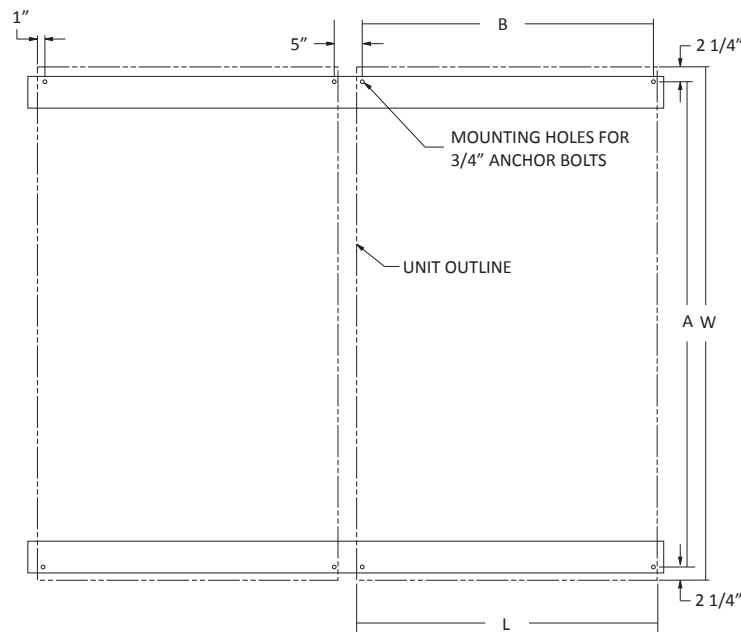
Support design and supply by others. Must comply with applicable building requirements.

See additional notes on following page.

Models 101X - 210X

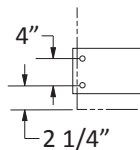
Multiple Cell Recommended Support
Layout

Physical Data

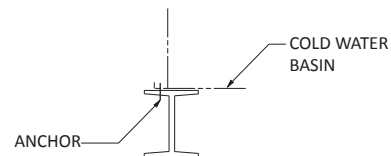


MODELS ACX-101X THRU ACX-104X USE FOUR (4) 3/4" ANCHOR BOLTS PER CELL
MODELS ACX-105X THRU ACX-210X USE EIGHT (8) 3/4" ANCHOR BOLTS PER CELL

MULTIPLE CELL LAYOUT



MODELS ACX-105X THRU ACX-210X



General notes:

Recommend support drawings are for reference only.

Use of a licensed structural engineer for final design should be used.

All support structures should be level and plumb for proper operation.

Concrete slab or curbs may be used if in accordance with local regulations.

Some tower options may change minimum distance between multiple cell layouts. Above is shown for standard unit design. Please refer to the certified support drawing supplied with your submittal for job specific design and dimensions.

Support fabrication, design, and installation by others.

Anchors should be full thread length bolts with nut, locking washer, and washers. Supplied by installer.

Use of other anchor types is not recommended.

Sample Specification

GENERAL**1.0 SELECTION**

Furnish ____ American Cooling Tower model ACX- ____ cooling tower(s). The ACX series cooling tower is a factory assembled, induced draft, axial fan, cross flow cooling tower with vertical air discharge. The cooling tower's overall dimensions shall not exceed ____ in length X ____ in width X ____ in height. Each cooling tower shall consist of ____ cell(s).

1.1 PERFORMANCE

The cooling tower(s) shall be designed to provide ____ USGPM of total cooling capacity based on an entering hot water temperature of ____°F with a leaving cold water temperature of ____°F and an entering ambient wet-bulb temperature of ____°F. The unit selected shall have had its published ratings and thermal performance tested and certified in accordance with CTI standard 201. In addition the CTI STD-201 certification the cooling tower shall be supplied with a manufacturer's thermal performance guarantee that is backed by the CTI ATC-105 field acceptance test code. Units shall also comply with CTI ATC-128 for cooling tower sound performance and meet or exceed ASHRAE 90.1 energy efficiency standards.

MATERIALS OF CONSTRUCTION**2.0 STRUCTURE**

The cooling tower shall be constructed out of a heavy-gauge steel design and engineered for maximum strength, durability, and service life. All cooling tower seams shall be sealed to provide watertight joints. The unit's standard construction shall be designed for a maximum 60 PSF wind load or 1.0g seismic force. For locations which exceed these amounts, the unit will be supplied with Structural Enhancement 'SE' construction package which includes additional anchorage and internal bracing and permit the cooling tower to handle a maximum wind load of 145 PSF or 5.12g seismic rating. All serviceable platforms, ladders, and landings shall be designed for a maximum 60 PSF live load or 300 pound concentrated load. Units shall exceed NFPA 2.14 requirements for fire safety and not require the use of external sprinkler systems.

