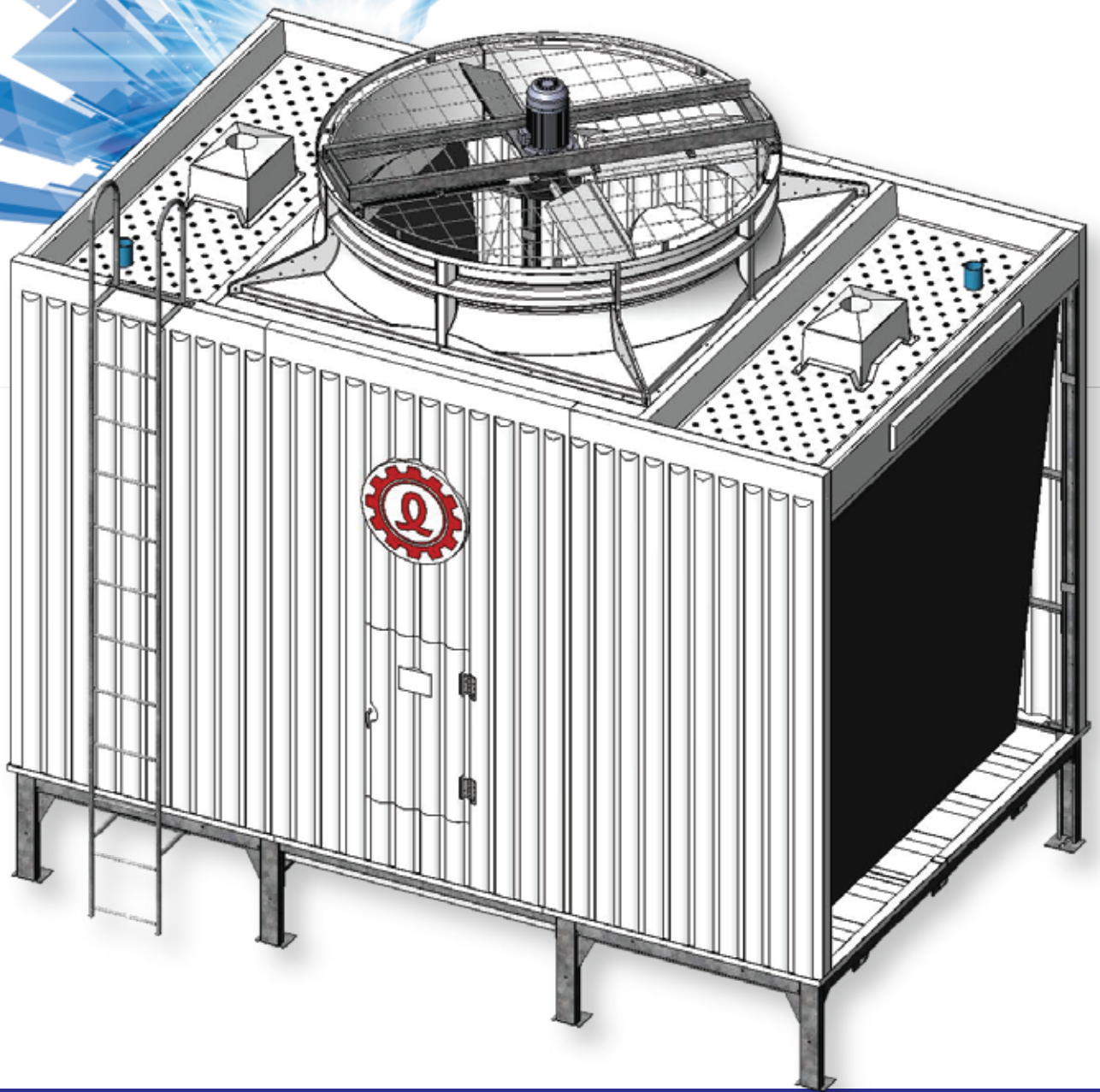


LEC-X Series

INDUCED DRAFT CROSSFLOW COOLING TOWER
Economical...Yet Efficient



LIANG CHI INDUSTRY (THAILAND) CO., LTD.



ISO 9001:2015



MEMBER

Liang Chi Introducing New LEC-X Series

Induced Draft Cross Flow Low Noise Type

Integrated Characteristics :

Higher Performance

LEC-X Incorporates new design of vacuum-formed rigid PVC filling with Increased heat transfer area and heat rejection efficiency.

Lower Power consumption

High efficient hydrodynamics "Venturi tube" fan stack with low resistance filling facilitates good ventilation and reduction of fan motor power to save electrical energy.

Lower Drift Loss Rate

Drift eliminator design pattern is embedded in the rigid PVC filling to economize the space for maintenance inside cooling tower plenum. Drift loss is less than 0.001% of the circulating water flow rate.

Durableness and Low Maintenance

Major components of LEC-X such as casing, fan stack, basin, access door and inlet louver are made up of anti-corrosive FRP material, and all steel parts are hot-dip galvanized to enable the durableness and low maintenance cost.

Simplified Tower Frame Work Provides Ease of Handling and Assembly

LEC-X minimized the complicated steel structures while at the same time maximized the use of light weight, strong construction FRP components. As the overall structure is simplified therefore providing easy handling and shorter assembly time.

