

# Series TLC

Liang Chi series TLC cooling towers have been designed for cross flow type with Low Noise Motor and Fan. The compact design is suitable for Equipment Cooling, Industrial Process Cooling and Air Conditioning.

**CTI**  
CERTIFIED

Thermal Performance certified by the Cooling Technology Institute (CTI) in accordance with CTI STD-201



**LIANG CHI INDUSTRY (THAILAND) CO., LTD.**



ISO 9001:2015

# Liang Chi Introducing New TLC Series

## Induced Draft Cross Flow Low Noise Type

### Integrated Characteristics :

#### Higher Performance

TLC 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 0.005% of the circulating water flow rate.

#### Durability and low Maintenance

Major components of TLC such as casing, fan stack, basin, access door and inlet louver are made from anti-corrosive FRP material, and all steel parts are hot-dip galvanized to increase durability and lower maintenance cost.

#### Simplified Tower Frame Work Provides Ease of Handling and Assembly

TLC minimize the need for complex complicated steel structures while maximizing the use of light-weight, strong construction FRP components. The simplified structure allows for easy handling and shorter assembly time.

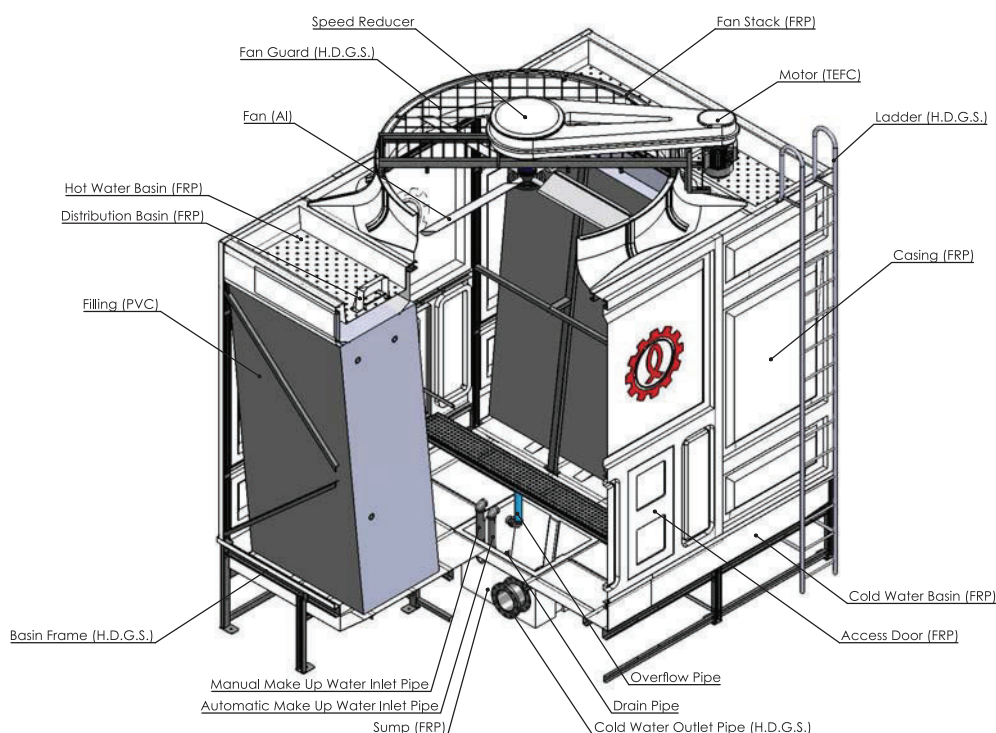
#### Easy of Piping Work

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



**\* Model TLC-300 up motor in of air stream**

# Enhanced Features

## Cooling Tower

### 1. Mechanical Driving Equipment

Motor is in of air stream and out of air stream with single speed reduction speed reducer equipped with high-strength v-belt with adjustable tension mechanism. Speed reducer is designed with FRP cover to prevent contact with warm and moist air exhaust from tower.

### 2. Fan

Specially designed with wide-span, streamed-line, adjustable axial fan blades to on acquire large air volume under low revolution speed. Air guiding cover is equipped under fan hub to prevent re-circulation of hot air, rendering smooth operation and increases efficiency.

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

### 3. Fan Stack

Rigid FRP fan stack provides secure fan operation and smooth circulation of air.

