Allan Tahvieh

آلان تهویه
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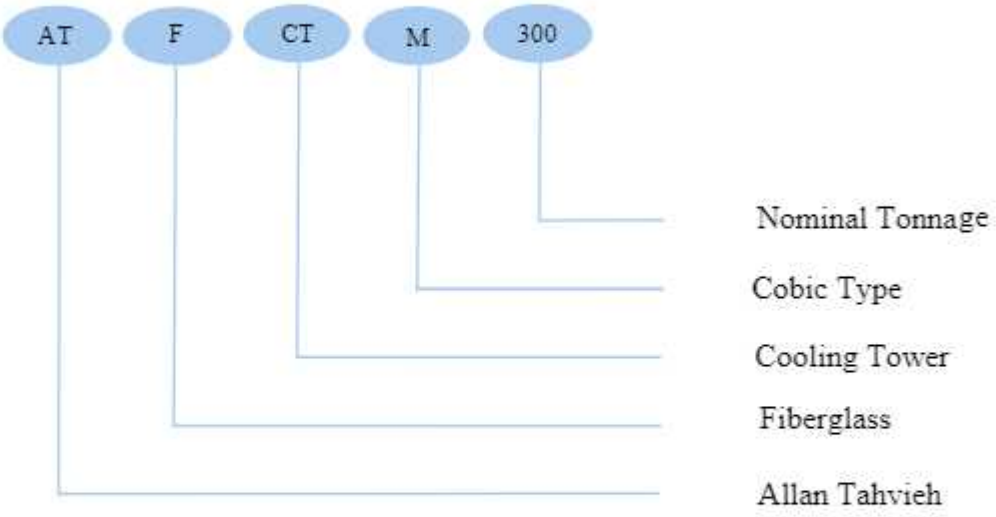
# Fiberglass Cooling Tower

Contents





# Nomenclature



# Fiberglass Cooling Tower Befits Over Metallic Type

Use of non ferric material in construction of body and water basin prevents the spread of legionnaires` disease bacteria.

Use of fiberglass in construction of this type of tower solves the problems related to corrosion and helps to prolong tower life and reduce maintenance cost. Due to inclusion of (UV) in the raw material, the tower body resists harmful sun rays, high humidity and discoloration.

The bottle shaped design of these towers accounts for about 30% of cooling taking place through natural flow of air. Of course, this means smaller electric motors and less energy consumption. The design also makes the tower more steady against high winds.

All fiberglass tower components are available in disassembled format so that transportation could be made simple. Fast assembly in any place is possible. The net weights of these towers are about 20% of the metallic ones which make installations on top of small and large buildings more simple.

Due to the use of fiberglass and PVC material and also the balancing of fan(s) both statically and dynamically, the vibration of these units have been reduced to the least. The fan(s) produce high air flow at low sound.

Service and maintenance is very easy and through simple operations internal parts of tower could be reached.

Fiberglass cooling tower body may be offered in an assortment of colors to match the installation area or as per customer requirement.

Packing made of PVC material produce a suitable film of water on the surfaces which means better water and air contact thereby a better heat transfer is achieved.



