NihonSpindle

Leading Eco-Technology

NS COOLING TOWERS
WA Series

Super Low Noise • Space Saving • Energy Saving

Nihon Spindle WA Series

Super Low Noise

Our cooling towers are designed in accordance to Japan Cooling Tower Institute (JCI) standard which has very stringent noise level criterias. Our continous development on super low noise fan further reiterated our commitment towards reducing noise level.

Energy Saving

Our power consumption for the fan meets the international standard and guideline. Our built-in drift eliminators help to reduce drift loss, thus conserving precious water resource. This all translate back to savings in terms of operation costs to the building owner.

Space Saving

Our new cooling tower footprint is further reduced from previous generations. In additon, the new WAH series offers a much higher capacity per cell with similiar footprint to the WA series.

Our cooling towers are designed for multi-cell construction, thus offering better flexibility in tower selection and operation.

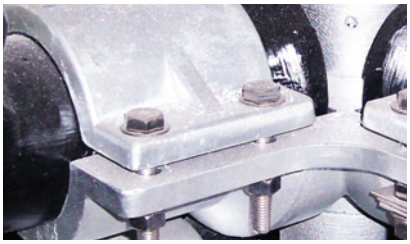
Our Successful History

With over 40 years of experience in the development of cooling towers, Nihon Spindle continues to lead the Asian market today through R&D and innovation. It is an ingrained part of Nihon Spindle's culture to seek continuous improvement in order to supersede existing performances and quantity standards.

Uncompromising Performance

Our cooling towers are manufactured to JIS B8609 standards. This is a renowned high performance standard for cooling towers that is certified by the Japan Cooling Tower Institute. Our performance standard incorporates features such as minimised footprint for the corresponding capacity required, super low noise performance and uncompromised energy efficiencies.

Quality Material



Nihon Spindle cooling towers are produced using only the highest quality components and materials. We use stainless steel 304 grade nut and bolts and hot-dipped galvanised steel for the structure and steel parts. These will ensure longer-lasting product life under exposure to water and heat. Our FRP fan blade is lighter and more durable, and consumes less power to run and start up.

CTI Standard Test Facility

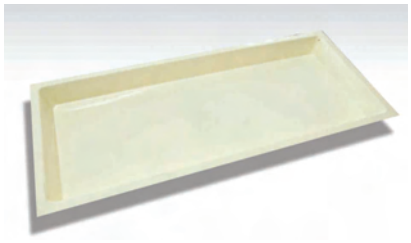
Diesel boilers to simulate heat load.

1100TR cooling tower CTI testing

In order to maintain the highest standards of quality, our products undergo strict annual testing according to world-renowned CTI standards. A test facility was designed and built at our manufacturing plant in Penang, Malaysia, in accordance to the specifications by a qualified and certified CTI tester. This unique CTI test facility has a combined floor space of 15,000 sq ft and is capable of up to 1,000 tonnes heat rejection testing. Testing is accomplished to great accuracy by 4 massive diesel-boilers and numerous sensors embedded around the vicinity of the test platform. In addition, our plant also includes a Static Fan Balancing and Dynamic Fan Testing facility.

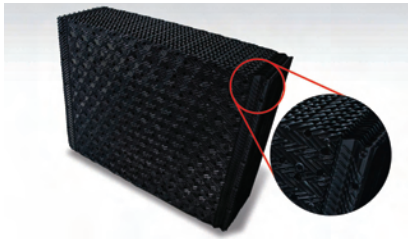
Our Japanese team

Manufacturing Control, Engineering Design, Quality Control and R&D led by qualified Japanese team from Nihon Spindle Manufacturing Co., Ltd., Osaka Japan.



Hot Water Distribution System

Our crossflow design uses hot water basin as the distribution system which eliminate the use of nozzle spray heads. This will lower the first cost in the pumping system and operating cost in the long run due to lower energy consumption.



Highly Efficient Infill

Our highly efficient infills incorporate a drift eliminators which significantly reduces drift loss to save precious water. This design is the result from years of Research & Development, led by Japanese engineers, to continuously improve the infill performance and efficiency.

Cost-Saving Internal Piping

The WA, WAS and WAH series features an internal piping design that help to reduce the amount of external piping works. The unique design helps to reduce further component costs as it only uses half the number of valves that are usually required. It also allows for a tidier, less cluttered piping installation. Maintenance is made easier due to the location of the values are installed on the same side.

Special Internal Walkway

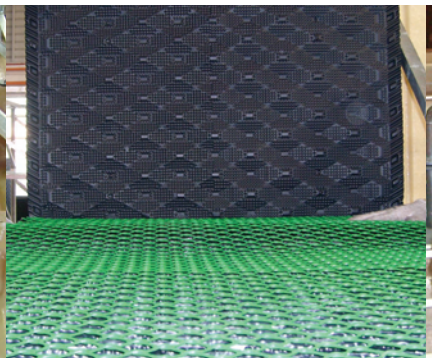
The internal chambers of our Nihon Spindle cooling towers can be easily accessed through a special internal walkway that runs along the centre of the tower. This special feature provides better access to internal components and helps to simplify the maintenance process, thus reducing maintenance cost. It also allows internal inspections to be done easily and safely.