2.1 COLD WATER BASIN

The cold water basin section shall be constructed of G-235 galvanized steel in accordance with ASTM A653/A653M to provide maximum durability and excellent resistance to rust and corrosion. G-235 designation represents that an average coating thickness of 2.35 ounces of zinc per square foot shall be applied to the steel surfaces. Units which utilize a designation less than G-235 shall not be acceptable. The cold water basin shall be designed with a tiered configuration allowing for reduced water volume to be retained in the basin which shall lower operating weight, and allow for easier maintenance. The cold water basin section shall include standard piping points of connection for the overflow, make-up, drain, and outlet connections. Outlet connection shall be beveled for weld and grooved for mechanical coupling (*flanged to accept an ASME B16.5 Class 150 type flange*). On multiple cell units an internal equalization system (*external equalizer connections for field piping*) shall be provided and allows isolation of individual cells for maintenance, and servicing.

2.1a (OPTION) TYPE SERIES 304 (316) STAINLESS STEEL COLD WATER BASIN WITH TRITEK SEAM PROTECTION

*The cold water basin section shall be constructed of stainless steel 304 (316) steel to provide superior service life, durability and excellent resistance to rust and corrosion. The cold water basin shall be designed with a tiered configuration allowing for reduced water volume to be retained in the basin which shall lower operating weight, and allow for easier maintenance. Stainless steel grade less than 304 (316) shall not be acceptable. The stainless steel basin seams shall be provided with the TRITEK protection system which incorporates a multi-layered seam sealant system guaranteed to be leak free for a period of five (5) years. The TRITEK system utilizes sealer tape installed within the seam joint and two layers of factory applied protection along the interior surface of the seam. Welded basin seams that are guaranteed to be leak free for five (5) years are an acceptable substitute. The cold water basin section shall include standard piping points of connection for the overflow, make-up, drain, and outlet connections. Outlet connection shall be beveled for weld and grooved for mechanical coupling (*flanged to accept an ASME B16.5 Class 150 type flange*). On multiple cell units an internal equalization system (*external equalizer connections for field piping*) shall be provided and allows isolation of individual cells for maintenance, and servicing.*

2.1b (OPTION) TYPE 304 (316) STAINLESS STEEL COLD WATER BASIN - WELDED BASIN SEAMS

*The cold water basin section shall be constructed of stainless steel 304 (316) steel to provide superior service life, durability and superior resistance to rust and corrosion. The cold water basin shall be designed with a tiered configuration that is sloped to allow for reduced water volume to be retained in the basin which shall lower operating weight, and promote positive drainage of the unit. Stainless steel grade less than 304 (316) shall not be acceptable. The stainless steel basin seams shall be provided with continuous welded basin seams which shall be guaranteed to be leak free for a period of five (5) years. Bolted basins shall not be acceptable. The cold water basin section shall include standard piping points of connection for the overflow, make-up, drain, and outlet connections. Outlet connection shall be (beveled for weld and grooved for mechanical coupling (*an ASME B16.5 Class 150 Flange*)). On multiple cell units, an internal equalization system (*external field equalizer connections*) shall be provided and allow isolation of individual cells for maintenance, and servicing.*

Sample Specification

2.2 CASING PANELS

The casing panels shall be constructed of G-235 (ASTM A653/A653M) galvanized steel to maximize the life of the cooling tower and minimize rust and corrosion. The casing panels shall be designed with heavy-gauge steel that incorporates flanged edges with rounded corners for maximum strength and durability. The panels shall be fastened to the cooling tower structure with all seams sealed to provide watertight joints.

2.2 (OPTION) STAINLESS STEEL 304 (316) STAINLESS STEEL CASING PANELS

The casing shall be constructed of series 304 (316) stainless steel to maximize the life of the cooling tower and provide superior protection against rust and corrosion. The casing panels shall be designed with heavy-gauge steel that incorporates flanged edges with rounded corners for maximum strength and durability. The panels shall be fastened to the cooling tower structure utilizing stainless steel fasteners of the same grade as the panels. All seams shall be sealed to provide watertight joints. Self-tapping fasteners shall not be accepted.

2.3 INTERNAL SUPPORT MEMBERS

The cooling tower shall be constructed of heavy-gauge G-235 (ASTM A653/A653M) galvanized steel for maximum strength and durability. All weight bearing support pieces will be fabricated from heavy gauge steel to ensure structural integrity of the unit throughout its service life. All supports will be fastened with galvanized hardware and fasteners.

2.3a (OPTION) STAINLESS STEEL 304 (316) INTERNAL SUPPORT MEMBERS

The cooling tower shall be constructed of heavy-gauge stainless steel 304 (316) steel to provide superior service life, durability and excellent resistance to rust and corrosion. All weight bearing support pieces will be fabricated from heavy gauge steel to ensure structural integrity of the unit throughout its service life. All supports will be fastened with stainless steel hardware.