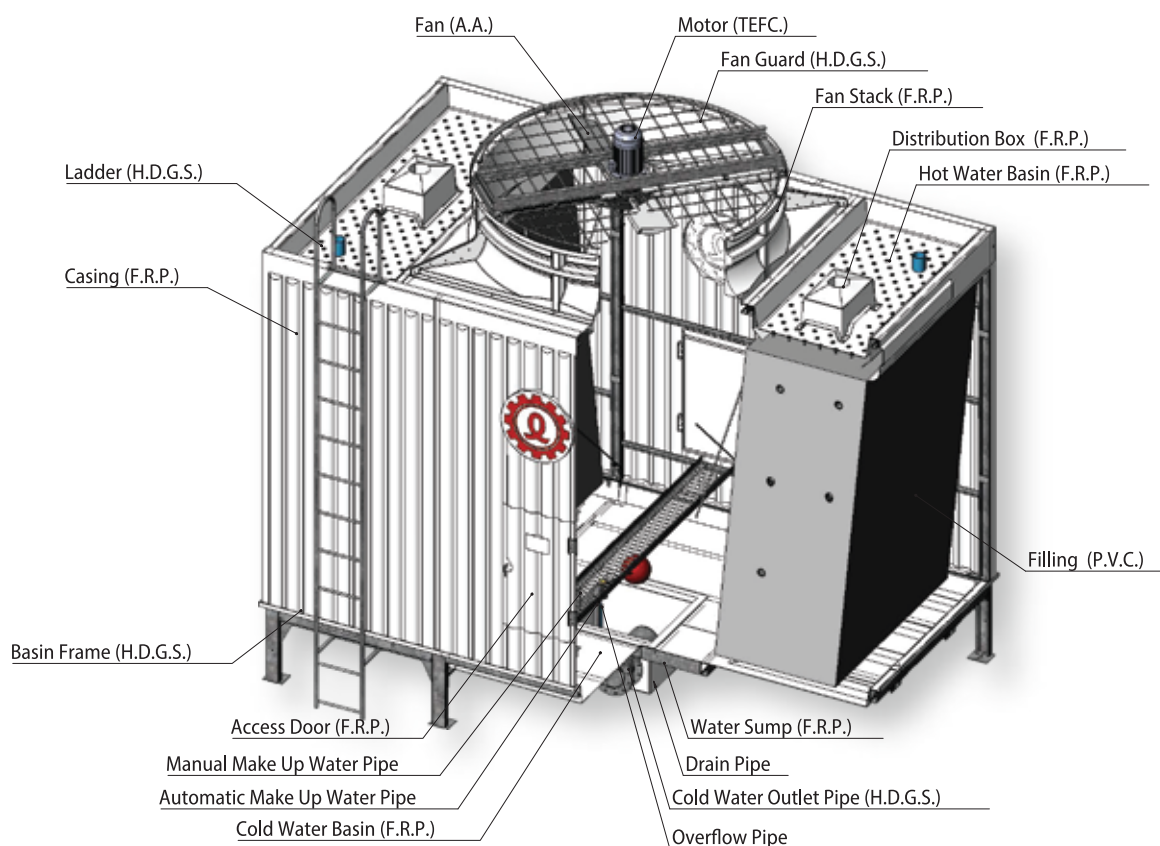
Easy of Piping Works

Multiple-cell design with independent water basin, all piping connection, except inlet pipe, are gathered on the basin. Piping are reversible to meet with the site condition. Common water basin can be furnished as an option, cell partition for independent operation of each cell is also available as option.

High Efficiency Distribution System

Gravitational distribution system with spray nozzles feature low pressure and slow water flow which can prolong cooling duration and ensure cooling efficiency.

Structure And Standard Materials



Enhanced Features of LEC-X Series Cooling Tower

1. Mechanical Drive Equipmen

All LEC-X models are designed with direct drive. This allows for ease of installation and cost savings while maintaining a high level of cooling tower performance.

2. Fan

It is specially design with wide-span, streamed-line, adjustable axial fan blode so it is able to acquire large air volume under low revolution speed. Air guiding cover is equipped under fan hub to prevent re-circulation of hot air, render smooth operation and increase efficiency.

***Optional** Energy saving aerofoil axial fan constructed of light weight aluminium alloy material with adjustable pitch.

3. Fan Stack

Rigid FRP fan stack providing secured fan operation and smooth circulation of air.

4. Hot Water Basin

Gravity type water distribution system, hot water basin is constructed of FRP material with robust design. Hot water is evenly sprinkled over the filling by metering orifice. This gravity type water distribution system requires less pump head than the traditional sprinkler head or nozzles.

5. Filling and Drift Eliminator

Vacuum-formed PVC rigid filling with embedded drift eliminator design provide increased heat transfer area and efficiency. New filling pattern slows down hot water from falling into cold water basin and therefore increases the heat transfer efficiency. Integral type drift eliminator limits the drift loss to less than 0.001% of the circulating water flow rate and yet provides sufficient maintenance space inside cooling tower plenum.

6. Casing and Partition

Constructed of anti-corrosive FRP material, robust, weather proof, and anti-deformation. Casing panel is designed for easy handling, assembly, and harmonize with building architecture. Optional cell partition is also constructed of FRP material, it allows each cell to operate independently.

7. Access Door

Constructed of anti-corrosive FRP material. It provides convenient access for inspection, maintenance and repairs.

8. Cold Water Basin

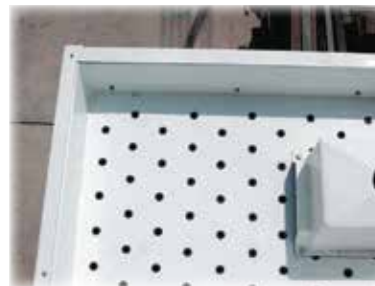
Constructed of FRP anti-corrosive FRP material. LEC-X cold water basin is composed of lesser pieces of FRP panels with less joints that require fiberglass over-lay, therefore, it is ideal for leak free operation.