# Heat Rejection Load Chart (Under Nominal Flow)

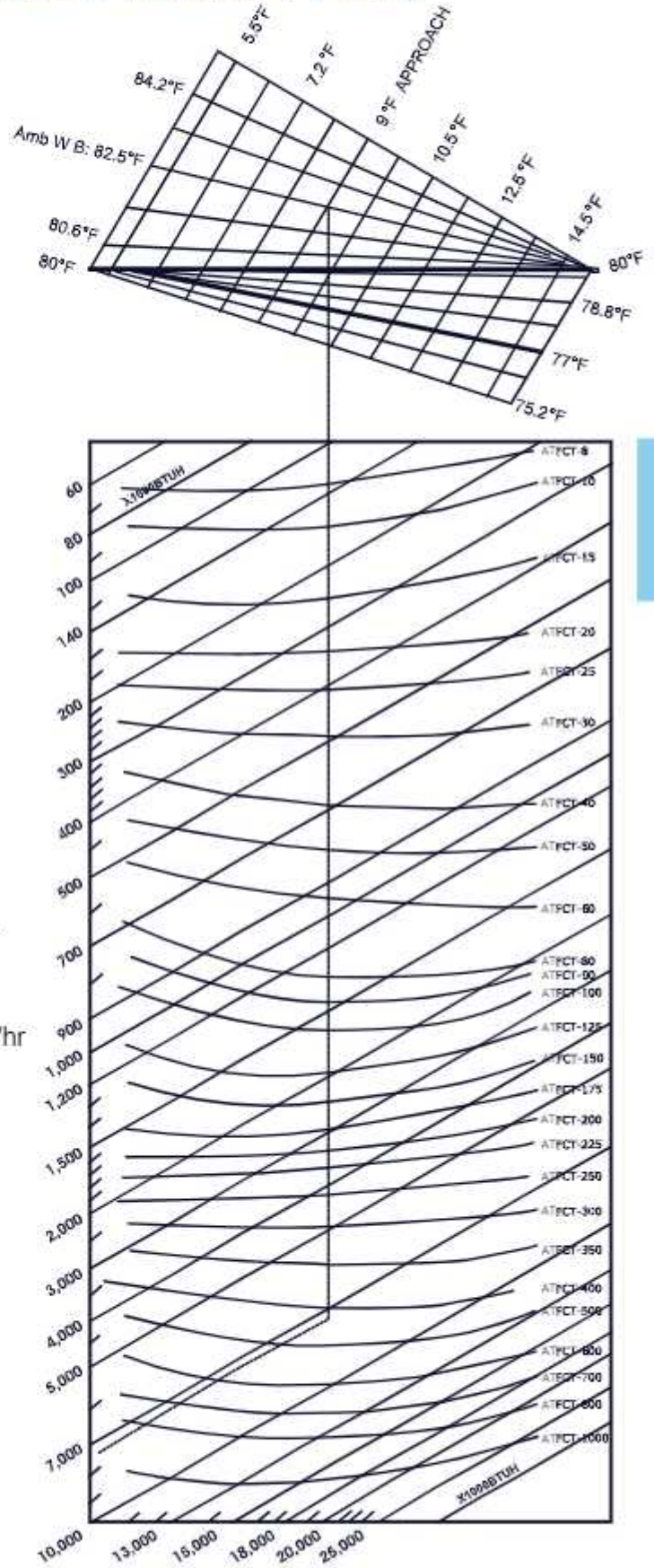
## Selection Example

### A) Given

1. Ambient W.B. Temp. = 82.5ºF
2. Approach = 9ºF
3. Heat Rejection = 7,500,000 Btu/hr

### B) Tower Selection

From the chart, find out the intersection of 82.5ºF W.B. Temp. and 9ºF Approach, project a line vertically to meet the 7,500,000 Btu/ hr line, then a ATFCT-500 should be selected.