CTA-WA-N Low Noise Design

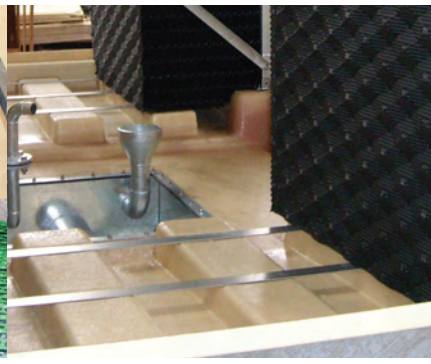
Specifications			Performance & Design											Overall Dimensions			
Temperature	In	° F	100	100	100.4	98.6	97.5	97	97	95	Drift Loss %	Evaporation Loss %	No. Of Cells	Basin Capacity (Litres)	Width(W) (mm)	Length(L) (mm)	Overall Height(H) (mm)	Fan Height(h) (mm)
	Out	° F	90	90	91.4	89.6	87.4	87	87	85.1								
	WB	° F	83	82	82.4	80.6	81	82	81	81								
	In	° C	37.8	37.8	38	37	36.4	36.1	36.1	35								
	Out	° C	32.2	32.2	33	32	30.8	30.6	30.6	29.5								
	WB	° C	28.3	27.8	28	27	27.2	27.8	27.2	27.2								
MODEL		HRT	Circulating Water Flowrate (m^3/hr)															
CTA-100WA-N		100	62.5	67.3	82.0	78.0	55.5	47.8	53.7	40.5	Less than 0.02%of circulating flowrate	Approximately 0.87% of total flow	1	940	1850	3370	2795	550
CTA-125WA-N		125	78.1	84.2	102.5	97.5	69.4	59.8	67.1	50.6				940	1850	3370	2795	550
CTA-150WA-N		150	94.0	101.2	123.0	117.0	83.5	72.1	80.8	61.0				940	1850	3370	3295	550
CTA-175WA-N		175	109.6	118.0	143.5	136.5	97.4	84.1	94.2	71.2				940	1850	3370	3295	550
CTA-200WA-N		200	125.3	134.9	164.0	156.0	111.3	96.1	107.7	81.4				1050	2050	3470	3395	650
CTA-225WA-N		225	141.0	151.7	184.5	175.5	125.2	108.1	121.1	91.5				1310	2350	3770	3295	550
CTA-250WA-N		250	156.6	168.6	204.9	195.0	139.2	120.1	134.6	101.7				1310	2350	3770	3630	550
CTA-300WA-N		300	187.9	202.3	245.9	234.0	167.0	144.1	161.5	122.0			2	1730	3700	3370	3295	550
CTA-350WA-N		350	219.3	236.0	286.9	273.0	194.8	168.1	188.5	142.4				1730	3700	3370	3295	550
CTA-400WA-N		400	250.6	269.8	327.9	312.0	222.6	192.2	215.4	162.7				1950	4100	3470	3395	650
CTA-450WA-N		450	281.9	303.5	368.9	351.0	250.5	216.2	242.3	183.0				2470	4700	3770	3295	550
CTA-500WA-N		500	313.2	337.2	409.9	390.0	278.3	240.2	269.2	203.4				2470	4700	3770	3630	550
CTA-600WA-N		600	375.9	404.6	491.9	468.0	334.0	288.2	323.1	244.1			3	3030	6150	3470	3395	650
CTA-700WA-N		700	438.5	472.1	573.8	546.0	389.6	336.3	376.9	284.7				3780	7050	3770	3295	550
CTA-750WA-N		750	469.9	505.8	614.8	585.0	417.5	360.3	403.8	305.1				3780	7050	3770	3630	550
CTA-800WA-N		800	501.2	539.5	655.8	624.0	445.3	384.3	430.7	325.4			4	3960	8200	3470	3395	650
CTA-900WA-N		900	563.8	606.9	737.8	702.0	500.9	432.4	484.6	366.1				4940	9400	3770	3295	550
CTA-1000WA-N		1000	626.5	674.4	819.8	702.0	556.6	480.4	538.4	406.8				4940	9400	3770	3630	550

HRT, nominal heat rejection ton is based on flowrate of 13L/min (0.78m^3/hr) at 37°C inlet temperature, 32°C outlet temperature & 27°C wet bulb temperature condition.

Sloping cold water basin and depressed sump provide complete self-draining during periodic wash-down.



A layer of PVC wire mesh to support the upper layer infill and to separate it from the bottom layer.



HDG Steel infill supports for the bottom layer.

Fan Assembly									Common Piping Details							Weight	
Fan						Motor											
Type	Diameter (mm)	No. Of Blades (per cell)	Fan Speed (rpm)	Air Flowrate m^3/min	Drive System	Type	Mounting Location	Power Supply	Rated Output (kw)	Hot Water Inlet(mmxq'ty)	Cold Water Outlet(mmxq'ty)	Drain(mmxq'ty)	Overflow(mmxq'ty)	Auto Make-Up Inlet(mmxq'ty)	Manual Make-Up Inlet(mmxq'ty)	Head Loss(m)	Dry Weight(kg)	Operating Weight(kg)
Totally Enclosed Fan-Cooled, IP55	1500	4	421	730	V-Belt And Pulley Drive	Totally Enclosed Fan-Cooled, IP55	Outside Air-Stream	3Phase 415V 50Hz or 3Phase 200V 50/60Hz or 3Phase 380V 50Hz or 3Phase 460V 60Hz	2.2 X 1	125x1	125x1	50x1	50x1	25x1	25x1	1.5	750	1950
	1500		521	913					3.7 X 1	125x1	125x1	50x1	50x1	25x1	25x1	1.5	770	1970
	1600		452	1064					3.7 X 1	125x1	125x1	50x1	50x1	25x1	25x1	1.5	840	2170
	1600		515	1241					5.5 X 1	150x1	150x1	50x1	50x1	25x1	25x1	1.5	860	2190
	1850		425	1418					5.5 X 1	150x1	150x1	50x1	50x1	25x1	25x1	1.5	930	2400
	2000		361	1596					5.5 X 1	150x1	150x1	50x1	50x1	25x1	25x1	1.5	1000	2770
	2000		400	1750					7.5 X 1	150x1	150x1	50x1	50x1	25x1	25x1	1.5	1080	2910
	1600		452	2128					3.7 X 2	125x2	200x1	80x1	80x1	40x1	40x1	1.5	1590	4130
	1600		515	2482					5.5 X 2	150x2	200x1	80x1	80x1	40x1	40x1	1.5	1630	4170
	1850		425	2836					5.5 X 2	150x2	250x1	80x1	80x1	40x1	40x1	1.5	1780	4580
	2000		361	3192					5.5 X 2	150x2	250x1	80x1	80x1	40x1	40x1	1.5	1920	5300
	2000		400	3500					7.5 X 2	150x2	250x1	80x1	80x1	40x1	40x1	1.5	2050	5580
	1850		425	4254					5.5 X 3	150x3	200x2	80x2	80x2	40x2	40x2	1.5	2670	6940
	2000		374	4965					7.5 X 3	150x3	200x2	80x2	80x2	40x2	40x2	1.5	2870	8010
	2000		400	5250					7.5 X 3	150x3	200x2	80x2	80x2	40x2	40x2	1.5	3060	8430
	1850		425	5672					5.5 X 4	150x4	200x2	80x2	80x2	40x2	40x2	1.5	3510	9110
	2000		361	6384					5.5 X 4	150x4	200x2	80x2	80x2	40x2	40x2	1.5	3780	10540
	2000		400	7000					7.5 X 4	150x4	250x2	80x2	80x2	40x2	40x2	1.5	4040	11100

Innovative internal piping design provides easy piping hook-up and minimum pressure drop.

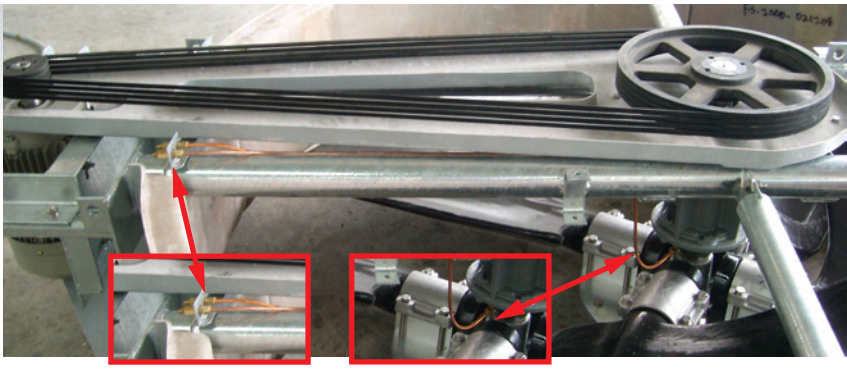
Axial flow type fan in the WA-N series are constructed using FRP.