MECHANICAL COMPONENTS

3.0 MECHANICAL BELT DRIVE SYSTEM

The fan drive system shall be belt driven consisting of a multi-groove, solid back Banded V-belt with taper lock sheaves designed with a minimum service factor of 1.5 and designed to be utilized in conjunction with a variable frequency drive. Multiple single belt systems shall not be accepted. Large diameter driven sheaves shall be constructed of lightweight aluminum alloy for corrosion protection.

3.0a (OPTION) MECHANICAL GEAR DRIVE SYSTEM

The fan drive system shall be a right angle gear driven design consisting of a right angle gear drive assembly which meets AGMA and CTI standards. A high efficiency close coupler (on internally mounted motors) or composite drive shaft with stainless steel couplings (externally mounted motors) shall be designed for maximum transmission efficiency and performance. Gear driven mechanical systems shall be designed for a minimum 2.0 service factor and suitable for operation in conjunction with a variable frequency drive.

3.1 FAN MOTOR(S)

____ HP NEMA Premium Efficiency totally enclosed fan cooled (T.E.F.C.) ball bearing fan motor(s) with a minimum 1.25 service factor shall be furnished and suitable for cooling tower service on 208-230/460 volts, 60 hertz, 3 phase. The fan motor shall be designed in accordance with MG1, part 31 suitable for inverter duty operation or in conjunction with a variable frequency drive. Motors shall be tested in accordance with IEEE 112, method B and efficiency values shall be certified by UL. The motor shall be designed specifically for use in cooling tower environments. Motor construction shall be provided with an interior and exterior epoxy coating to provide maximum protection against corrosion. The motor(s) shall be installed on an adjustable base for servicing and maintenance. A protective hinged cover shall shield externally mounted motors to protect them from the weather and to restrict accessibility to the rotating shaft, sheave, and belts for safety. When a gear drive system is chosen, the fan motors shall be mounted horizontally on a fixed motor base and shall be either close coupled internally or when mounted externally shall be provided with a removable shaft and coupling guard.

3.2 LOW NOISE 'SC' FAN WITH VT TIP TECHNOLOGY

Fan(s) shall be low noise wide chord, axial propeller, adjustable pitch type, marine grade aluminum design, that are dynamically balanced. The fan(s) shall be supplied and installed by the manufacturer prior to shipping maintaining a strict tip clearance for maximum efficiency. Fans shall be constructed of 5052 high grade marine alloy aluminum for maximum protection against rust and corrosion. Fan blades shall be designed with a resilient mounting system to eliminate the need to lockout variable frequency drive ranges. The fan(s) shall incorporate velocity tips for reduced sound. Fans constructed of galvanized steel or fixed pitch type shall not be acceptable. The fan shall be located within a fan stack that shall be designed out of G-235 galvanized steel (*stainless steel type 304 (316)*) and shall include a hot dipped galvanized steel (*stainless steel*) OSHA compliant fan guard that is securely fastened to the fan stack by fasteners during operation and can be removed for inspection or servicing.

Sample Specification

3.2a (OPTION) SUPER LOW NOISE 'EC' FAN WITH VE TIP TECHNOLOGY

Fan(s) shall be extended chord super low noise, axial propeller, adjustable pitch type, marine grade aluminum design that are dynamically balanced. The fan(s) shall be supplied and installed by the manufacturer prior to shipping maintaining a strict tip clearance for maximum efficiency. Fans shall be constructed of 5052 high grade marine alloy aluminum for maximum protection against rust and corrosion. Fan blades shall be designed with a resilient mounting system to eliminate the need to lockout variable frequency drive ranges. The fan(s) shall incorporate velocity edge for reduced sound. Fans constructed of galvanized steel or fixed pitch type shall not be acceptable. The fan shall be located within a fan stack that shall be designed out of G-235 galvanized steel (stainless steel type 304 (316)) and shall include a hot dipped galvanized steel (stainless steel) OSHA compliant fan guard that is securely fastened to the fan stack by fasteners during operation and can be removed for inspection or servicing. The cooling tower's fan stack shall be increased to accommodate the extended chord fan design for maximum efficiency.

3.3 BEARINGS

Fan shaft bearings shall be heavy duty self-aligning ball type with self-locking collars and lube lines that extend to the outside of the unit near the access door for servicing. Bearings shall be designed for a minimum L₁₀ life of 100,000 hours minimum and shall be guaranteed for a period of five (5) years under the mechanical warranty.