### 4. Hot water Basin

Gravity Type water distribution system, hot water basin is constructed with FRP material and 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 (Model LE-15) with embedded drift eliminator design provides 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 0.005% of the circulating water flow rate while providing 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 harmonizes 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

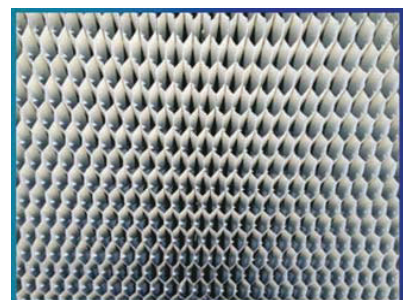
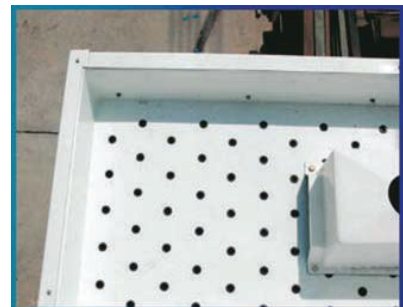
Constructed of FRP anti-corrosive FRP material. TLC cold water basin is composed of fewer pieces of FRP panels with fewer joints that require fiber glass over-lay, therefore, it is ideal for leak-free operation.

### 9. Tower Structural Frame work

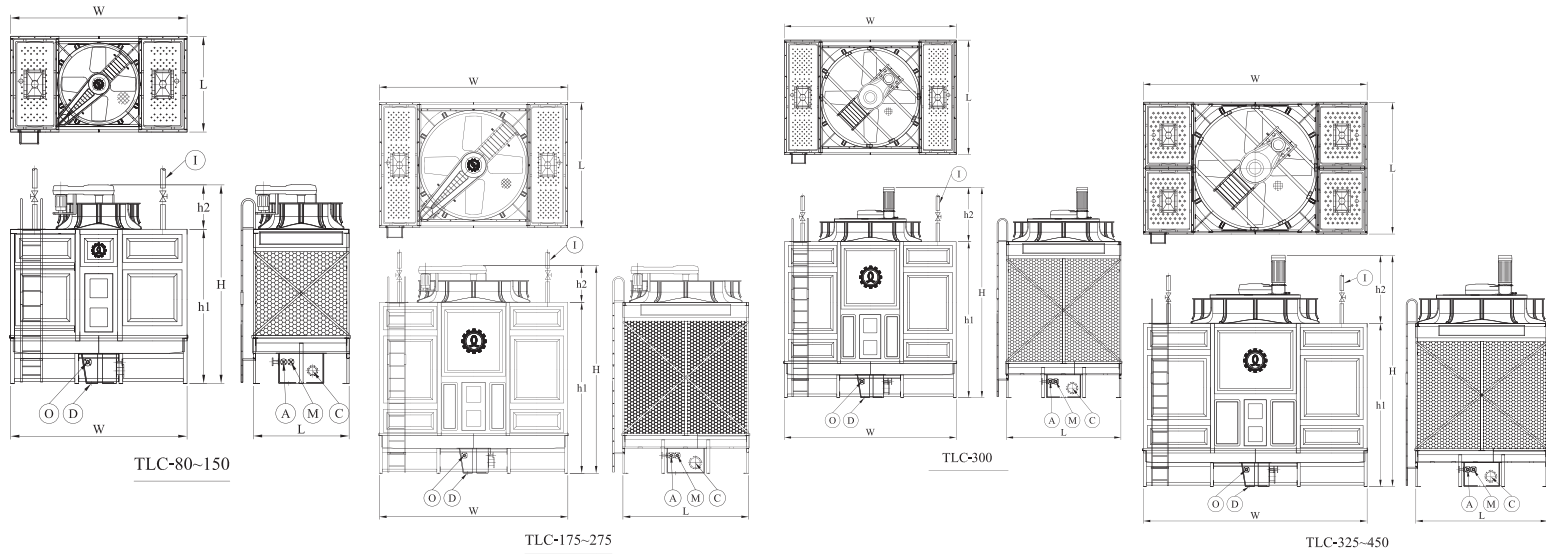
TLC revolutionizes the street structural frame work of the traditional cross flow cooling tower by simplifying the tower frame work while maintaining strength. The tower structural frame work is constructed of hot-dip galvanized steel, robust and free of rust. The new structural frame work design provides ease of handaing and assembly.