CTA-WAS-N Super Low Noise Design

Specifications			Performance & Design								Drift Loss %	Evaporation Loss %	No. Of Cells	Basin Capacity (Litres)	Overall Dimensions			
Temperature	In	° F	100	100	100.4	98.6	97.5	97	97	95					Width(W) (mm)	Length(L) (mm)	Overall Height(H) (mm)	Fan Height(h) (mm)
	Out	° F	90	90	91.4	89.6	87.4	87	87	85.1								
	WB	° F	83	82	82.4	80.6	81	82	81	81								
	In	° C	37.8	37.8	38	37	36.4	36.1	36.1	35								
	Out	° C	32.2	32.2	33	32	30.8	30.6	30.6	29.5								
	WB	° C	28.3	27.8	28	27	27.2	27.8	27.2	27.2								
MODEL		HRT	Circulating Water Flowrate (m^3/hr)															
CTA-100WAS-N		100	62.5	67.3	82.0	78.0	55.5	47.8	53.7	40.5	Less than 0.02%of circulating flowrate	Approximately 0.87% of total flow	1	940	1850	3370	2795	550
CTA-125WAS-N		125	78.1	84.2	102.5	97.5	69.4	59.8	67.1	50.6				940	1850	3370	2795	550
CTA-150WAS-N		150	94.0	101.2	123.0	117.0	83.5	72.1	80.8	61.0				940	1850	3370	3295	550
CTA-175WAS-N		175	109.6	118.0	143.5	136.5	97.4	84.1	94.2	71.2				940	1850	3370	3295	550
CTA-200WAS-N		200	125.3	134.9	164.0	156.0	111.3	96.1	107.7	81.4				1050	2050	3470	3615	870
CTA-225WAS-N		225	141.0	151.7	184.5	175.5	125.2	108.1	121.1	91.5				1310	2350	3770	3665	920
CTA-250WAS-N		250	156.6	168.6	204.9	195.0	139.2	120.1	134.6	101.7				1310	2350	3770	4000	920
CTA-300WAS-N		300	187.9	202.3	245.9	234.0	167.0	144.1	161.5	122.0			2	1730	3700	3370	3295	550
CTA-350WAS-N		350	219.3	236.0	286.9	273.0	194.8	168.1	188.5	142.4				1730	3700	3370	3295	550
CTA-400WAS-N		400	250.6	269.8	327.9	312.0	222.6	192.2	215.4	162.7				1950	4100	3470	3615	870
CTA-450WAS-N		450	281.9	303.5	368.9	351.0	250.5	216.2	242.3	183.0				2470	4700	3770	3665	920
CTA-500WAS-N		500	313.2	337.2	409.9	390.0	278.3	240.2	269.2	203.4				2470	4700	3770	4000	920
CTA-600WAS-N		600	375.9	404.6	491.9	468.0	334.0	288.2	323.1	244.1			3	3030	6150	3470	3615	870
CTA-700WAS-N		700	438.5	472.1	573.8	546.0	389.6	336.3	376.9	284.7				3780	7050	3770	3665	920
CTA-750WAS-N		750	469.9	505.8	614.8	585.0	417.5	360.3	403.8	305.1				3780	7050	3770	4000	920
CTA-800WAS-N		800	501.2	539.5	655.8	624.0	445.3	384.3	430.7	325.4			4	3960	8200	3470	3615	870
CTA-900WAS-N		900	563.8	606.9	737.8	702.0	500.9	432.4	484.6	366.1				4940	9400	3770	3665	920
CTA-1000WAS-N		1000	626.5	674.4	819.8	702.0	556.6	480.4	538.4	406.8				4940	9400	3770	4000	920

HRT, nominal heat rejection ton is based on flowrate of 13L/min (0.78m^3/hr) at 37°C inlet temperature, 32°C outlet temperature & 27°C wet bulb temperature condition.

Super low noise fan.



In order to prolong lifespan of the fan bearing, grease nipples and copper piping allow for easy and direct delivery of lubrication to the fan bearing.

Fan Assembly									Common Piping Details							Weight	
Fan						Motor											
Type	Diameter (mm)	No. Of Blades (per cell)	Fan Speed (rpm)	Air Flowrate m	Drive System	Type	Mounting Location	Power Supply	Rated Output (kw)	Hot Water Inlet(mmxq'ty)	Cold Water Outlet(mmxq'ty)	Drain(mmxq'ty)	Overflow(mmxq'ty)	Auto Make-Up Inlet(mmxq'ty)	Manual Make-Up	Head Loss(m)	Dry Weight(kg)	Operating Weight(kg)
Axial Flow	1500	4	421	730	V-Belt And Pulley Drive	Totally Enclosed Fan-Cooled, IP55	Outside Air-Stream	3Phase 415V 50Hz or 3Phase 200V 50/60Hz or 3Phase 380V 50Hz or 3Phase 460V 60Hz	2.2 X 1	125x1	125x1	50x1	50x1	25x1	25x1	1.5	760	1960
	1500		521	913					3.7 X 1	125x1	125x1	50x1	50x1	25x1	25x1	1.5	780	1980
	1600		452	1064					3.7 X 1	125x1	125x1	50x1	50x1	25x1	25x1	1.5	850	2180
	1600		515	1241					5.5 X 1	150x1	150x1	50x1	50x1	25x1	25x1	1.5	870	2200
	1850		425	1418					5.5 X 1	150x1	150x1	50x1	50x1	25x1	25x1	1.5	950	2420
	2000		361	1596					5.5 X 1	150x1	150x1	50x1	50x1	25x1	25x1	1.5	1030	2800
	2000		400	1750					7.5 X 1	150x1	150x1	50x1	50x1	25x1	25x1	1.5	1110	2940
	1600		452	2128					3.7 X 2	125x2	200x1	80x1	80x1	40x1	40x1	1.5	1610	4150
	1600		515	2482					5.5 X 2	150x2	200x1	80x1	80x1	40x1	40x1	1.5	1650	4190
	1850		425	2836					5.5 X 2	150x2	250x1	80x1	80x1	40x1	40x1	1.5	1820	4620
	2000		361	3192					5.5 X 2	150x2	250x1	80x1	80x1	40x1	40x1	1.5	1980	5360
	2000		400	3500					7.5 X 2	150x2	250x1	80x1	80x1	40x1	40x1	1.5	2110	5640
	1850		425	4254					5.5 X 3	150x3	200x2	80x2	80x2	40x2	40x2	1.5	2730	7000
	2000		374	4965					7.5 X 3	150x3	200x2	80x2	80x2	40x2	40x2	1.5	2960	8100
	2000		400	5250					7.5 X 3	150x3	200x2	80x2	80x2	40x2	40x2	1.5	3150	8520
	1850		425	5672					5.5 X 4	150x4	200x2	80x2	80x2	40x2	40x2	1.5	3590	9190
	2000		361	6384					5.5 X 4	150x4	200x2	80x2	80x2	40x2	40x2	1.5	3900	10660
	2000		400	7000					7.5 X 4	150x4	250x2	80x2	80x2	40x2	40x2	1.5	4160	11220

Tower structures in HDG steel on standard WA / WAS / WAH Series.

The motor unit for every model is strategically placed away from the discharge air stream. The wedge belts driving the fan units are enclosed inside the FRP belt covers for added protection and longer service life.