3.3a (OPTION) RIGHT ANGLE GEAR DRIVE

The cooling tower shall be designed with a right angle gear drive which exceeds AGMA and CTI standards. Right angle gear drives shall be constructed of a heavy duty rigid case which is epoxy coated for maximum protection against rust and corrosion and designed to absorb internal and external loads with minimum deflection. The spiral bevel gears are precision machined from high grade alloy steel, case hardened, and lapped in pairs for maximum durability and efficiency. The gear drives internal bearings shall be designed for a 100,000 hour L₁₀ life. Lubrication of the gear drive occurs by way of an internal slinger which incorporates a low speed function to eliminate minimum speed requirements and is suitable for operation in conjunction with a variable frequency drive. The gear drive utilizes a permanently mounted oil sight level gauge and is provided with an oil fill line and a drain line for servicing. Oil fill line shall be ran to the exterior of the cooling tower near the access door for servicing. Units which do not provide low speed options or extended oil fill lines shall not be accepted.

3.4 MECHANICAL WARRANTY

Cooling tower fan drive components shall be covered by a five (5) year complete mechanical warranty. Drive components protected by this warranty shall include the fans, bearings, fan shafts, belts, sheaves, bushings, and fan motors.

WATER DISTRIBUTION SYSTEM

4.1 WATER DISTRIBUTION SYSTEM

The hot water distribution basins shall be constructed of heavy gauge G235 (ASTM A653/A653M) galvanized steel materials and shall be open gravity type for easy cleaning and maintenance. The basins must be accessible from outside the unit and serviceable during tower operation. The hot water distribution basins shall be designed with top inlet studded flange connections located above each fill region of the cooling tower. The studded connections will be supplied with flow control valves for water balancing and connection to field piping. Distribution covers shall be constructed out of identical materials and shall be removable during tower operation for inspection and servicing of the hot water basins. Plastic or FRP covers shall not be accepted.

4.1a (OPTION) STAINLESS STEEL 304 (316) WATER DISTRIBUTION SYSTEM

The hot water distribution basins shall be constructed of heavy gauge stainless steel 304(316) materials and shall be open gravity type for easy cleaning and maintenance. The basins must be accessible from outside the unit and serviceable during tower operation. The hot water distribution basins shall be designed with top inlet studded flange connections located above each fill region of the cooling tower. The studded connections will be supplied with flow control valves for water balancing and connection to field piping. Distribution covers shall be constructed out of identical materials and shall be removable during tower operation for inspection and servicing of the hot water basins. Plastic or FRP covers shall not be accepted.

4.2 (OPTION) SINGLE POINT INLET CONNECTION – SIDE INLET CONNECTION

The cooling tower inlet piping shall be a single point connection type that is designed with factory installed piping to deliver balanced water flow to the hot water basins and simplify field piping of the cooling tower. The single inlet connection shall be side oriented with a beveled for weld and grooved connection type for mechanical coupling (*flanged to accept an ASME B16.5 Class 150 type flange*).

Sample Specification

4.2 (OPTION) SINGLE POINT INLET CONNECTION – SIDE INLET CONNECTION

The cooling tower inlet piping shall be a single point connection type that is designed with factory installed piping to deliver balanced water flow to the hot water basins and simplify field piping of the cooling tower. The single inlet connection shall be side oriented with a beveled for weld and grooved connection type for mechanical coupling (*flanged to accept an ASME B16.5 Class 150 type flange*).

4.2a(OPTION) SINGLE POINT INLET CONNECTION – BOTTOM INLET CONNECTION

The cooling tower inlet piping shall be a single point connection type that is designed with factory installed piping to deliver balanced water flow to the hot water basins and simplify field piping of the cooling tower. The single inlet connection shall be bottom oriented type flat face flange designed to accept an ASME B16.5 Class 150 type flange.

THERMAL COMPONENTS

5.1 FILL MEDIA

The cooling tower fill shall be PVC (Polyvinyl Chloride) of herring bone design for maximum heat transfer. The PVC fill shall be self-extinguishing for fire resistance with a flame spread rating of 5 per ASTM E84-81a. It shall also be resistant to rot, decay and biological attack. The fill shall be able to withstand continuous hot water temperatures up to 140°F. Fill media shall be supported by fiberglass reinforced polyester FRP bottom support system designed to elevate the fill media off of the floor of the basin and permit water circulation while preventing debris accumulation under the fill media.

5.2 DRIFT ELIMINATORS

Drift eliminators shall be designed for cross flow applications and shall be designed as an integral part of the fill media. Separate Drift Eliminators shall not be accepted. Maximum drift loss shall not exceed 0.0003% of total flow.

5.3 AIR INLET LOUVERS

Air Inlet louvers shall be required and shall be an integral member of the fill media. Integral louvers shall have the same material properties as the fill media and shall be designed to prevent splash out from occurring while maximizing air flow through the unit. When separate air inlet louvers are utilized, the air inlet louvers shall be constructed of noncorrosive fiberglass reinforced polyester material and can be removed and replaced for maintenance or cleaning. Air inlet louver supports shall be constructed out of the same material as the structural members of the cooling tower.