### Note:

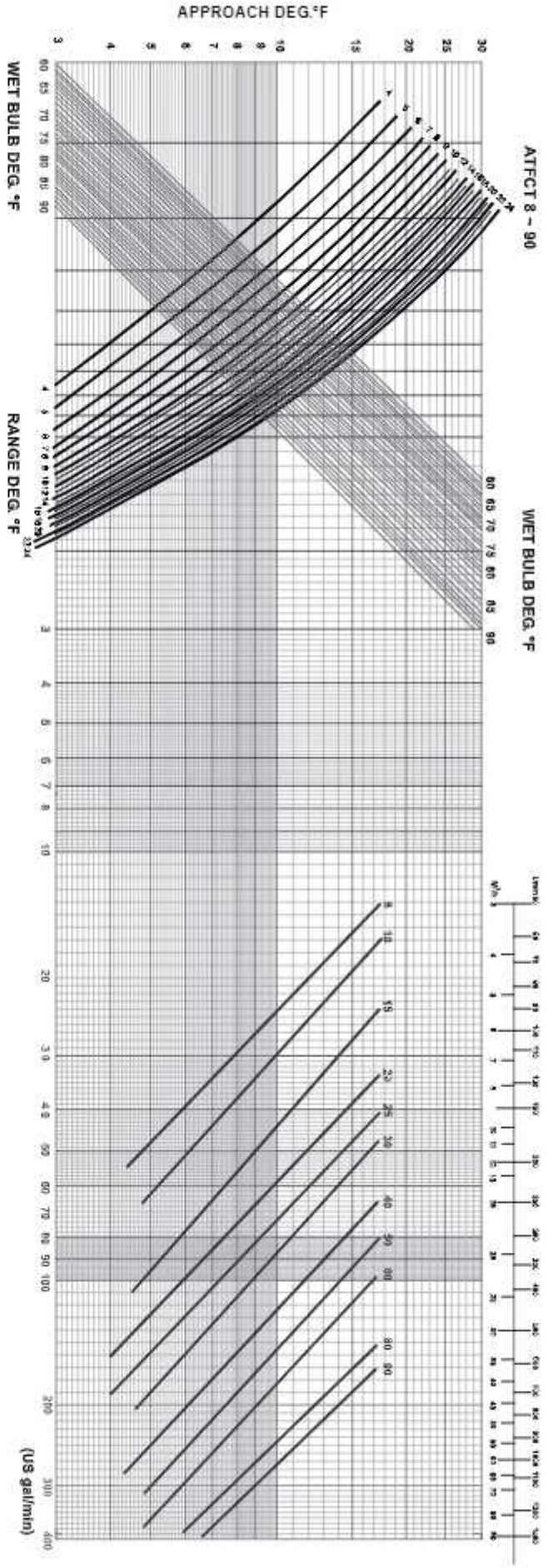
The selection point should be on or above the curve of the tower selected.
Range = Inlet Temp. - Outlet Temp.
Approach = Outlet Temp. - W.B. Temp.

## Reference

$1m^3/min$ = 1000 L/min = 60 $m^3/hr$
1 L/min= 0.21995 gal (Imp.)/min
= 0.26418 U.S.gal/min
1 gal(Imp.)/min = 4.546 L/min = 0.27279 $m^3/hr$
= 1.2 U.S.gal/min
1 U.S.gal /min = 3.78533 L/min = 0.22711 $m^3/hr$
= 0.83 gal (Imp.)/min
1 $Ft^3/min$ (CFM) = 0.0283 $m^3/min$ =1.699 $m^3/hr$
1KW=1.333 HP = 3394.08 Btu/hr = 855.36 Kcal/hr
ºF= (9/5) × ºC + 32
ºC= (5/9) × (ºF – 32)

| ºC | ºF | ºC | ºF | ºC | ºF | ºC | ºF |
|---|---|---|---|---|---|---|---|
| 65 | 18.3 | 75 | 23.9 | 85 | 29.4 | 95 | 35.0 |
| 66 | 18.9 | 76 | 24.4 | 86 | 30.0 | 96 | 35.6 |
| 67 | 19.4 | 77 | 25.0 | 87 | 30.6 | 97 | 36.1 |
| 68 | 20.0 | 78 | 25.6 | 88 | 31.1 | 98 | 36.7 |
| 69 | 20.6 | 79 | 26.1 | 89 | 31.7 | 99 | 37.2 |
| 70 | 21.1 | 80 | 26.7 | 90 | 32.2 | 100 | 37.8 |
| 71 | 21.7 | 81 | 27.2 | 91 | 32.8 | 101 | 38.3 |
| 72 | 22.2 | 82 | 27.8 | 92 | 33.3 | 102 | 38.9 |
| 73 | 22.8 | 83 | 28.3 | 93 | 33.9 | 103 | 39.4 |
| 74 | 23.3 | 84 | 28.9 | 94 | 34.4 | 104 | 40.0 |