CTA-WAH-N Space Saving Low Noise Design

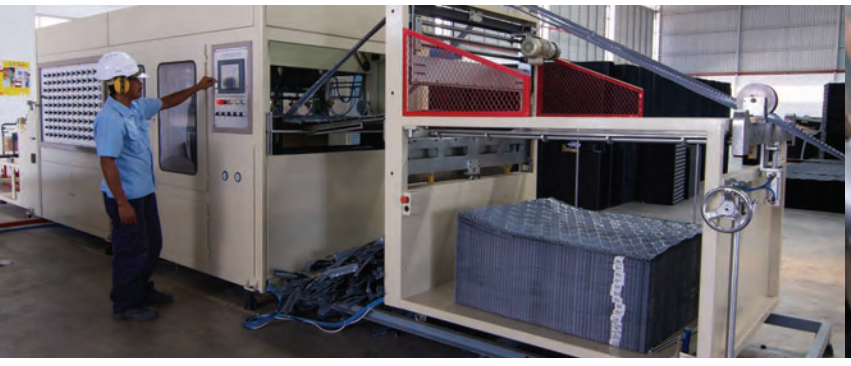
Specifications			Performance & Design								No. of Cells	Drift Loss %	Evaporation Loss %	Basin Capacity (Litres)	Overall Dimensions			
Temperature	In	° F	100	100	100.4	98.6	97.5	97	97	95					Width(W) (mm)	Length(L) (mm)	Overall Height(H) (mm)	Fan Height(h) (mm)
	Out		90	90	91.4	89.6	87.4	87	87	85.1								
	WB		83	82	82.4	80.6	81	82	81	81								
	In	° C	37.8	37.8	38	37	36.4	36.1	36.1	35								
	Out		32.2	32.2	33	32	30.8	30.6	30.6	29.5								
	WB		28.3	27.8	28	27	27.2	27.8	27.2	27.2								
MODEL		HRT	Circulating Water Flowrate (m^3/hr)															
CTA-275WAH-N		275	172.3	185.5	214.5	214.5	153.1	132.1	148.1	111.9	1	Less than 0.02%of circulating flowrate	Approximately 0.87% of total flow	1310	2350	3770	4350	550
CTA-300WAH-N		300	187.9	202.3	214.5	214.5	167.0	144.1	161.5	122.0				1310	2350	3770	4610	810
CTA-550WAH-N		550	344.6	370.9	429.0	429.0	306.1	264.2	296.1	223.7	2			2470	4700	3770	4350	550
CTA-600WAH-N		600	375.9	404.6	429.0	429.0	334.0	288.2	323.1	244.1				2470	4700	3770	4610	810
CTA-825WAH-N		825	516.9	556.4	643.5	643.5	459.2	396.3	444.2	335.6	3			3780	7050	3770	4350	550
CTA-900WAH-N		900	563.8	606.9	643.5	643.5	500.9	432.4	484.6	366.1				3780	7050	3770	4610	810
CTA-1100WAH-N		1100	689.1	741.8	858.0	858.0	612.3	528.4	592.3	447.4	4			4940	9400	3770	4350	550
CTA-1200WAH-N		1200	751.8	809.3	858.0	858.0	667.9	576.5	646.1	488.1				4940	9400	3770	4610	810

HRT, nominal heat rejection ton is based on flowrate of 13L/min (0.78m^3/hr) at 37°C inlet temperature, 32°C outlet temperature & 27°C wet bulb temperature condition. (CTA-275WAH-N & CTA-300WAH-N is limited by max. flow rate of 214.5m3/hr respectively per cell)

Trained staff conducting stringent quality control on every product.

Production floor space: 60,000 sq. ft.

Fan Assembly									Common Piping Details							Weight	
Fan						Motor											
Type	Diameter (mm)	No. Of Blades (per cell)	Fan Speed (rpm)	Air Flowrate m^3/min	Drive System	Type	Mounting Location	Power Supply	Rated Output (kw)	Hot Water Inlet(mmxq'ty)	Cold Water Outlet(mmxq'ty)	Drain(mmxq'ty)	Overflow(mmxq'ty)	Auto Make-Up Inlet(mmxq'ty)	Manual Make-Up Inlet(mmxq'ty)	Head Loss(m)	Dry Weight(kg)	Operating Weight(kg)
Axial Flow	2000	4	405	1880	V-Belt And Pulley Drive	Totally Enclosed Fan-Cooled, IP55	Outside Air-Stream	3Phase 415V 50Hz or 3Phase 200V 50/60Hz or 3Phase 380V 50Hz or 3Phase 460V 60Hz	7.5 X 1	150x1	200x1	80x1	80x1	40x1	40x1	1.5	1250	3220
	2200		345	2052					11 X 1	200x1	200x1	80x1	80x1	40x1	40x1	1.5	1300	3270
	2000		405	3760					7.5 X 2	150x2	250x1	80x1	80x1	40x1	40x1	1.5	2400	6180
	2200		345	4104					11X 2	200x2	250x1	80x1	80x1	40x1	40x1	1.5	2500	6280
	2000		405	5640					7.5 X 3	150x3	200x2	80x2	80x2	40x2	40x2	1.5	3540	9280
	2200		345	6156					11 X 3	200x3	200x2	80x2	80x2	40x2	40x2	1.5	3690	9430
	2000		405	7520					7.5 X 4	150x4	250x2	80x2	80x2	40x2	40x2	1.5	4720	12280
	2200		345	8208					11 X 4	200x4	250x2	80x2	80x2	40x2	40x2	1.5	4920	12480



Automated Vacumn Forming Machine to produce high efficiency infills.

Highly skilled assembly workers.

CTA-WA-N Sound Data

MODEL	Measuring Direction	1	2	3	4	5
		2m	5m	10m	20m	45° Upper Dfm
CTA-100 WA-N	W	64	59.5	54.5	47	68
	L	61	56.5	51.5	44	
CTA-125 WA-N	W	65	60.5	55	47.5	69
	L	62	57	52	44.5	
CTA-150 WA-N	W	65.5	61	56	48.5	69
	L	62.5	58	53	45.5	
CTA-175 WA-N	W	66.5	62	57	49.5	70
	L	63.5	59	54	46.5	
CTA-200 WA-N	W	67	62.5	57.5	50	70.5
	L	64	59.5	54.5	47	
CTA-225 WA-N	W	67.5	63	58	50.5	71
	L	64.5	60	55	47.5	
CTA-250 WA-N	W	68.5	64	59	51.5	72
	L	65.5	61	56	48.5	
CTA-300 WA-N	W	69	65	59.5	52	72.5
	L	65	61	55.5	48	
CTA-350 WA-N	W	69.5	65.5	60	52.5	73
	L	65.5	61.5	56	48.5	

* All units are measured in dB. ±3dB tolerance is applicable in comparison with standard levels.