5.4 (OPTION) AIR INLET DEBRIS SCREENS

The cooling tower's air inlets shall be supplied with a factory installed debris screen designed to prevent entry of large debris or other unwanted foreign objects which may damage the fill media or enter the circulating water system. The air inlet debris screen shall be constructed of heavy gauge mesh with a maximum opening of 1" square and fastened to the cooling tower structure. The screens shall be easily removed for servicing and accessibility. Air inlet debris screen shall be constructed of hot dipped galvanized steel (HDG) (*stainless steel*) construction.

PLENUM ACCESS

6.1 ACCESS DOORS

Two hinged access doors shall be provided for access into the plenum section on the sides of the cooling tower supplied with a latching system to secure the doors during operation.

6.2 INTERNAL WALKWAY

The cooling tower plenum region shall include a mechanical walkway running between each access door to permit access to the plenum region of the cooling tower. The walkway shall be constructed of heavy gauge G235 galvanized steel supports (*Stainless Steel*) with fiberglass reinforced polyester FRP walkway with is provided with an anti-skid surface and is slotted to prevent water accumulation.

6.3 (OPTION) INTERNAL ELEVATED MECHANICAL SERVICE PLATFORM [*applicable to ACX-20XX models only*]

The cooling tower's plenum region shall be supplied with an elevated service platform designed to provide safe access to the mechanical components of the cooling tower. The elevated service platform shall be accessible from the internal walkway within the cooling tower by way of a factory mounted ladder. The elevated service platform will include an anti-skid walking surface and supplied with a handrail system. The entire assembly shall be in compliance with OSHA requirements. The elevated platform shall be constructed from hot dipped galvanized (HDG) (*Stainless Steel*) and the ladder shall be constructed of aluminum.

Sample Specification

SOUND

7.1 SOUND LEVEL

The cooling tower's sound levels shall not exceed ____ dB at a distance of 5 (50) feet from the cooling tower in any cardinal direction or above the equipment. Where sound criteria is determined by job specific requirements, those levels shall not exceed the sound levels as indicated on the chart below. Sound data shall be in accordance with CTI ATC-128 test procedures.

SOUND PRESSURE LEVEL MEASURED AT 5 (50) FEET									
	63	125	250	500	1000	2000	4000	8000	dB(A)
AIR INLET SIDES									
CASED SIDES									
VERTICAL									

Lp SOUND PRESSURE LEVELS ARE EXPRESSED IN (Db) REFERENCE 0.0002 MICROBAR

In the event the cooling tower cannot meet the required sound levels for the project, the manufacturer shall be required to incorporate a fan design that can meet the requirement or utilize sound attenuation as necessary. Units which do not meet the sound requirements are not acceptable.

ACCESSORIES & OPTIONS

8.0 ACCESS LADDER & PERIMETER HAND RAIL SYSTEMS

Ladders shall be installed to facilitate access to the mechanical drive system and access door of the cooling tower. In the event that an external service platform is incorporated into the overall design, the ladder shall be designed with a walk through to the access platform. The ladder shall be constructed to current OSHA standards and shall be designed of non-corrosive aluminum material with safety cage constructed of galvanized steel that adheres strictly to OSHA standards. The cooling tower shall be designed with a galvanized tube handrail system along the perimeter of the fan deck for fall protection. The handrail shall be designed from a minimum 1 ¼" galvanized steel tubing with galvanized fasteners. The handrail shall comply with OSHA requirements and we extend 42" from the fan deck. The system will include handrail, knee rail, and toe guard.

8.1 EXTERNAL COLD WATER BASIN SERVICE PLATFORM & LADDER

For elevated cooling tower installations the cooling tower shall be supplied with a cold water basin service platform that provides access to the access door of the cooling tower's plenum region. The cold water basin service platform shall be self-supporting design constructed of hot dipped galvanized steel (HDG) (*Stainless Steel 304*) with anti-skid walking surface and supplied with a complete handrail system which includes hand rail, knee rail, and toe guard. The platform shall be OSHA compliant and capable of a maximum 60 PSF live load or 300 pound concentrated load. The service platform will be supplied with a vertical access ladder which extends to the base of the cooling tower and is securely fastened to the cooling tower structure. Mounting hardware and brackets that attach to the cooling tower shall be made of identical materials of construction at the point of connection. When required a safety cages will be provided. (*A self-closing gate shall be provided at the step through ladder location.*)