# Tower Selection Chart



# Tower Selection Chart

## Selection Procedure

### A) Given

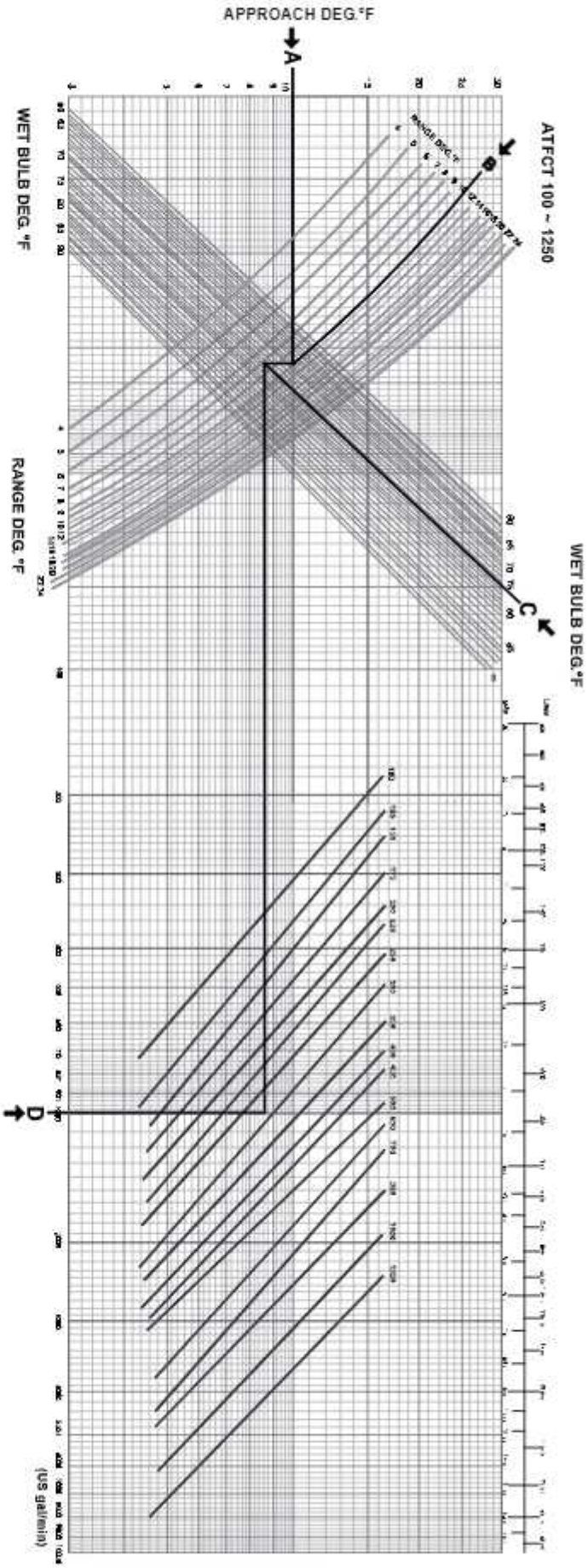
Warm Water Inlet Temperature = 95ºF
Cooled Water Outlet Temperature = 85ºF
Ambient Wet Bulb Temperature = 75ºF
Water Flow (Qty.) =1000 GPM