9. Tower Structural Frame Work

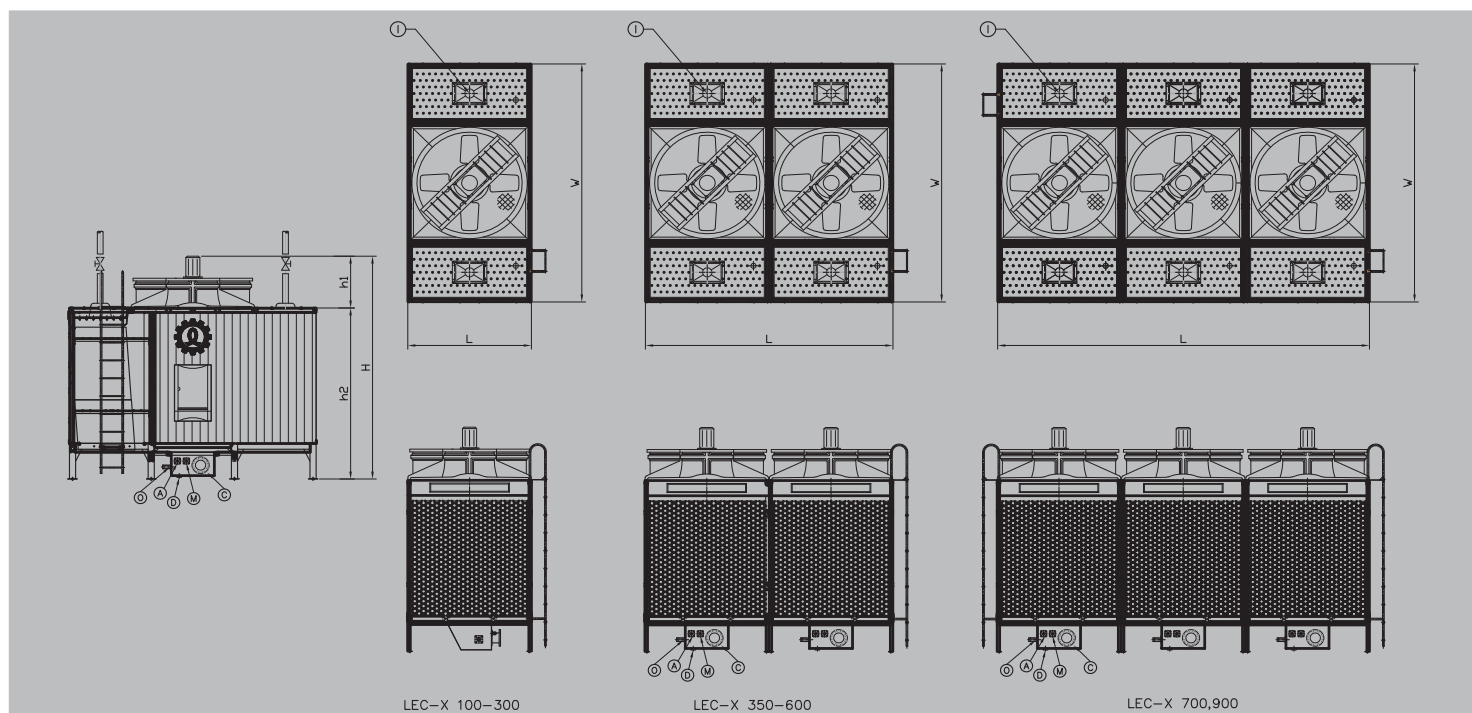
LEC-X revolutionizes the steel structural frame work of the traditional cross flow cooling tower by simplifying the tower frame work but yet maintain strength. The tower structural frame work is constructed of hot-dip galvanized steel, robust and free of rust. The new structural frame work design provides ease of handing and assembly.

10. Accessories Option

Internal pipe, Handrail and Ladder Cage, Hot Water Basin Cover

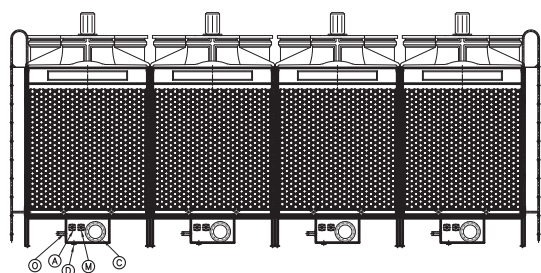
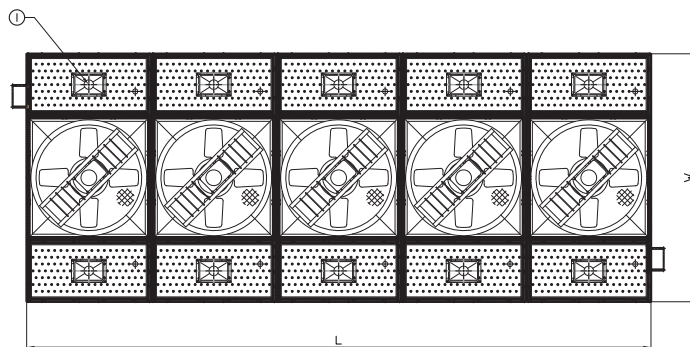
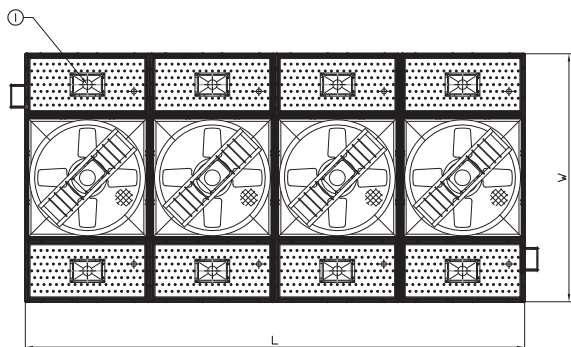