8.2 VIBRATION SWITCH

The cooling tower shall be designed with an electro-mechanical vibration switch with local reset, designed to monitor, detect, and de-energize the fan motor in the event of excessive vibration. The vibration switch shall be factory mounted to the mechanical support and designed for operation within the cooling tower plenum and housed within a NEMA 4/4X IP66 (CSA types 4 and 12) enclosure. The unit is supplied with a local reset button and adjustable sensitivity dial which offers a range of 0-7G. The mechanical switch shall be designed with dual SPDT capability and capable of being integrated to the building's BMS system. (*The switch shall be furnished a remote reset option in either 115 VAC or 24 VDC.*)

8.3 BASIN HEATERS

The cooling tower shall be provided with ____ kW basin heater(s) for cold climates that are prone to freezing conditions. The heater selection shall be made by the factory and will be designed to maintain a minimum cold water temperature of no less than 40°F at 0°F (-20°F/-40°F) ambient. The electric basin heater shall incorporate a low water cutout switch and an adjustable thermostat housed within a NEMA 4x enclosure.

8.4 FILL BYPASS CONNECTION

The cooling tower cold water basin will be supplied with a fill bypass connection for use in cold weather climates or when conditions are such that the inlet water is to be diverted directly to the cold water basin without coming into contact with the fill media. The fill bypass connection shall be a side (*bottom*) oriented connection that is beveled for weld and grooved for mechanical coupling (*flanged to accept an ASME B16.5 Class 150 type flange*).

Sample Specification

8.5 MECHANICAL DAVIT

The cooling tower shall be supplied with a removable and portable light-weight aluminum davit that is designed to assist removal of the fan motor or fan assembly when servicing or maintenance is required. The davit shall be designed with a factory mounted fixed base, one per cell, constructed of identical materials as that of the upper section of the cooling tower and designed for a maximum weight load of 200% of the motor weight.

8.6 INTERNAL SWEEPER PIPING

The cooling tower shall include an integrated internal sweeper piping system for connection to an external water filtration system. The internal sweeper piping shall be designed with separate supply and return lines which are constructed of schedule 40 PVC piping no less than 2" in diameter. The return piping shall be located in the depressed region of the cold water basin and shall incorporate a series of collection holes which are no less than 1/2" in diameter. The collection holes shall be located facing downwards, slightly elevated off the basin floor to allow debris to be pulled into the circulating water and directed back to the filter system. Points of connection shall be by PVC bulkhead fittings for galvanized cold water basins. Stainless steel cold water basins shall utilize stainless steel welded couplings which are of identical material to the basin.

8.6a EDUCTOR NOZZLES

The supply piping shall incorporate ABS sweeper jets designed to create a negative pressure region at the nozzle outlet to induce ambient basin water into the elliptical discharge of the nozzle and direct the water discharge to a return pipe located in the depressed area of the cold water basin. The nozzles shall be spaced evenly from the point of connection to the end of the supply pipe. Nozzles shall be swivel mounted so that they can be adjusted as needed. Nozzles which are fixed body type shall not be accepted.

8.7 ELECTRONIC WATER LEVEL CONTROL HIGH/LOW ALARM

The cooling tower shall include an electric water level control device which is designed to operate by monitoring water levels within the cold water basin by way of stainless steel probes housed within an externally mounted stilling chamber. The probes shall be designed to monitor high and low water levels which will open and close the brass solenoid valve to regulate water levels within the cold water basin. The five probe system includes additional probes which are designed as high and low water level alarms for additional monitoring and protection. The control panel utilizes dry contact locations for remote monitoring and is provided with a 110 dB alarm at the control panel in the event that the low or high alarm is triggered. The electric water level controls shall be housed within a NEMA 4x enclosure designed for outdoor operation.

8.8 QUICK FILL LINE

The cooling tower shall be provided with an external point of connection which can permit full flow filling capability of the cooling tower basin in addition to the make-up connection. The quick fill line shall be located adjacent to the make-up connection for ease of tie-in to make-up water line and is designed to help accelerate the filling of the cooling tower following shutdowns that require the system to be drained. The connection type shall be NPT and diameter shall match the make-up connection size of the specified model.

8.9 VARIABLE FREQUENCY DRIVE

The cooling tower shall be furnished with a high quality, easy to use, variable frequency drive designed to monitor cold water basin temperatures and efficiently monitor fan power operation to minimize energy costs based on designated set points. The drive selection will be based on the electrical service and cooling tower horsepower as indicated on the mechanical schedule. The VFD Drive conforms to NEMA ICS 3.1 and shall be capable of operating without fault or failure when the voltage varies plus 10% or minus 15% from rating, and frequency variations of plus or minus 5%. The variable frequency drive shall be furnished in a NEMA 1 (NEMA 3R) (NEMA 12) enclosure and shall include a two contactor manual bypass when required. The VFD and bypass package shall be NEMA rated, fully pre-wired and read for installation as a single UL listed device. The VFD drive shall be furnished with a 2 year warranty and startup shall be conducted by an authorized local startup company.