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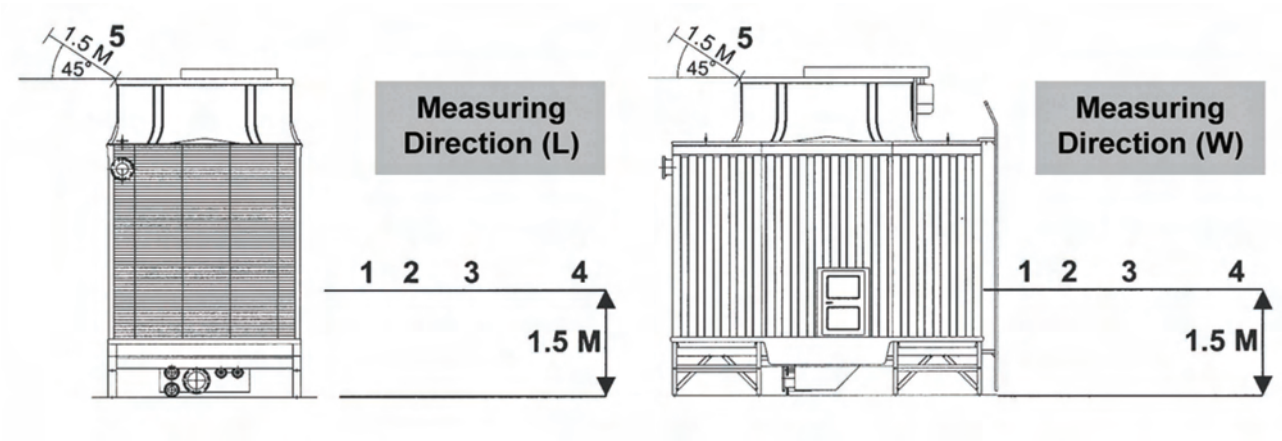
2. Noise levels are based on normal operating conditions, other factors are excluded.
3. Noise levels are measured based on A scale.



CTA-WA-N Sound Data

MODEL	Measuring Direction	1	2	3	4	5
		2m	5m	10m	20m	45° Upper Dfm
CTA-400 WA-N	W	70	66	60.5	53	73.5
	L	66	62	56.5	49	
CTA-450 WA-N	W	70.5	66.5	61	53.5	74
	L	66.5	62.5	57	49.5	
CTA-500 WA-N	W	71.5	67.5	62	54.5	75
	L	67.5	63.5	58	50.5	
CTA-600 WA-N	W	72	67.5	62.5	55.5	75.5
	L	67.5	63	57.5	50.5	
CTA-700 WA-N	W	73	68.5	63	56	76.5
	L	68.5	64	58.5	51.5	
CTA-750 WA-N	W	73.5	69	63.5	56.5	77
	L	69	64.5	59	52	
CTA-800 WA-N	W	73	68.5	63	56	76.5
	L	68.5	64	58.5	51.5	
CTA-900 WA-N	W	73.5	69	63.5	56.5	77
	L	69	64.5	59	52	
CTA-1000 WA-N	W	74.5	70.5	65	57.5	78
	L	70	66	60.5	53	

* All units are measured in dB. ±3dB tolerance is applicable in comparison with standard levels.

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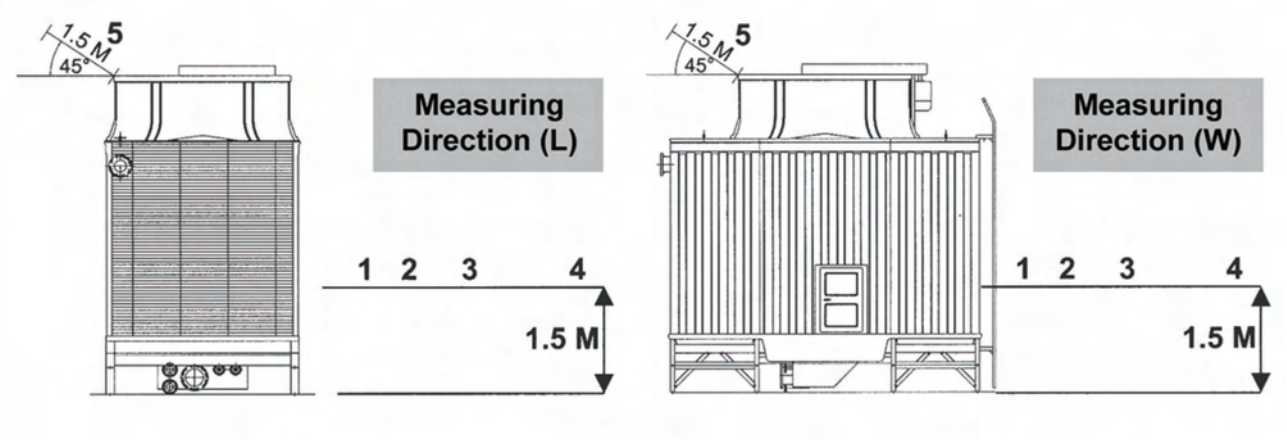

CTA-WAS-N Sound Data

MODEL	Measuring Direction	1	2	3	4	5
		2m	5m	10m	20m	45° Upper Dfm
CTA-100 WAS-N	W	59	54.5	49.5	42	63
	L	56	51.5	46.5	39	
CTA-125 WAS-N	W	60.5	56	50.5	43	64.5
	L	57.5	52.5	47.5	40	
CTA-150 WAS-N	W	61.5	57	52	44.5	65
	L	58.5	54	49	41.5	
CTA-175 WAS-N	W	62	57.5	52.5	45	65.5
	L	59	54.5	49.5	42	
CTA-200 WAS-N	W	63	58.5	53.5	46	66.5
	L	61	55.5	50.5	42	
CTA-225 WAS-N	W	63.5	59	54	46.5	67
	L	60.5	56	51	43.5	
CTA-250 WAS-N	W	64	59.5	54.5	47	67.5
	L	61	56.5	51.5	44	
CTA-300 WAS-N	W	65	62	58	49.5	67.5
	L	62	58.5	54	46.5	
CTA-350 WAS-N	W	65	61	55.5	48	68.5
	L	61	57	51.5	44	

* All units are measured in dB. ±3dB tolerance is applicable in comparison with standard levels.

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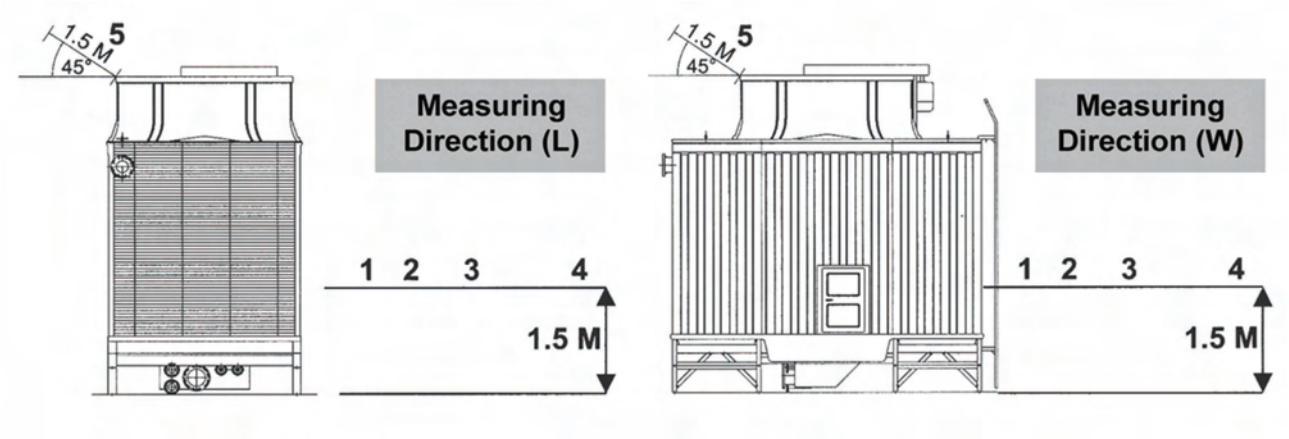