Dimensions and standard specifications >>

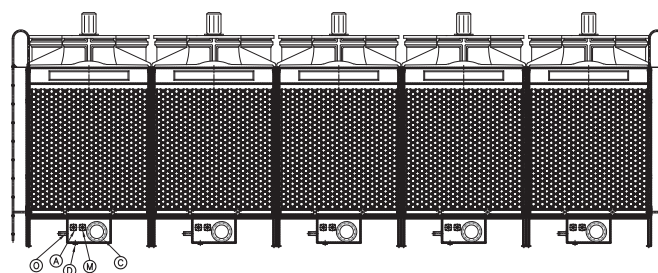


Tower Model LEC-X	NOMINAL FLOW L/MIN	DIMENSIONS (mm)					FAN DIAMETER mm	FAN MOTOR HP x UNIT
		WIDTH	LENGTH	HEIGHT				
		W	L	h1	h2	H		
100	1300	3500	1695	770	2875	3645	1300	2 x 1
125	1625	3500	1805	870	2875	3745	1300	5 x 1
150	1950	3700	2010	870	2875	3745	1500	5 x 1
175	2275	3900	2010	960	2875	3835	1700	7 1/2 x 1
200	2600	4000	2010	980	2875	3855	1800	7 1/2 x 1
225	2925	4200	2395	980	2875	3855	2000	7 1/2 x 1
250	3250	4200	2595	980	2875	3855	2000	7 1/2 x 1
300	3900	4200	2595	980	3375	4355	2000	7 1/2 x 1
350	4550	3900	4020	960	2875	3835	1700	7 1/2 x 2
400	5200	4000	4020	980	2875	3855	1800	7 1/2 x 2
450	5850	4200	4790	980	2875	3855	2000	7 1/2 x 2
500	6500	4200	5190	980	2875	3855	2000	7 1/2 x 2
600	7800	4200	5190	980	3375	4355	2000	7 1/2 x 2
700	9100	4200	7195	980	2875	3855	2000	7 1/2 x 3
800	10400	4000	8050	980	2875	3855	1800	7 1/2 x 4
900	11700	4200	7795	980	3375	4355	2000	7 1/2 x 3
1000	13000	4200	10395	980	2875	3855	2000	7 1/2 x 4
1125	14625	4200	11990	980	2875	3855	2000	7 1/2 x 5
1200	15600	4200	10395	980	3375	4355	2000	7 1/2 x 4
1250	16250	4200	12995	980	2875	3855	2000	7 1/2 x 5
1500	19500	4200	12995	980	3375	4355	2000	7 1/2 x 5

1. Nominal TONS are defined as 13 l/min/ton, Cooled from 37 °c to 32 °c with 27 °c wetbulb temperature.
2. Total pump head required for cooling tower circulation pump is the sum of condenser water pressure drop, piping friction loss and tower head.



LEC-X 800,1000,1200

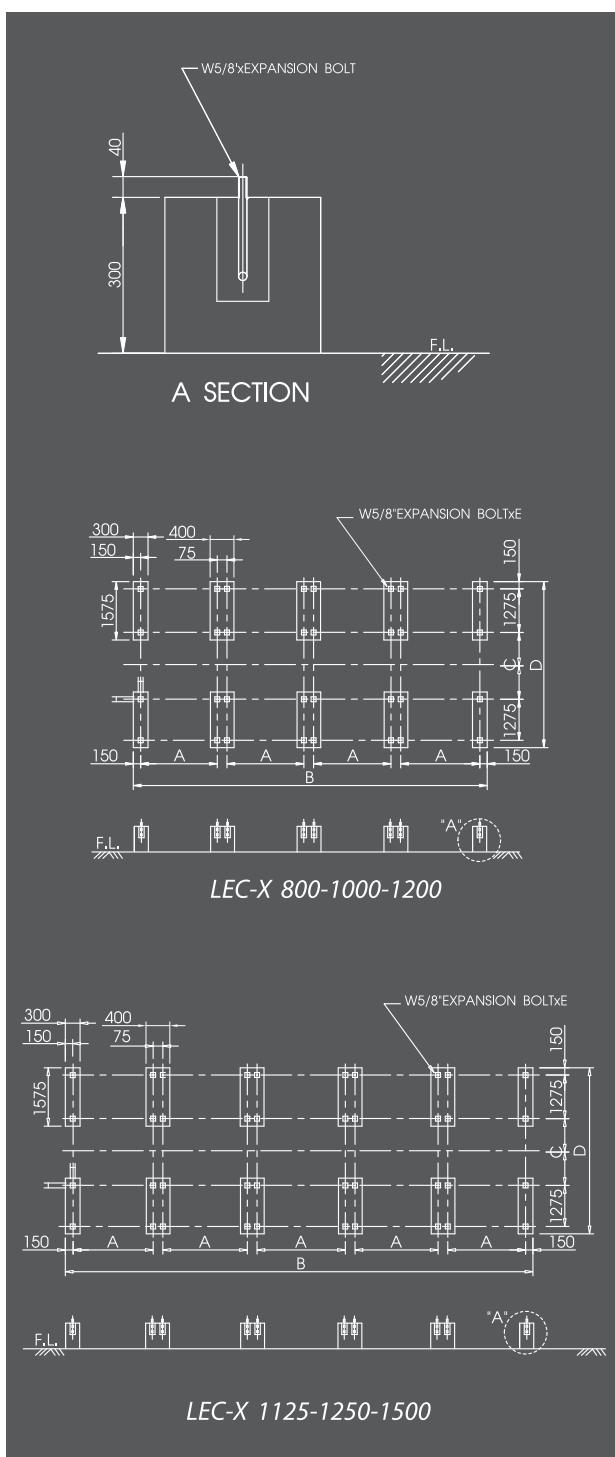
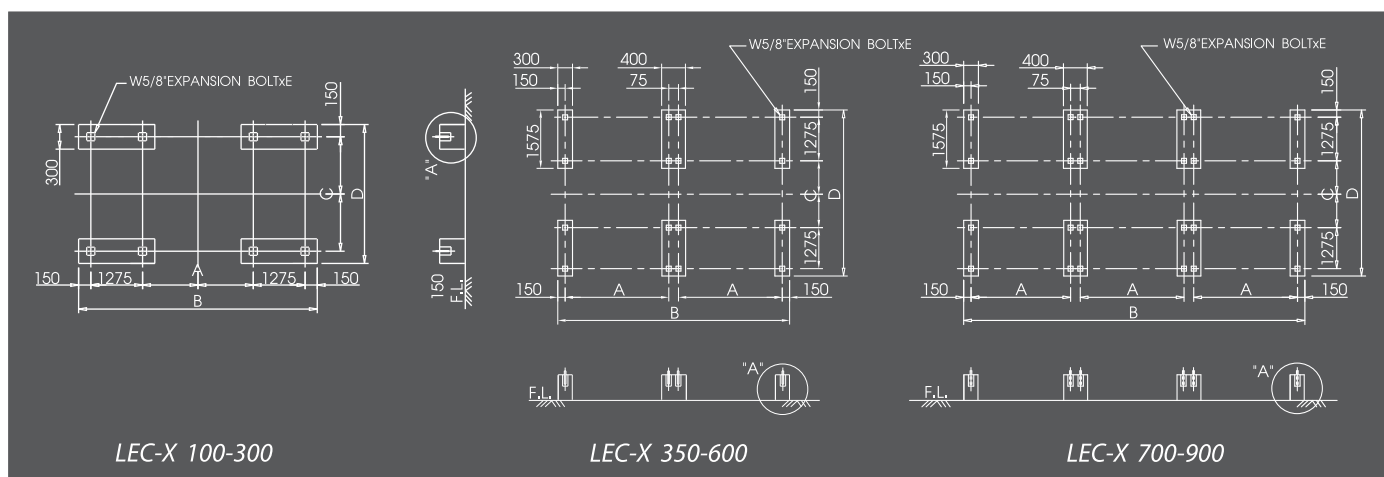