### 10. Accessories Option

internal pipe, FRP Hood, Handrail and Ladder age, Hot Water Basin Cover



# Dimension and standard specifications

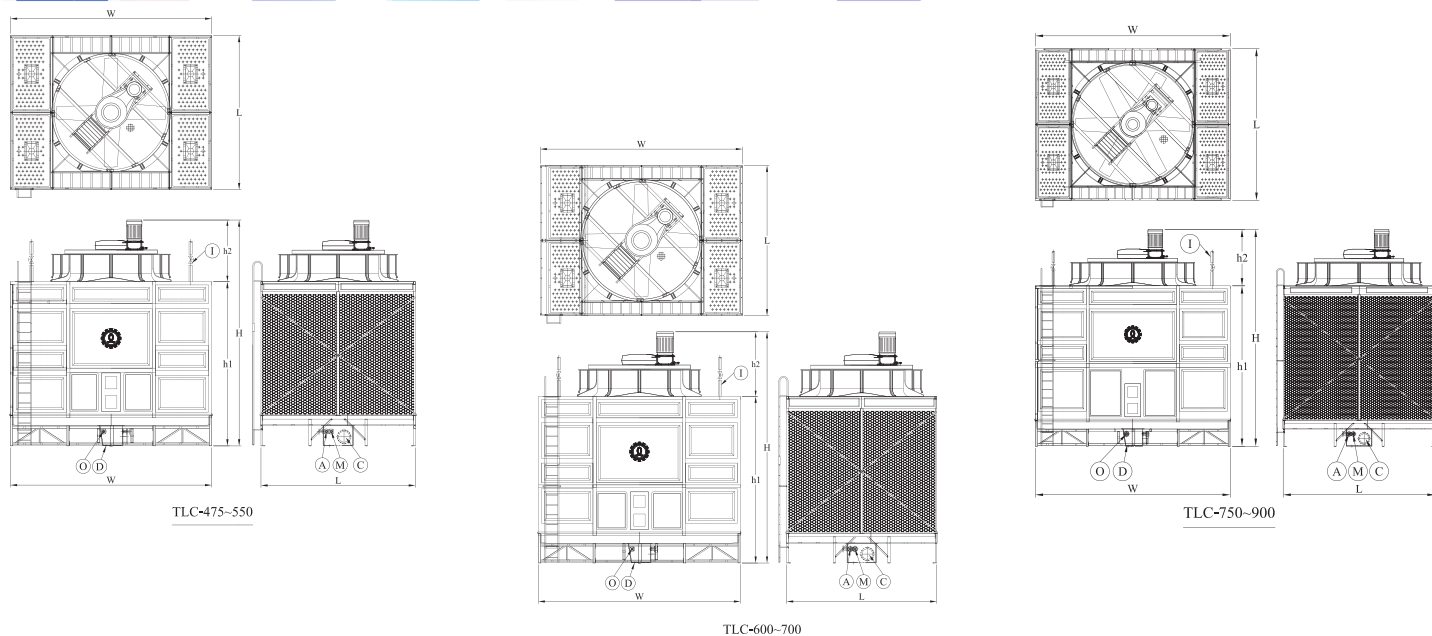


TOWER MODEL	NOMINAL FLOW L/MIN	DIMENSIONS ( mm )					FAN	
		WIDTH W	LENGTH L	HEIGHT			DIAMETER mm	MOTOR HP x UNIT
				h1	h2	H		
80	1300	3500	1900	3060	880	3940	1450	5x1
100	1495	3500	2100	3060	880	3940	1450	5x1
125	2015	3800	2100	3680	880	4560	1750	5x1
150	2405	3800	2100	3680	880	4560	1750	7 1/2 x 1
175	2860	4200	2600	3680	880	4560	2150	7 1/2 x 1
200	3250	4200	2600	3880	880	4760	2150	7 1/2 x 1
225	3575	4200	2600	4090	880	4970	2150	10 x 1
250	4095	4500	3000	4090	880	4970	2450	10 x 1
275	4160	5100	3000	3680	880	4560	2450	10 x 1
300	4745	5100	3000	3680	1425	5105	2450	15 x 1
325	4875	5600	3300	4090	1460	5550	2950	10 x 1
350	5525	5600	3300	4090	1525	5615	2950	15 x 1
375	5915	5600	3300	4900	1525	6425	2950	15 x 1
400	6500	5600	3300	4900	1635	6535	2950	20 x 1
425	6630	5600	3800	4900	1525	6425	2950	15 x 1
450	7150	5600	3800	4900	1635	6535	2950	20 x 1
475	7345	6000	4600	4900	1725	6625	3320	15 x 1
500	8060	6000	4600	4900	1835	6735	3320	20 x 1
550	8905	6200	4600	5100	1835	6935	3520	20 x 1
600	9555	6200	4600	5100	2100	7200	3520	25 x 1
650	10530	6200	5100	5100	2100	7200	3520	25x 1
700	11115	6200	5100	5100	2100	7200	3520	30 x 1
750	11505	6800	5300	5600	2100	7700	4120	30 x 1
800	12610	6800	5300	5600	2170	7770	4120	40 x 1
850	13390	7300	5500	6100	2170	8270	4620	40 x 1
900	14300	7300	5500	6100	2170	8270	4620	50 x 1

**Remarks:**

1. Design Temperature 37-32-28 °C
2. Total pump head required for cooling tower circulation pump is the sum of condenser water pressure drop, piping friction loss and tower head.