CTA-WAS-N Sound Data

MODEL	Measuring Direction	1	2	3	4	5
		2m	5m	10m	20m	45° Upper Dfm
CTA-400 WAS-N	W	66	62	56.5	49	69.5
	L	63	59	53.5	46	
CTA-450 WAS-N	W	66.5	62.5	57	49.5	71
	L	62.5	58.5	53	45.5	
CTA-500 WAS-N	W	67.5	63.5	58	50.5	72
	L	64.5	60.5	55	47.5	
CTA-600 WAS-N	W	68.5	64.5	59.5	51.5	72.5
	L	65.5	61.5	56	48.5	
CTA-700 WAS-N	W	69	64.5	59	52	72.5
	L	65	60.5	55	48	
CTA-750 WAS-N	W	69.5	65	59.5	52.5	73
	L	65.5	61	55.5	48.5	
CTA-800 WAS-N	W	70	65.5	60	53	73.5
	L	66	61.5	56	49	
CTA-900 WAS-N	W	70.5	66	60.5	53.5	74
	L	66.5	62	56.5	49.5	
CTA-1000 WAS-N	W	71	67	61.5	54	74.5
	L	67	63	57.5	50	

* All units are measured in dB. ±3dB tolerance is applicable in comparison with standard levels.

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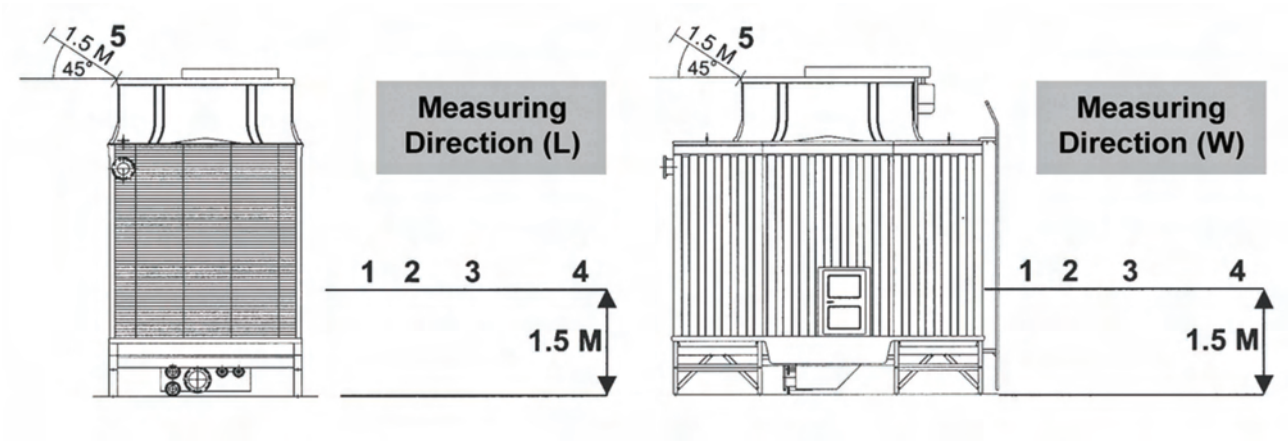

CTA-WAH-N Sound Data

MODEL	Measuring Direction	1	2	3	4	5
		2m	5m	10m	20m	45° Upper Dfm
CTA-275 WAH-N	W	68.5	64	59	51.5	72
	L	65.5	61	56	48.5	
CTA-300 WAH-N	W	71	68	64	55.5	73.5
	L	68	64.5	60	52.5	
CTA-550 WAH-N	W	71.5	67.5	62	54.5	75
	L	67.5	63.5	58	50.5	
CTA-600 WAH-N	W	74	70	65	57	76.5
	L	70	66	60.5	53	
CTA-825 WAH-N	W	73.5	69	63.5	56.5	77
	L	69	64.5	59	52	
CTA-900 WAH-N	W	76	71.5	66	59	79.5
	L	71.5	67	61.5	54.5	
CTA-1100 WAH-N	W	74.5	70.5	65	57.5	78
	L	70	66	60.5	53	
CTA-1200 WAH-N	W	77	73	67.5	60	80.5
	L	72.5	68	62.5	55	

* All units are measured in dB. ±3dB tolerance is applicable in comparison with standard levels.

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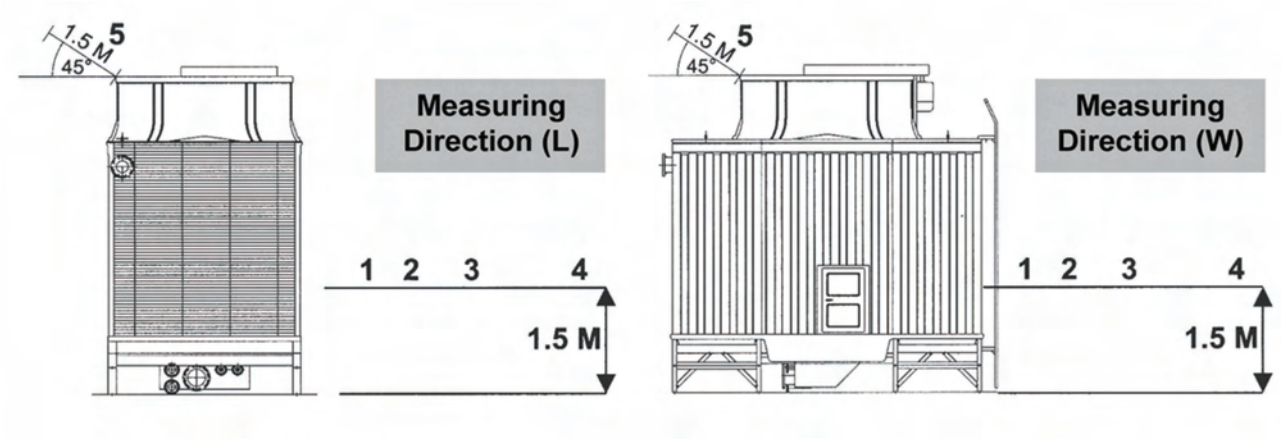
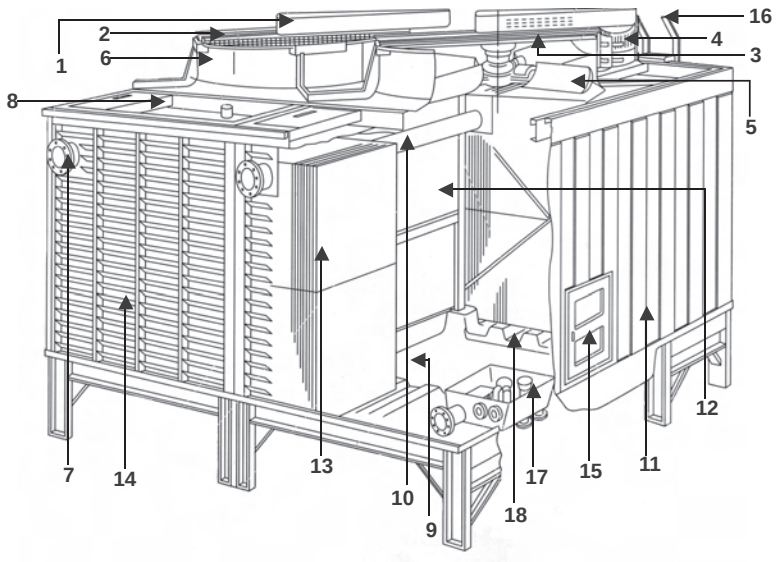