LEC-X 1125,1250,1500

PIPE CONNECTION						APROX,AEIGHT		TOWER HEAD
INLET	OUTLET	DRAIN	OVER-FLOW	AUTO FILLER	QUICK FILLER	DRY	OPERATING	
I	C	D	O	A	M	kg	kg	M.
3B(80A) X 2	5B(125A) X 1	2B(50A) X 1	2B(50A) X 1	1B(25A) x 1	1B(25A) x 1	910	1690	3.7
4B(100A) X 2	5B(125A) X 1	2B(50A) X 1	2B(50A) X 1	1B(25A) x 1	1B(25A) x 1	960	1790	3.7
4B(100A) X 2	6B(150A) X 1	2B(50A) X 1	2B(50A) X 1	1B(25A) x 1	1B(25A) x 1	1090	2040	3.8
5B(125A) X 2	6B(150A) X 1	2B(50A) X 1	2B(50A) X 1	1B(25A) x 1	1B(25A) x 1	1190	2190	3.8
5B(125A) X 2	6B(150A) X 1	2B(50A) X 1	2B(50A) X 1	1 1/4B(32A) x1	1 1/4B(32A) x1	1200	2220	3.8
5B(125A) X 2	8B(200A) X 1	2B(50A) X 1	2B(50A) X 1	1 1/4B(32A) x1	1 1/4B(32A) x1	1350	2600	3.8
5B(125A) X 2	8B(200A) X 1	2B(50A) X 1	2B(50A) X 1	1 1/4B(32A) x1	1 1/4B(32A) x1	1450	2790	3.8
5B(125A) X 2	8B(200A) X 1	2B(50A) X 1	2B(50A) X 1	1 1/4B(32A) x1	1 1/4B(32A) x1	1600	2940	3.8
5B(125A) X 4	6B(150A) X 2	2B(50A) X 2	2B(50A) X 2	1B(25A) x2	1B(25A) x2	2380	4380	3.8
5B(125A) X 4	6B(150A) X 2	2B(50A) X 2	2B(50A) X 2	1 1/4B(32A) x2	1 1/4B(32A) x2	2400	4440	3.8
5B(125A) X 4	8B(200A) X 2	2B(50A) X 2	2B(50A) X 2	1 1/4B(32A) x2	1 1/4B(32A) x2	2700	5200	3.8
5B(125A) X 4	8B(200A) X 2	2B(50A) X 2	2B(50A) X 2	1 1/4B(32A) x2	1 1/4B(32A) x2	2900	5580	3.8
5B(125A) X 4	8B(200A) X 2	2B(50A) X 2	2B(50A) X 2	1 1/4B(32A) x2	1 1/4B(32A) x2	3200	5880	3.8
5B(125A) X 6	8B(200A) X 3	2B(50A) X 3	2B(50A) X 3	1 1/4B(32A) x3	1 1/4B(32A) x3	4050	7800	3.8
5B(125A) X 8	6B(150A) X 4	2B(50A) X 4	2B(50A) X 4	1 1/4B(32A) x4	1 1/4B(32A) x4	4800	8880	3.8
5B(125A) X 6	8B(200A) X 3	2B(50A) X 3	2B(50A) X 3	1 1/4B(32A) x3	1 1/4B(32A) x3	4800	8820	3.8
5B(125A) X 8	8B(200A) X 4	2B(50A) X 4	2B(50A) X 4	1 1/4B(32A) x4	1 1/4B(32A) x4	5800	11160	3.8
5B(125A) X 10	8B(200A) X 5	2B(50A) X 5	2B(50A) X 5	1 1/4B(32A) x5	1 1/4B(32A) x5	6750	13000	3.8
5B(125A) X 8	8B(200A) X 4	2B(50A) X 4	2B(50A) X 4	1 1/4B(32A) x4	1 1/4B(32A) x4	6400	11760	3.8
5B(125A) X 10	8B(200A) X 5	2B(50A) X 5	2B(50A) X 5	1 1/4B(32A) x5	1 1/4B(32A) x5	7250	13950	3.8
5B(125A) X 10	8B(200A) X 5	2B(50A) X 5	2B(50A) X 5	1 1/4B(32A) x5	1 1/4B(32A) x5	8000	14700	3.8

Technical specification might be changed proof to any notice. Please contact Liang Chi for updated information.