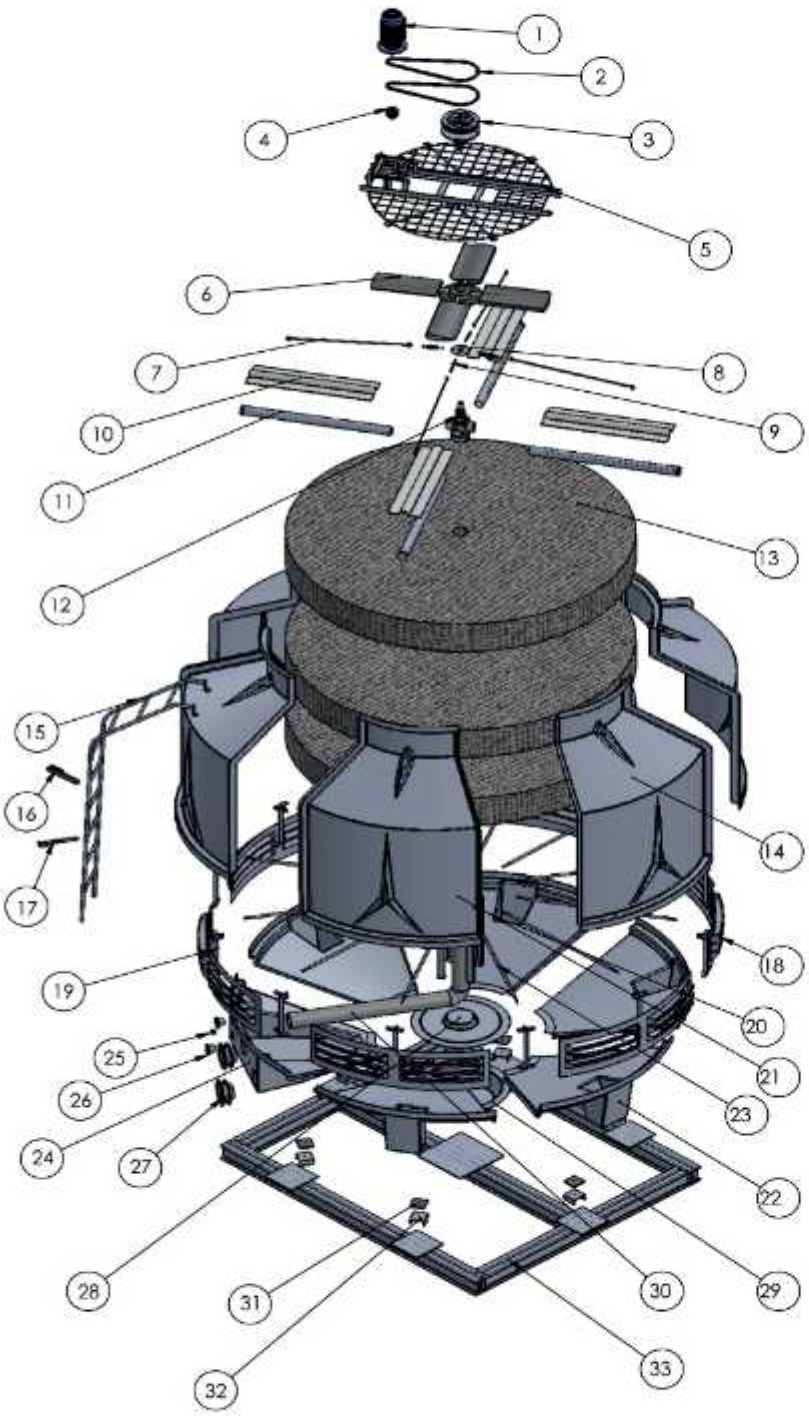
### B) Solution

Range= Inlet Temp.-Outlet Temp. =10ºF
Approach=Outlet Temp.-W.B. Temp =10ºF

### C) Step

(1) Draw a line horizontally from the 10ºF Approach Line to the 10ºF Range Curve.
(2) From the intersection point drop a perpendicular to the 75ºF Wet Blub Curve.
(3) From this intersection point draw a horizontal line to meet the 1000 gal/min line.
(4) The point reached is within closest to the 300 TIFCT Curve, therefore:
The model selected, is ATFCT-300.






**DIS ASSEMBLY**
**150T**

| BOM Table | | |
|---|---|---|
| ITEM NO. | PART NUMBER | QTY. |
| 1 | ELECTRO MOTOR | 1 |
| 2 | BELT | 2 |
| 3 | FOLEY-L | 1 |
| 4 | FOLEY-S | 1 |
| 5 | MECHANICAL SUPORT | 1 |
| 6 | FAN | 1 |
| 7 | STUTS CACHE | 4 |
| 8 | PLATE CACHE | 1 |
| 9 | HOOK AND EYE | 4 |
| 10 | ELEMENTOR | 4 |
| 11 | SPRINKLER ARMS | 4 |
| 12 | SPRINKLER HEAD | 1 |
| 13 | FILLING | 3 |
| 14 | CASING | 6 |
| 15 | LADDER | 1 |
| 16 | CLAMP-RIGHT | 1 |
| 17 | CLAMP-LEFT | 1 |
| 18 | LOUVER | 6 |
| 19 | STAND | 12 |
| 20 | LEG | 1 |
| 21 | STAND PIPE | 1 |
| 22 | BASIN STAND | 5 |
| 23 | RADIUS ARMS | 12 |
| 24 | BASIN STAND - FLANGES | 1 |
| 25 | FLANGES 3/4 | 1 |
| 26 | FLANGES 1.5 | 2 |
| 27 | FLANGES 5 | 2 |
| 28 | DOOR SUMP | 1 |
| 29 | SUMP | 1 |
| 30 | PIPING INLET | 1 |
| 31 | ANTI SHOCK | 6 |
| 32 | STUDS | 6 |
| 33 | FOUNDATION | 1 |