Materials of Construction Options (WA-N, WAS-N & WAH-N)

Area	Part	Standard Construction	Wetted Parts SS Construction	All SS Construction
Tower Structure	Bottom Basin Frame	HDG Steel	HDG Steel	Stainless Steel
	Upper Structural Frame	HDG Steel	Stainless Steel	Stainless Steel
	Ladder	HDG Steel	HDG Steel	Stainless Steel
	Bolt & Nut	Stainless Steel	Stainless Steel	Stainless Steel
	Infill Support	HDG Steel	Stainless Steel	Stainless Steel
	Fan Guard	HDG Steel	Stainless Steel	Stainless Steel
Basin	Outlet Sump	HDG Steel	Stainless Steel	Stainless Steel
	Cold Water Basin	FRP		
	Hot Water Basin	HDG Steel	Stainless Steel	Stainless Steel
	Inlet Port	PVC		
Perimeter Structure	Casing	FRP		
	Access Door	FRP		
	Internal Partition w/door	FRP		
	Louver	PVC		
	Fan Stack	FRP		
Fan Assembly	Fan	FRP		
	Fan Belt	Wedge Belt		
	Motor	Aluminum/Cast Iron		
	Pulley Cover	FRP		
	Fan Holder	HDG Steel	Stainless Steel	Stainless Steel
Infill	Infill w/Integral Drift Eliminator	Thermal-Vacuum-Formed PVC		



Legend:

1	Pulley Cover
2	Fan Guard
3	Fan Holder
4	Motor
5	Fan Blade
6	Fan Stack
7	Hot Water Inlet Port
8	Hot Water Basin
9	Cold Water Basin
10	Internal Piping
11	Casing (Wall)
12	Internal Wall
13	Infill
14	Louver
15	Access Door
16	Ladder
17	Sump
18	Internal Walkway

Optional Accessories

Vibration Isolators

Mounted at the feet of the cooling tower, vibration isolators provide an effective way of isolating any vibration from the tower to the concrete floors.

Single-spring and double-spring design are generally sufficient to meet the requirements of the range of Nihon Spindle cooling towers. Selection of the right sizes depending on rated load and rated deflection.

Aluminium Alloy Blade

Aluminium alloy blades are available as an optional item to our standard FRP blades. These blades are recommended for use in highly corrosive enviroments.

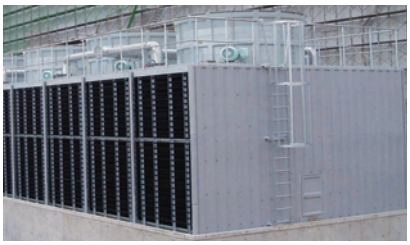
Gear Reducer

As an alternative to wedge belt drive system, gear reducer option is available. The motor is located outside the air steam.

Vibration Switch

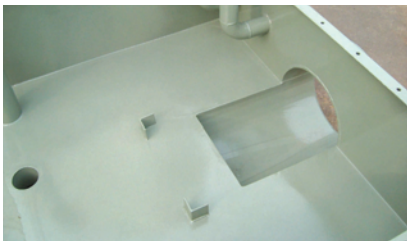
Vibration switch is mounted on the cooling tower fan deck where if there is any excessive vibration, it will cut off power supply to fan motor.

Handrail & Caged Ladder



Handrail and caged ladder can be supplied as an optional item for added safety when the fan deck is relatively high above ground.

Epoxy Fusion Coating

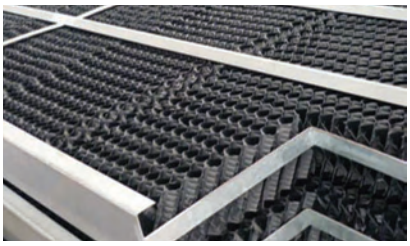


Wherever extra corrosion protection is needed over the standard hot dipped galvanized steel parts, epoxy fusion coating is available as option.

Extended Discharge Hood (Angle/ Straight)

Wherever the discharge of air is necessary to be diverted towards a certain direction, FRP extended discharge hood can be easily installed onto the standard fan cylinder.

Additional Drift Eliminators



Additional drift eliminators can be supplied when very low drift loss is to be achieved. Additional drift eliminators can further reduce drift loss to as low as 0.002% of the circulating water flowrate.

Hot Water Basin Cover

The hot water basin cover is available as an added protection to the hot water basin from gathering dirt, foreign particles and objects that can clog the basin.

Water Treatment & Filtration

Water Quality

The open recirculating cooling tower system has the greatest potential for problems associated with fouling, corrosion and microbiological organisms. Even the highest quality water contains some amount of dissolved solids that become concentrated over time, posing potential threat to corrosion and fouling. This is further enhanced by the effects of air pollution and make-up water contamination.

The degree to which dissolved solids and other impurities build up in recirculating water may be defined as the cycles of concentration which is the ratio of dissolved solids in the circulating water to be dissolved solids in the make-up water. This should be determined and monitored frequently through water treatment.

The annexed table lists the water quality standards for use with refrigeration and air-conditioning equipment. For maximum heat transfer efficiency and maximum equipment life, these guidelines should be followed.