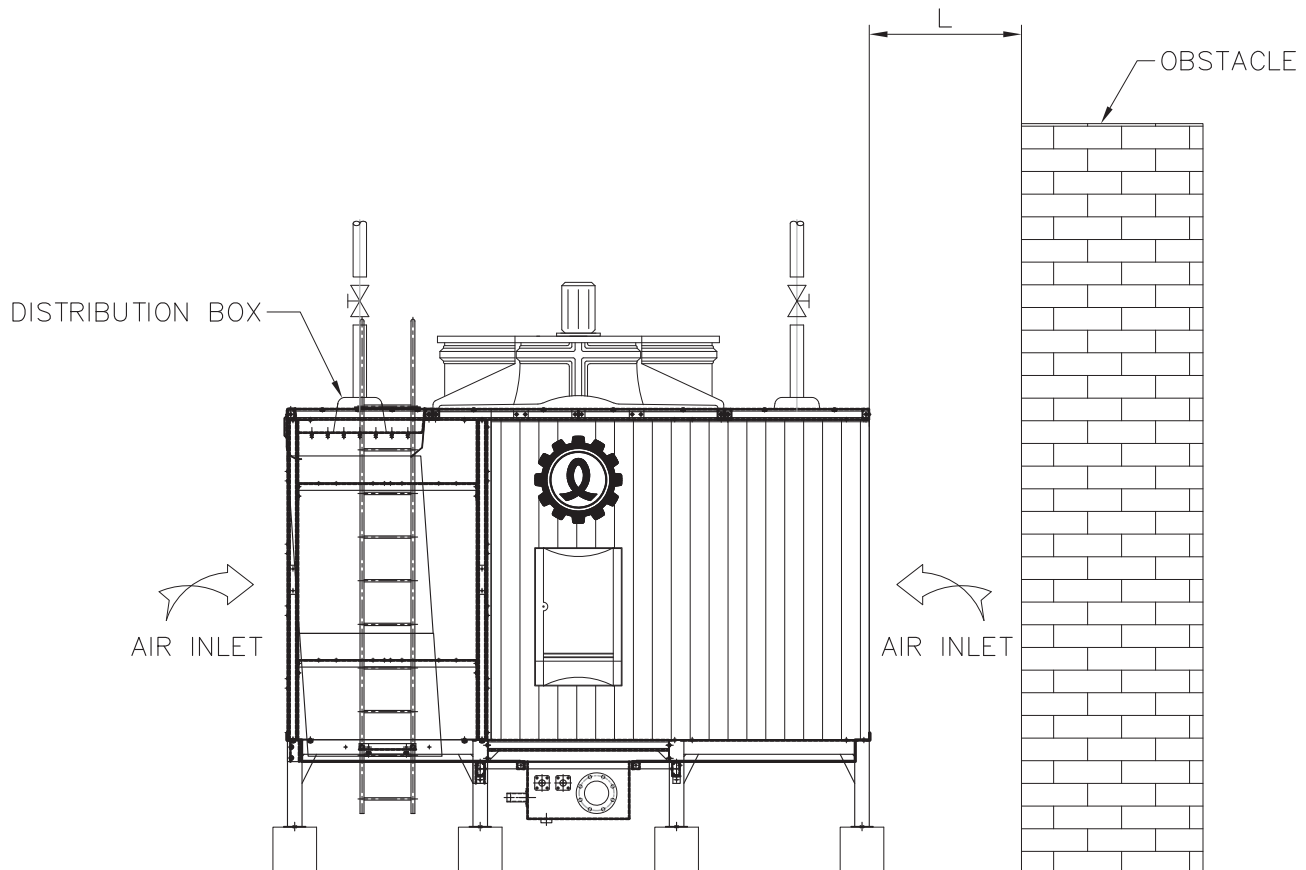
Recommended Concrete Foundations



Item	LEC-X	A	B	C	D	E
100		850	3700	1625	1925	8
125		850	3700	1735	2035	8
150		1050	3900	1940	2240	8
175		1250	4100	1940	2240	8
200		1350	4200	1940	2240	8
225		1550	4400	2325	2625	8
250		1550	4400	2525	2825	8
300		1550	4400	2525	2825	8
350		1940	4255	1250	4100	16
400		1940	4255	1350	4200	16
450		2325	5025	1550	4400	16
500		2525	5425	1550	4400	16
600		2525	5425	1550	4400	16
700		2325	7425	1550	4400	24
800		1940	8285	1350	4200	32
900		2525	8025	1550	4400	24
1000		2525	10625	1550	4400	32
1125		2325	12225	1550	4400	40
1200		2525	10625	1550	4400	32
1250		2525	13225	1550	4400	40
1500		2525	13225	1550	4400	40

Recommended Installation Area

LEC-X Series



Recommended Installation Area :

1. A drafty site is needed for installation.
2. The installation site should be distant from places that are full of dust and acidic air.
3. The location should be remote from chimney or other heat source areas.
4. Enough space should be made for connection of pipe to main machine.
5. Be sure to keep the tower vertically when installing it, the anchor bolt and steel support of water basin should be locked closely.
6. In design, the air will be sucked in through inlet louver into the tower so the proper distance between louvers and surrounding objects should be kept to avoid air deficiency due to the excessive resistance.

Please refer to table for the details.

LEC-X	L
100 - 125	MORE THAN 2.0 M
150 - 200	MORE THAN 2.5 M
225 - 350	MORE THAN 3.0 M
400 - 600	MORE THAN 3.5 M
700 - 800	MORE THAN 4.0 M
900 - 1500	MORE THAN 5.0 M

Recommended Concrete Foundations And Piping Orientation.