8.10 SINGLE POINT CONTROL PANEL

The cooling tower shall be furnished with a single point electrical supply control panel for the cooling tower cell(s) with features and functions in accordance to the plans and specifications. The minimum requirements of the control panel shall be to provide a single point of electrical power supply capable of operating the cooling tower fan motors and electrical accessories or components being supplied. The single point electrical panel shall provide branch circuit protection to each motor, controls transformer, and electric basin heaters when present. Panel shall provide visual indicator lights and alarm for signal an event associated with temperature, vibration, or power loss. Unit shall be supplied within a fused enclosure with lockable door and an HOA switch for motors. The enclosure shall be NEMA 1 (NEMA 3R) (NEMA 12) (NEMA 4X) type and provide scalable contact points for the accessories and options and permit signal wiring to be integrated to the panel for BMS monitoring. When a VFD is used in conjunction with the single point electrical panel, the VFD from section 9.10 shall be housed within the enclosure which is sized according to requirements. All panels shall be UL listed.

Thermal Guarantee

American Cooling Tower ACX Series Cooling Tower
Thermal Performance Guarantee

The ACX Series cooling tower models listed here have achieved CTI Certification in accordance with CTI Standard 201 Test Code and are listed at www.cti.org.

CTI 201 Validation number for the ACX Series line is C38C-18R02.

In addition to certification, all ACX towers are supplied with a THERMAL GUARANTEE.

The ACX series packaged cooling towers designed and manufactured by AMERICAN COOLING TOWER INC., are provided with a THERMAL GUARANTEE stating that based on design conditions presented in bid documents or requirements provided by the client, tower performance shall meet or exceed a minimum of 95% capacity as is acceptable under CTI Standards & Testing and verified by a Thermal Acceptance Test performed under CTI ATC-105 testing standards certifying that the unit's thermal performance has been tested and meets CTI standards for thermal capacity ratings.

Upon the owner's request an ATC-105 thermal acceptance test can be provided at the owner's expense if they suspect that the cooling tower is not meeting thermal performance as required by the technical specifications supplied. A thermal acceptance test shall be provided by a third party testing agency to conduct the ATC-105 thermal acceptance per CTI requirements. Upon completion of the thermal test a report shall be provided to the customer confirming the results. This report will be furnished to both American Cooling Tower and the owner and is considered a legal document and will be recognized as such by all parties involved.

In the event that the suspected unit(s) do not pass the CTI ATC-105 thermal acceptance test, American Cooling Tower, will be held responsible for making any and all changes to the existing cooling tower(s) or replacing the existing cooling tower(s) to bring the unit into an acceptable performance range. If the unit(s) fail the ATC-105 thermal acceptance test American Cooling Tower will pay for all upgrades and the testing fees associated to certifying the cooling tower meets design requirements of the project.

Thermal Guarantees will be void should any design conditions be altered without the acknowledgement of American Cooling Tower. Any obstructions that limit air flow or cause air recirculation may also void thermal guarantees. American Cooling Tower provides a thermal guarantee under the assumption that the customer will maintain preventative maintenance as instructed by AMERICAN COOLING TOWER and uses only Factory Authorized Parts supplied by American Cooling Tower. Any parts, accessories, or optional components not supplied by American Cooling Tower, which may affect cooling performance can void thermal guarantee. The owner should consult with the factory prior to the installation of any components, platforms, ladders, or other accessories that may affect cooling tower performance.



ACX Series Single & Multiple cell models.

Belt or Gear Drive Units

Low Noise and Super Low Noise Fans

Some options and design parameters may void 201 certification.

Models will be noted with the suffix 'X' at the end of the model number when certification is void.

Warranty

AMERICAN COOLING TOWER STANDARD ACX SERIES COOLING TOWER WARRANTY STATEMENT**Five Year Mechanical Warranty - One Year Total Product**

AMERICAN COOLING TOWER warrants the mechanical equipment of their ACX series packaged system which includes the bearings, fan(s), fan motor(s), pulley(s), shaft(s), and mechanical support(s) for a period of five (5) years from the date of shipment by AMERICAN COOLING TOWER. Warranty coverage ensures that the mechanical components of the ACX series cooling tower will be free of defects in materials and workmanship. Any component not mentioned previously will be guaranteed to be free of defects associated with materials or workmanship for a period of one (1) year from the date of installation or for a period of eighteen (18) months from the date of shipping, whichever time expires first, by AMERICAN COOLING TOWER. The components that are included in the one (1) year or eighteen (18) month coverage period include; fill media, structural components, drift eliminators, inlet louvers, fan belts, make-up valve(s), vibration switches, or any other component not included in the standard five (5) year mechanical warranty.