# Dimensions and standard specification

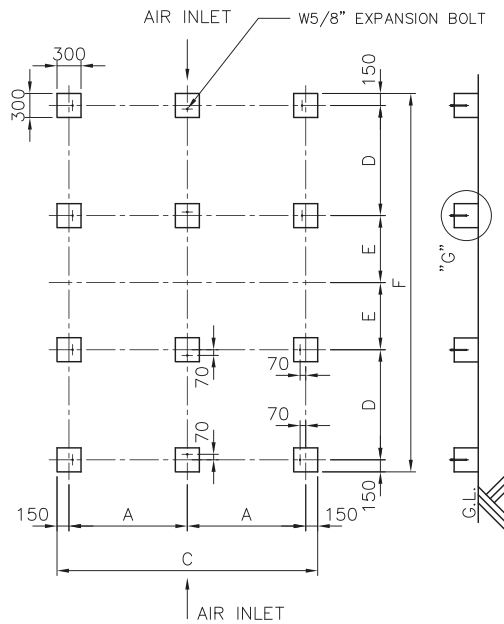


TOWER MODEL TLC	PIPE CONNECTION						APPROX. WEIGHT		TOWER HEAD M.
	INLET	OUTLET	DRAIN	OVER-FLOW	AUTO FILLER	QUICK FILLER	DRY	OPERATING	
	I	C	D	O	A	M	kg	kg	
80	4B(100A) x 2	5B(125A) x 1	2B(50A) x 1	2B(50A) x 1	1B(25A) x 1	1B(25A) x 1	1650	3300	3.7
100	5B(125A) x 2	6B(150A) x 1	2B(50A) x 1	2B(50A) x 1	1B(25A) x 1	1B(25A) x 1	1750	3530	3.7
125	5B(125A) x 2	6B(150A) x 1	2B(50A) x 1	2B(50A) x 1	1B(25A) x 1	1B(25A) x 1	1850	3760	4.1
150	5B(125A) x 2	8B(200A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	1872	3782	4.1
175	5B(125A) x 2	8B(200A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2015	4495	4.1
200	5B(125A) x 2	8B(200A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2070	4550	4.3
225	5B(125A) x 2	8B(200A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2200	4680	4.6
250	5B(125A) x 2	8B(200A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2350	5350	4.6
275	5B(125A) x 2	8B(200A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2500	5860	4.2
300	5B(125A) x 2	8B(200A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2580	5940	4.2
325	5B(125A) x 4	10B(250A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	3150	7110	4.7
350	5B(125A) x 4	10B(250A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	3200	7160	4.7
375	5B(125A) x 4	10B(250A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	3837	7797	5.5
400	5B(125A) x 4	10B(250A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	3900	7860	5.5
425	6B(150A) x 4	10B(250A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	4037	8097	5.5
450	6B(150A) x 4	10B(250A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	4100	8610	5.5
475	6B(150A) x 4	12B(300A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	5062	10852	5.6
500	6B(150A) x 4	12B(300A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	5125	10915	5.6
550	6B(150A) x 4	12B(300A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	5500	11970	5.8
600	6B(150A) x 4	12B(300A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	2B(50A) x 1	5520	11990	5.8
650	6B(150A) x 4	12B(300A) x 1	2B(50A) x 1	3B(80A) x 1	2 1/2B(65A) x 1	2 1/2B(65A) x 1	5950	12780	5.8
700	6B(150A) x 4	12B(300A) x 1	2B(50A) x 1	3B(80A) x 1	2 1/2B(65A) x 1	2 1/2B(65A) x 1	5950	12780	5.8
750	6B(150A) x 4	12B(300A) x 1	2B(50A) x 1	3B(80A) x 1	2 1/2B(65A) x 1	2 1/2B(65A) x 1	7500	14970	6.2
800	6B(150A) x 4	12B(300A) x 1	2B(50A) x 1	3B(80A) x 1	2 1/2B(65A) x 1	2 1/2B(65A) x 1	7500	14970	6.2
850	6B(150A) x 4	12B(300A) x 1	2B(50A) x 1	3B(80A) x 1	2 1/2B(65A) x 1	2 1/2B(65A) x 1	7950	16240	6.8
900	6B(150A) x 4	12B(300A) x 1	2B(50A) x 1	3B(80A) x 1	2 1/2B(65A) x 1	2 1/2B(65A) x 1	7950	16240	6.8