Cooling Tower Water Flow and Temperatures

Selection Table Model LEC-X Cooling Tower

(UNIT): L/MIN

W.B	RANGE	°C	MODEL LEC-X																			
			100	125	150	175	200	225	250	300	350	400	450	500	600	700	800	900	1000	1125	1250	1500
27 °C	5	38-33	1566	1951	2338	2722	3120	3517	3903	4676	5444	6240	7034	7806	9360	10551	12480	14068	15612	17585	19515	23418
		37-32	1300	1625	1950	2275	2600	2925	3250	3900	4550	5200	5850	6500	7800	9100	10400	11700	13000	14625	16250	19500
		36-31	1048	1315	1580	1847	2104	2362	2628	3160	3694	4208	4724	5256	6312	7086	8416	9448	10512	11810	13140	15765
		35-30	807	1018	1225	1437	1630	1825	2034	2450	2874	3260	3650	4068	4890	5475	6520	7300	8136	9125	10170	12200
28 °C	5	38-33	1378	1722	2066	2409	2755	3100	3444	4132	4818	5510	6200	6888	8265	9300	11020	12400	13776	15500	17220	20660
		37-32	1112	1394	1675	1958	2231	2506	2787	3345	3915	4462	5010	5574	6693	7515	8924	10020	11145	12525	13935	16722
		36-31	858	1081	1301	1525	1731	1939	2160	2602	3050	3462	3878	4320	5193	5817	6924	7756	8640	9695	10800	12956
		39-34	1659	2065	2475	2880	3303	3724	4133	4948	5760	6606	7448	8265	9909	11172	13212	14896	16530	18620	20663	24796
29 °C	5	38-33	1180	1479	1776	2076	2367	2659	2957	3552	4152	4734	5318	5914	7101	7977	9468	10636	11828	13295	14785	17740
		37-32	912	1148	1381	1619	1838	2060	2294	2762	3238	3676	4120	4588	5514	6180	7352	8240	9176	10300	11470	13764
		40-35	1758	2187	2620	3048	3498	3945	4377	5240	6096	6995	7890	8754	10493	11835	13991	15780	17508	19725	21885	26262
		39-34	1462	1825	2189	2551	2919	3286	3650	4378	5102	5838	6572	7300	8757	9858	11676	13144	14600	16430	18250	21900
30 °C	5	38-33	959	1220	1467	1719	1953	2189	2438	2934	3438	3906	4378	4876	5859	6567	7812	8756	9752	10945	12190	14625
		41-36	1863	2316	2775	3227	3705	4180	4637	5548	6453	7409	8360	9273	11114	12540	14818	16720	18546	20900	23182	27819
		40-35	1551	1934	2319	2703	3094	3485	3869	4638	5406	6188	6970	7738	9282	10435	12676	13940	15476	17425	19345	23214
		39-34	1253	1569	1884	2201	2511	2822	3138	3768	4402	5022	5644	6276	7533	8466	10044	11288	12552	14110	15690	18826
31 °C	5	38-33	742	939	1131	1330	1504	1681	1874	2262	2658	3007	3361	3748	4511	5041	6015	6724	7496	8402	9370	11244
		39-34	1031	1296	1559	1825	2075	2327	2590	3118	3650	4150	4654	5180	6225	6981	8300	9308	10360	11635	12950	15540
		40-35	1331	1666	2000	2334	2665	2997	3331	4000	4668	5330	5994	6662	7995	8991	10660	11988	13324	14985	16655	19984
		41-36	1645	2051	2459	2864	3280	3696	4103	4918	5728	6560	7392	8206	9840	11088	13120	14784	16412	18480	20515	24618
28 °C	6	39-33	1208	1514	1818	2124	2422	2721	3026	3635	4247	4844	5442	6052	7266	8163	9688	10884	12104	13605	15130	18156
		38-32	978	1231	1480	1733	1970	2209	2459	2959	3465	3939	4417	4917	5909	6626	7879	8834	9835	11043	12294	14753
		37-31	759	960	1156	1357	1537	1719	1916	2311	2714	3073	3437	3832	4610	5155	6146	6874	7664	8593	9580	11496
		36-30	549	698	842	992	1118	1246	1392	1683	1984	2235	2491	2783	3352	3737	4470	4983	5568	6229	6958	8350
29 °C	6	39-33	1040	1307	1571	1839	2092	2346	2611	3142	3678	4183	4692	5222	6275	7038	8366	9384	10444	11730	13055	15666
		38-32	808	1020	1229	1442	1634	1828	2037	2457	2884	3267	3655	4074	4901	5483	6535	7311	8148	9138	10185	12222
		37-31	585	743	896	1056	1190	1327	1482	1792	2111	2379	2653	2963	3569	3980	4759	5307	5928	6634	7409	8891
		40-34	1283	1606	1928	2252	2570	2888	3211	3856	4503	5139	5776	6421	7709	8664	10278	11552	12844	14440	16054	19265

(UNIT): US.GPM

100 - 90 - 83 °F	270	340	409	479	545	611	681	818	958	1090	1222	1361	1635	1833	2180	2444	2724	3055	3402	4083
100 - 90 - 84 °F	244	307	369	433	492	551	614	739	866	984	1103	1228	1476	1653	1968	2204	2456	2757	3070	3684
100 - 90 - 85 °F	216	273	328	385	437	489	545	656	770	874	978	1090	1311	1467	1748	1956	2180	2445	2725	3270

For other temp conditions and water, Please contact Liang Chi Industry (Thailand) Co., Ltd.

The Calculation of Make-Up Water

The gradual loss of circulation water during operation is caused by the following factors :

1. During the heat exchange , contact of cold air and hot water gets evaporated as vapor flowing out of the cooling tower
2. Where there is large air volume, a part of the gravitating water is discharged due to the cold air being driven by mechanical power (motor and fan)
3. When the water is circulating for long periods of time, the concentration of solids increases, thus water quality is affected by the growth of scales which should be expelled and replaced with fresh water.

1. The formula for evaporation loss

$$E = \frac{Q}{600} = \frac{(T_1 - T_2)}{600} \times L$$

*E = Evaporation water (Kg / h)

*Q = Heat load (Kcal / h)

*600 = Water evaporation heat (Kcal / h)

*T₁ = Inlet water temperature (°C)

*T₂ = Outlet water temperature (°C)

*L = Circulating water flow (Kg /h)

2. The loss of carry over

The loss of carry-over depends on factors such the design of cooling and velocity . Generally, the loss is between 0.1% to 0.3% of the circulation water.