In addition to the equipment warranty, AMERICAN COOLING TOWER offers a performance guarantee which states that the cooling tower specified in the CERTIFIED UNIT DRAWING will meet the designed specifications as indicated for the project for a period of one (1) year from date of installation or eighteen (18) months from the date of shipping by AMERICAN COOLING TOWER, whichever time expires first. If after installation and startup, the tower is not operating as specified, at the customer's request, AMERICAN COOLING TOWER technicians will perform a thorough inspection and performance test of the installed unit. The customer, consulting engineer, and manufacturer representative will be permitted access to observe the performance test and inspection. If the results of the performance test or the inspection show the equipment to be deficient, AMERICAN COOLING TOWER will make any necessary repairs or alterations to correct the problem at no additional cost to the owner. If following the inspection the unit is found to be in accordance with the certified drawings and stated performance, the owner will reimburse AMERICAN COOLING TOWER for all direct expenses associated with the performance test and inspection.

No other warranties written or verbal will supersede the above warranty statement. The sole remedy for breach of the warranty as stated above will be the repair or replacement of the equipment by AMERICAN COOLING TOWER at its option. Any third party labor or components that are installed onto the unit after unit is shipped by AMERICAN COOLING TOWER will void any warranty unless the components or accessories are approved in writing by AMERICAN COOLING TOWER. In addition, warranty coverage will be void if the owner does not perform preventative maintenance as recommended and operate the cooling tower in accordance to AMERICAN COOLING TOWERS' operation and maintenance manual. AMERICAN COOLING TOWER standard warranty as stated above is void in the event of natural disasters, riots, wars, or acts of God which result in the loss of the cooling tower. Under no circumstances will AMERICAN COOLING TOWER be liable for lost profits, lost savings, personal injuries, incidental damages, economic loss, property damage, or any other consequential, incidental, special or contingent damages. In addition, AMERICAN COOLING TOWER shall not be responsible for any injuries or damages of any kind whatsoever under any theory of tort to the extent caused by misuse of the product by the buyer or any third party. Warranty EXCLUDES labor to perform the repairs and shall be at the OWNER'S expense unless otherwise agreed upon in writing by AMERICAN COOLING TOWER.

Owner agrees to all terms outlined above in the stated warranty and this agreement is acknowledged upon owner's issuance of a purchase order and AMERICAN COOLING TOWER agrees to the above warranty at the time of purchase order acceptance.

ACT OFFERS FLEXIBLE WARRANTY PLANS WHICH INCLUDE:

5 Year mechanical / 1 Year total product (Parts Only)

5 Year mechanical / 1 Year total product (Parts & Labor)

5 Year Total Product (Parts Only)

5 Year Total Product (Parts & Labor)

Extended warranties beyond 5 years are also available

For more information please contact your representative or you can call **1-800-371-5959**.

Low Noise Options

American Cooling Tower provides the ACX Series cooling tower with several fan design options to help meet the growing need to provide units which operate at reduced sound levels. In the past and even today, many manufacturers have capitalized on sound requirements by charging top dollar for these options.

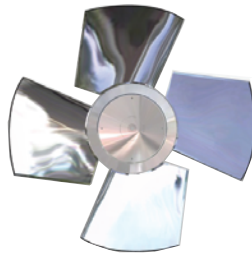
At American Cooling Tower, we do not believe that sound should come at a premium to our clients.

All of our fans are constructed from light-weight, high grade 5052 marine aluminum which offers maximum resistance to corrosion and reduced weights for longer mechanical life. In addition, all of the fan designs offered on our ACX series units incorporate a resilient mount system which allows the fan blades to automatically adjust based on speed variations associated with inverter duty operation. This feature reduces the need to lockout VFD ranges and permit clients with the ability to operate their towers across a wider range to maximize energy efficiency.

Whether you are looking at our Low Noise 'SC' Fans, Super Low Noise 'EC' Fans, or have a need for our Xtreme Low Noise 'XC' fan design, rest assured that American Cooling Tower will help you choose the right fan for your application.



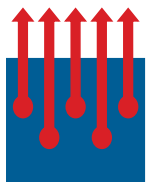
Low Noise 'SC' fans with VT Technology fans come standard on all units and provide superior sound levels when compared to most competitor's standard fan designs.



Xtreme Low Noise 'XC' Fans offer superior construction and sound levels without the use of expensive FRP sweeping blade fans which are prone to cracking and failure over time and are provided at a fraction of the cost.

ACX Series Cross Flow Induced Draft Cooling Towers

Engineering Data



**AMERICAN
COOLING
TOWER, INC.**

CORPORATE OFFICE:

American Cooling Tower, Inc.
3130 W Harvard Street
Santa Ana, CA 92704
800-371-5959
www.americancoolingtower.com

YOUR REPRESENTATIVE IS:



*Some options and accessories are excluded from CTI STD-201 certification. This is subject to change without notice. Publication: ACX2501