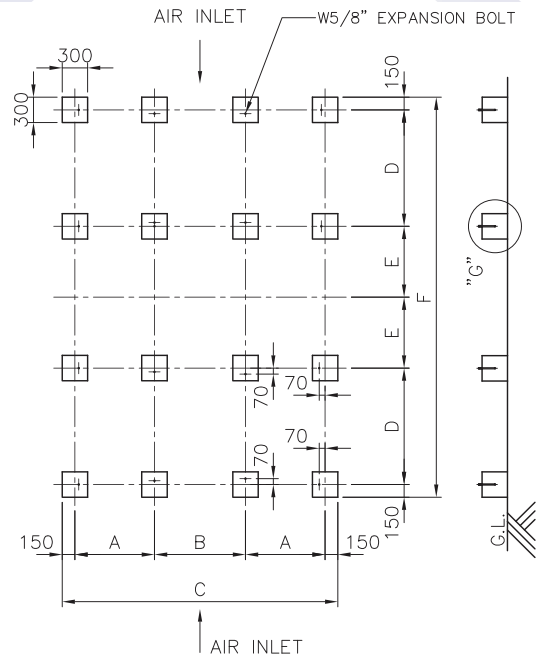
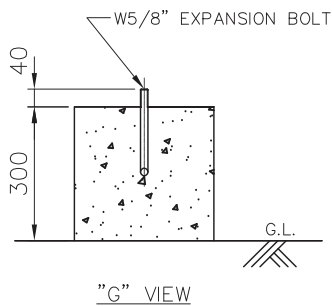
3. We reserve the right to make change in the specification and dimension without notice.