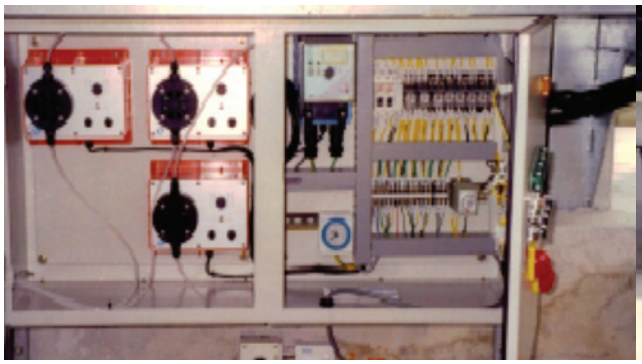
Item	HDG Steel	Stainless Steel
Ph	7-9	6.5-9
Hardness as CaCO3	500 ppm max	500 ppm max
Alkalinity as CaCO3	500 ppm max	500 ppm max
Total Dissolved Solids	1500 ppm max	2000 ppm max
Total Suspended Solids	25 ppm	25 ppm
Chlorides as NaCl	750 ppm max	1500 ppm max
Sulphates	500 ppm max	750 ppm max
Silica as SiO2	150 ppm	150 ppm

Water Treatment

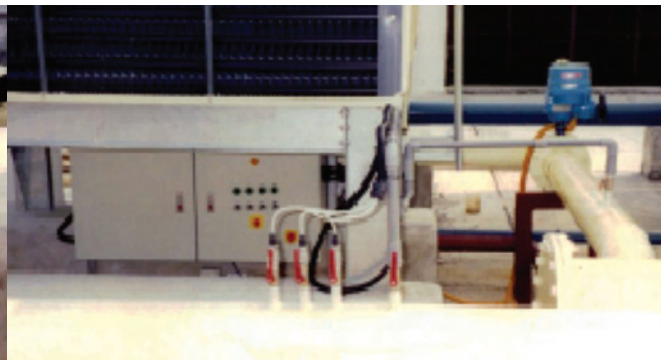
In addition to blowdown which serves as a mean to control scale build-up and corrosion, some extensive form of water treatment is necessary in order to maintain the quality of water within the guidelines and for the control of biological contamination. The growth of microorganisms must be checked in order to prevent the presence of any potential harmful bacteria including the possible outbreak of the Legionnaire disease.

The water treatment system should minimally consist of a chemical dosage system and a conductivity control system. In its automatic mode during operation, chemicals are dosed at a predetermined amount and duration. The conductivity control also has a pre-set range, where about its limit, blowdown will automatically take place and stop when its lower limit reached.

Lastly, the chemicals must be compatible with the materials of construction of the cooling parts in contact with the recirculated water.



Fully automatic chemical dosing system with conductivity controller and pumps.



Overview of the installation at site.

Water Treatment & Filtration

Water Losses

In cooling towers, recirculating water loss is attributed to evaporation loss, drift loss and blow-down loss

Evaporation Loss

The cooling towers evaporates a part of the recirculating water in order to bring down its temperature. The amount of evaporation is the water loss which can be estimated as follows:

Amount of evaporation:

$$E\ (\%) = \frac{\Delta t \times 100}{R}$$

$$E\ (kg/h) = \frac{\Delta t \times L}{R}$$

where,

Δ t : Difference in inlet and outlet temperature (°C)

L : Amount of circulation water (kg/h)

R : Water's latent heat of evaporation (kcal/kg) 575 (kcal/kg) at 37 °C

Drift Loss

There is the undesired loss which can be controlled through drift eliminators but not totally eliminated. Drift loss occurs due to the carry-over of tiny water droplets together with the air discharge.

Amount of drift loss:
C% = Approx.0.02% of the amount circulation water

Blow-down Loss

To maintain the limits on cycles of concentration in order to meet the water quality guidelines, it is necessary to bleed or blowdown a certain portion of the recirculated water. The amount of blowdown can be calculated as follows:

Amount of blowdown:

$$B\ (\%) = \frac{E}{N-1} - C$$

where,

N : Concentration multiple (generally, N = around 3)

Total Loss

The amount of make-up water is the total sum of the three type of losses stated above.

Amount of make-up water:

$$M\ (\%) = E + C + B$$

$$M\ (kg/h) = L \times (E + C + B)$$

Example,

Amount of evaporation water: E = 0.87 %

Amount of loss due to drift loss: C = 0.02 %

Extent of blow –down : B = 0.3%

Hence,

M- 0.87 + 0.02 + 0.3 = 1.19 (%)

Engineering Specification

Cooling Tower

Each cooling tower is manufactured to cool litres per second of water from _____°C (HW) entering water temperature to _____ °C (CW) leaving water temperature at _____°C (WB) entering wet bulb temperature.

The cooling towers are guaranteed to perform in accordance with the conditions specified without any modifications.

Infill

Infill shall be of ultra-violet ray treated PVC (Polyvinyl Chloride). The PVC infill shall be vacuum-formed with patented intricate design to facilitate a good spread of water over the surface area of crossflow induced draft of air. It also incorporate a built-in drift eliminator.

Motor

The fan motor(s) shall be to IP55 standard with Class F insulation, specifically designed for cooling tower service. The motor shall be located adjacent to the fan cylinder for ease of maintenance and increased motor life expectancy. The motor shall be fully outside of the moist discharge air stream.

Structure

The cooling tower structure shall be constructed from HDG Steel. All HDG (Hot Dipped Galvanized) are carried out in accordance to ISO 1461:1999. The cooling tower casing shall be constructed from FRP (Fibreglass Reinforced Polyester).

Water Distribution System

The hot water distribution shall be of open gravity type basin. It shall be constructed of HDG Steel designed with multiple array of turret-punched holes to facilitate even distribution of stable water sprinkling effect.

Mechanical Support

The mechanical support shall be of HDG Steel and bolted to the top of fan cylinder. HDG Steel fan guard shall be bolted to the top of mechanical support for safety measure. Extended lubrication lines shall be provided to the bearings with grease nipples located outside for ease of schedule maintenance.

Basin

The basin sump shall be constructed from HDG Steel. The basin shall be made of FRP and equipped with drain outlet for ease of cleaning.

Mechanical Equipment (Fan Section)

Fans shall be axial flow type with FRP blades. The fans shall be designed to provide necessary air flow for heat transfer. Fan blades shall be assembled, balanced and pitched. The fan shall operate within a FRP fan cylinder, which provides a streamlined air entry and minimum tip clearance for maximum fan efficiency.

Wedge-Belt Drive System

The wedge-belt shall be fabric impregnated type. Belt tensioning adjustment shall be provided. Entire drive arrangement shall be protected by a FRP cover.

Air Inlet Louvers

Air inlet louvers shall be made from PVC (Polyvinyl Chloride), designed to prevent water splash-out and to minimise sunlight from entering the cooling tower interior. Louvers are designed to be easily removable intended for easy access to cleaning.

Bolts & Nuts

All bolts & nuts shall be 304 stainless steel.

Access

A FRP inspection door shall be provided to facilitate entry into the cooling tower for inspection and maintenance. A HDG Steel access ladder shall be installed on the cooling tower.

Our Past Project Portfolio

Capital Square Phase 2, Kuala Lumpur, Malaysia

ASE Electronics, Penang Malaysia

University Putra Malaysia

Damai Beach Resort, Kuching, Malaysia

Dataran Giza, Kota Damansara Malaysia

Westin Langkawi, Malaysia

Surian Tower, Mutiara Damansara Malaysia

Menara UOA Bangsar, Malaysia

Yayasan Selangor, Kuala Lumpur, Malaysia

Bangsar Shopping Centre, Malaysia

Rapid KL LRT Station - Masjid Jamek, Dang Wangi, KLCC, Kampung Baru & Ampang Park, Malaysia

Giant Putra Heights, Malaysia

Plexus Manufacturing, Penang, Malaysia

Hotel Grand Central, Singapore

Meritus Mandarin Hotel, Singapore

National Parks Board Headquarters, Singapore

NUS Business School, Singapore

Emirate Glass Factory, Dubai

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