3. The loss of regular blow-down

To decrease the loss of regular blow-down, please follow the procedures below:

- A. The drain on cold water basin should be turned on slightly when the cooling tower is in operation.
- B. The operational water level should be increased to let the water flow out of the overflow outlet at any time.
- C. The water in the cold water basin and pipes should be replaced seasonally. The loss of regular blow-down is determined by the water quality and its concentration of solids. Generally, the loss is about 0.3% of circulation water

4. Make-up water

The total make-up water of circulating water is equal to:

$$M = E + C + D$$

M = Make-up water

E = Evaporation loss

C = Carry-over

D = Regular blow-down loss

When the cooling tower is rigged on air conditioner, its cooling range is set up at 5°C. In this case, The male-up water needed for cooling tower is about 2% of circulation water.

After Sales service

On top of the quality of our towers, we focus heavily on after sales service. This is because we understand that a malfunctioning cooling tower will have adverse effects on essential air conditioning systems so we try to address these issues most rapidly. We have established a service section, comprising 5 engineers, 10 foremen, over 50 service personnel, and many more experienced employees in the section, so we can ensure that your trust in us is well justified.



Before

After

Product Performance Test



Liang Chi Cooling Tower Knowledge Library

(In Shanghai)
Sole Cooling Tower Knowledge
Library in The World

Two CTI Certified Test Labs In Asia



Test Laboratory
(Shanghai Factory)

Test Laboratory (Taoyuan Factory)



R&D Technician and Quality Guarantee

With over half a century of experience in Taiwan and more than 40 years in Thailand, Liang Chi has laid a good foundation for research and development techniques, together with expert technicians responsible for testing. We continuously improve and innovate, eager to meet the environmental demands, power conservation, and other modern updates to technical developments. Customers can rest assured that their investment in us will yield the greatest economic benefits, as we trust that our skillfully constructed cooling towers will exceed all expectations.

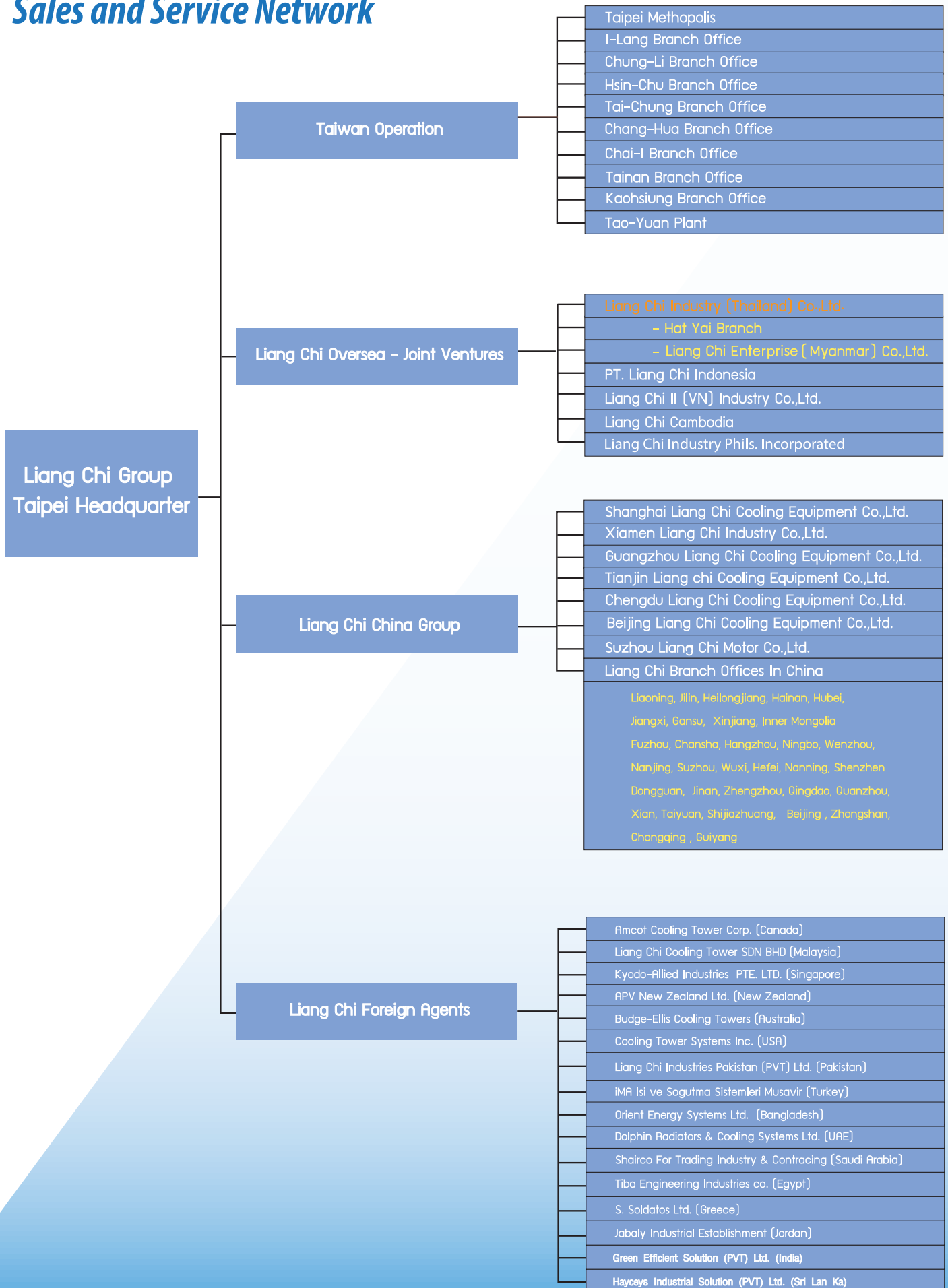


ISO-9001-2015

The Manager System of Liang Chi (Thailand)



Sales and Service Network



สำนักงานใหญ่ (Head Office)

บริษัท เหลียงฉี อุตสาหกรรม (ประเทศไทย) จำกัด

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