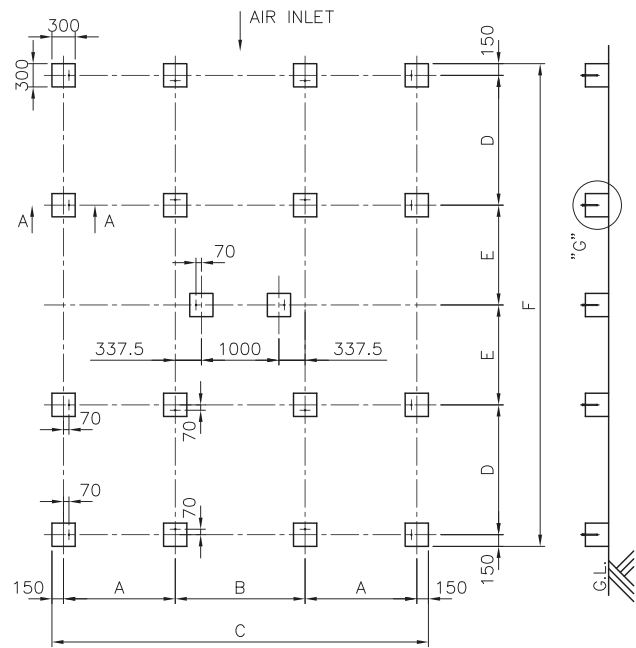
# Recommended Concrete Foundations



TLC-80~150



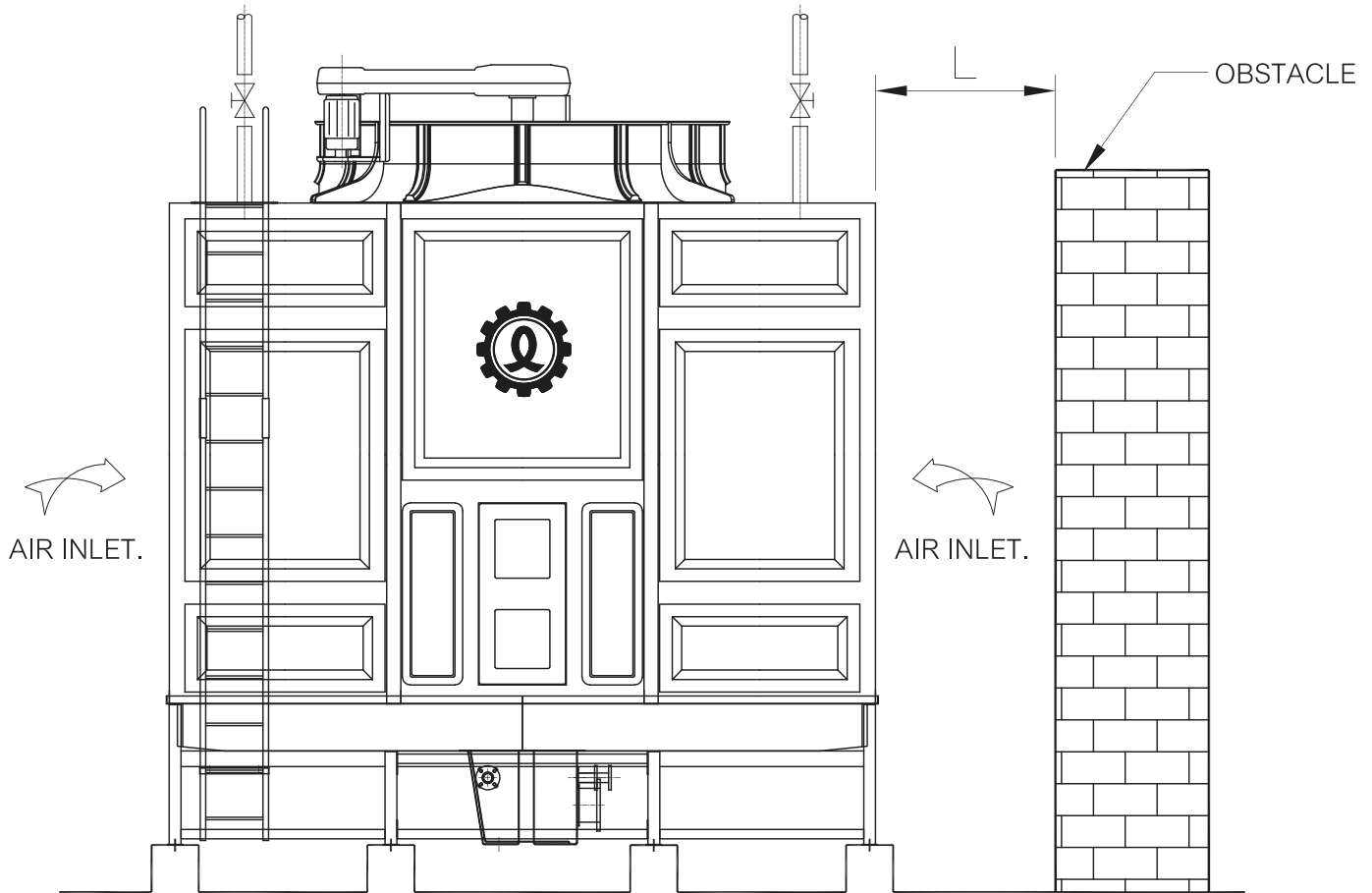
TLC-175~450



TLC-475~900

TLC ITEMS	80	100	125-150	175-225	250	275-300	325-400	425-450	475-500	550-600	650-700	750-800	850-900
A	927.5	1027.5	1027.5	740	940	940	1090	1340	1440	1440	1690	1790	1890
B	-	-	-	1075	1075	1075	1075	1075	1675	1675	1675	1675	1675
C	2155	2355	2355	2855	3255	3255	3555	4055	4855	4855	5355	5555	5755
D	1275	1275	1275	1375	1375	1675	1675	1675	1675	1675	1675	1775	1775
E	437.5	437.5	587.5	687.5	837.5	837.5	1087.5	1087.5	1287.5	1387.5	1387.5	1587.5	1837.5
F	3725	3725	4025	4425	4725	5325	5825	5825	6225	6425	6425	7025	7525
G	12	12	12	16	16	16	16	16	18	18	18	18	18

# Recommended Installation Area



1. A drafty site
2. The installation site should be distant from places that are full of dust and acid air.
3. The location should keep aloof 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 louvers 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:

TLC	L
80-100	MORE THAN 2.0 M.
125-200,275-300	MORE THAN 2.5 M.
225-250,325-350	MORE THAN 3.0 M.
375-500	MORE THAN 3.5 M.
550-700	MORE THAN 3.7 M.
750-900	MORE THAN 4.0 M.



# 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 part of water will be transferred into vapor flowing out of the cooling tower.
2. In the situation of large air volume, part of circulating water will be carried out of the cooling tower due to the cold air being driven by mechanical power (motor & fan).
3. When the water is circulating for some long time, the concentration of solids will increase and water quality will be affected by the growth of scales so that part of water should be let out and replaced with fresh water.

## 1. The calculation formula of 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 the design of cooling, velocity, etc. In general, the loss is equal to 0.1% to 0.3% 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 opened a little bit when the cooling tower is in operation.
- B. The operational water level should be increased to let the water anytime flow out of the overflow outlet.
- 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 circulating water.

## 4. Make-up Water

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

$$M = E + C + D$$

M	=	MAKEUP 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 make-up water needed for cooling tower is about 2% of circulation water.



# Product Performance Test



C.T.I. Certificate is equivalent to cooling tower passport, quality and internationally insured performance.



Test Laboratory (Shanghai Factory)



Test Laboratory (Taoyuan Factory)

Sole Manufacturer That Owns  
Two CTI Confirmed

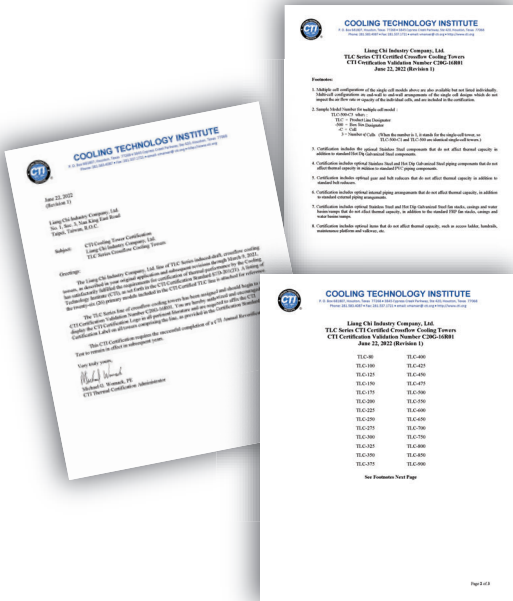


Various advanced equipment and precise test instruments as lab in Taiwan



**Liang Chi Cooling Tower  
Knowledge Library (In Shanghai)**  
Sole Cooling Tower Knowledge  
Library in the World

# R&D Technician Team And Quality Guarantee



Certified CTI  
Thermal performances certified by CTI Including TLC Series



The Certificate of field test for filling L5-15 from King Mongkut's Institute of Technology Ladkrabang



ISO-9001-2015  
The Management System of Liang Chi (Thailand)



With the accumulation of 50 year experience of Liang Chi Taiwan and over 35 year of Liang Chi Thailand in cooling tower and manufacturing, Liang Chi has laid good foundation for the R&D techniques together with expert technicians responsible for design, R&D and testing Continuously, the improvement, R&D and innovation for products will be made to meet the environmental demands, power conservation and modern tendency of technical developments. Customers can be assured of the greatest economic benefits for their investment and high quality of Liang Chi's Cooling Towers.

## After Sales Service

Over and above the choice of the cooling tower or the quality of the cooling tower, consideration has to be given to post-sale service. This is due to the fact that if the cooling tower is out of order, it will affect the air condition system, which will greatly affect the production of the industry. Liang Chi realizes the importance of post-sale service, so the company established a service section, comprising of 5 engineers, 10 foremen, over 50 service personnel and experienced employees of the service section, so it is certain that if Liang Chi's cooling tower is chosen, there will be no problem regarding post-sale service.





## Central

- Central Department Store Nakhon Ratchasima  
TLC-500 x 2 Sets
- Central Festival Phuket 2  
TLC-250 C4 x 3 Sets  
TLC-250 C2 x 2 Sets
- Central Plaza The Ring (Mahachai)  
TLC-250 x 1 Set  
TLC-250 C2 x 5 Sets
- Central Marina Pattaya  
TLC-250 x 6 Sets
- Central Plaza Nakhon Ratchasima  
TLC-250 C4 x 5 Sets



## Robinson

- Robinson Department Store Central Plaza Nakhon Si Thammarat  
TLC-250 x 3 Sets
- Robinson Branch Lopburi  
TLC-250 x 6 Sets
- Robinson Branch Phetchaburi  
TLC-350 x 6 Sets

## Cosmo Office Park TLC-350 x 8 Sets



## Jas Srinakarin TLC-175 C2 x 4 Sets





Bangkok Cosmo Bazaar  
TLC-200 x 3 Sets



IBIS Hotel (Impact Arena)  
TLC-300 x 3 Sets





## Building

- Mae Sot Airport, Tak
- MS Siam Tower, Rama III Road
- Government Pharmaceutical Organization
- Bangkok Assembly Hall Auditorium
- PT Town Ladkrabang
- Bank of Thailand
- True Center Thana Buri
- Thai Life Insurance (Rama 9)
- Metropolitan Electricity Authority Minburi Branch
- Rosewood Bangkok Hotel (Ploenchit)
- Cosmo Office Park

## Department Store

- IT Square
- Central Department Store Nakhon Ratchasima
- Central Festival Phuket2
- Big-C Ban Dung Branch (Udon Thani)
- Big-C Kamphaengphet Branch
- Central Plaza The Ring (Mahachai)
- Big-C Nakhon Ratchasima Branch
- Big-C Pathum Thani Branch (New Build)
- Century The Movie Plaza Sukhumvit
- Cosmo Bazaar Project
- Makro Kalasin Branch
- Makro Prachuab Khiri Khan
- Makro Petchkasem
- Homepro Srinakarin Branch
- Makro Bangbuathong Branch
- Index Surin Branch
- SG Center (Raminthra Express)
- Jas (Srinakarin) Shopping Center
- Robinson Department Store  
Central Plaza Nakhon Si Thammarat
- Central Marina Pattaya
- Robinson Lopburi Branch
- Wishco Whole Sale Nakhon Ratchasima
- Central Plaza Nakhon Ratchasima
- Robinson Branch Phetchaburi

## Factory

- New Grohe Factory
- Denso (Apeso)
- Wellgrow Industrial Estate
- Bang Poo Industrial
- Celestica Laemchabang

## Hotel

- Evergreen Laurel Hotel Bangkok (Sathorn)
- Fortune Grand Hotel Nakhon Si Thammarat
- IBIS Impact
- A-One Grand Marina Hotel (Pattaya)
- Hyatt Regency Sukhumvit 13

## Hospital

- Occupation Therapy and Services  
Mae Fah Luang University
- Yanhee Hospital
- Ubon Rak Hospital
- Chulalongkorn Hospital  
(Sirinthorn Building)
- Thaksin Hospital
- Medical Center Walailak University
- Synphaet Hospital, Bangna
- Chulalongkorn Hospital  
(Queen Sirikit Building)
- Thammasat University Hospital

## Education Institute

- Walailak University, Nakhon Si Thammarat

## สำนักงานใหญ่ (Head Office)

### บริษัท เลียงชี่ อุตสาหกรรม (ประเทศไทย) จำกัด

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#### E-mail

Sales Center

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Engineer Dep.

: engineer@liangchi.co.th

FRP Dep.

: frp@liangchi.co.th

Cooling Tower Dep.

: cooling@liangchi.co.th

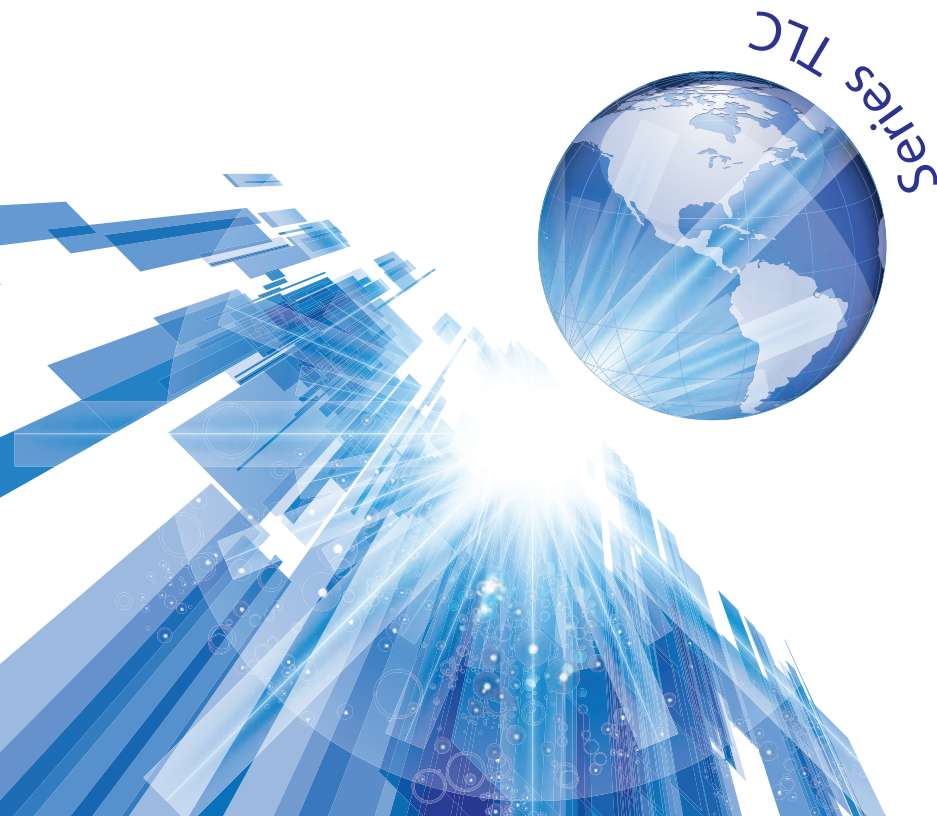
Spare Parts Dep.

: sp@liangchi.co.th

#### Sales Offices

HAT YAI

: hatyai@liangchi.co.th



*Together we cool*

[www.liangchi.co.th](http://www.liangchi.co.th)