## Technical Data

| Model | Nominal Tonnage | Pump | | Fan | | | Weights | |
|---|---|---|---|---|---|---|---|---|
| | | Water Flow Rate (GPM) | Nozzle Head (Ft) | Motor Power (HP) | Air Flow Rate (CFM) | Dia. (cm) | Net (Kg) | Opr. (Kg) |
| ATFCT-10 | 10 | 35 | 4.3 | 1/4 | 3180 | 60 | 62 | 156 |
| ATFCT-20 | 20 | 71 | 5.4 | 1/2 | 7000 | 80 | 117 | 272 |
| ATFCT-30 | 30 | 105 | 6.8 | 1 | 8480 | 90 | 170 | 385 |
| ATFCT-40 | 40 | 141 | 6.8 | 1 | 9710 | 90 | 185 | 440 |
| ATFCT-50 | 50 | 176 | 7.4 | 1/5 | 11300 | 90 | 230 | 545 |
| ATFCT-60 | 60 | 212 | 8 | 2 | 14500 | 120 | 375 | 666 |
| ATFCT-80 | 80 | 282 | 8 | 2 | 17100 | 120 | 415 | 776 |
| ATFCT-90 | 90 | 318 | 10 | 2 | 21800 | 120 | 458 | 881 |
| ATFCT-100 | 100 | 352 | 10 | 2 | 24100 | 120 | 522 | 1002 |
| ATFCT-125 | 125 | 460 | 11 | 3 | 27500 | 150 | 618 | 1330 |
| ATFCT-150 | 150 | 528 | 11 | 4 | 29700 | 150 | 708 | 1439 |
| ATFCT-175 | 175 | 636 | 13 | 4 | 32900 | 180 | 906 | 2519 |
| ATFCT-200 | 200 | 705 | 14 | 5 | 47100 | 200 | 1048 | 2659 |
| ATFCT-225 | 225 | 813 | 14 | 7.5 | 57100 | 200 | 1190 | 2799 |
| ATFCT-250 | 250 | 880 | 15 | 7.5 | 66500 | 240 | 1300 | 3919 |
| ATFCT-300 | 300 | 1050 | 15 | 7.5 | 76900 | 240 | 1502 | 4119 |
| ATFCT-350 | 350 | 1230 | 16 | 10 | 83500 | 240 | 1622 | 5079 |
| ATFCT-400 | 400 | 1410 | 16 | 15 | 90700 | 240 | 1865 | 5322 |
| ATFCT-450 | 450 | 1580 | 17 | 15 | 106500 | 300 | 1993 | 7446 |
| ATFCT-500 | 500 | 1770 | 17 | 15 | 119500 | 300 | 2038 | 7759 |
| ATFCT-600 | 600 | 2120 | 18 | 15 | 139500 | 330 | 2150 | 8150 |
| ATFCT-700 | 700 | 2460 | 18 | 20 | 171000 | 330 | 2250 | 8250 |
| ATFCT-800 | 800 | 2830 | 19 | 25 | 197100 | 360 | 2350 | 8350 |
| ATFCT-1000 | 1000 | 3520 | 19 | 30 | 217700 | 360 | 2480 | 8550 |
| ATFCT-1250 | 1250 | 4400 | 20 | 30 | 270700 | 420 | 2650 | 8900 |
| ATFCT-1400 | 1400 | 4700 | 20 | 40 | 310500 | 420 | 2800 | 9200 |

## Physical Data

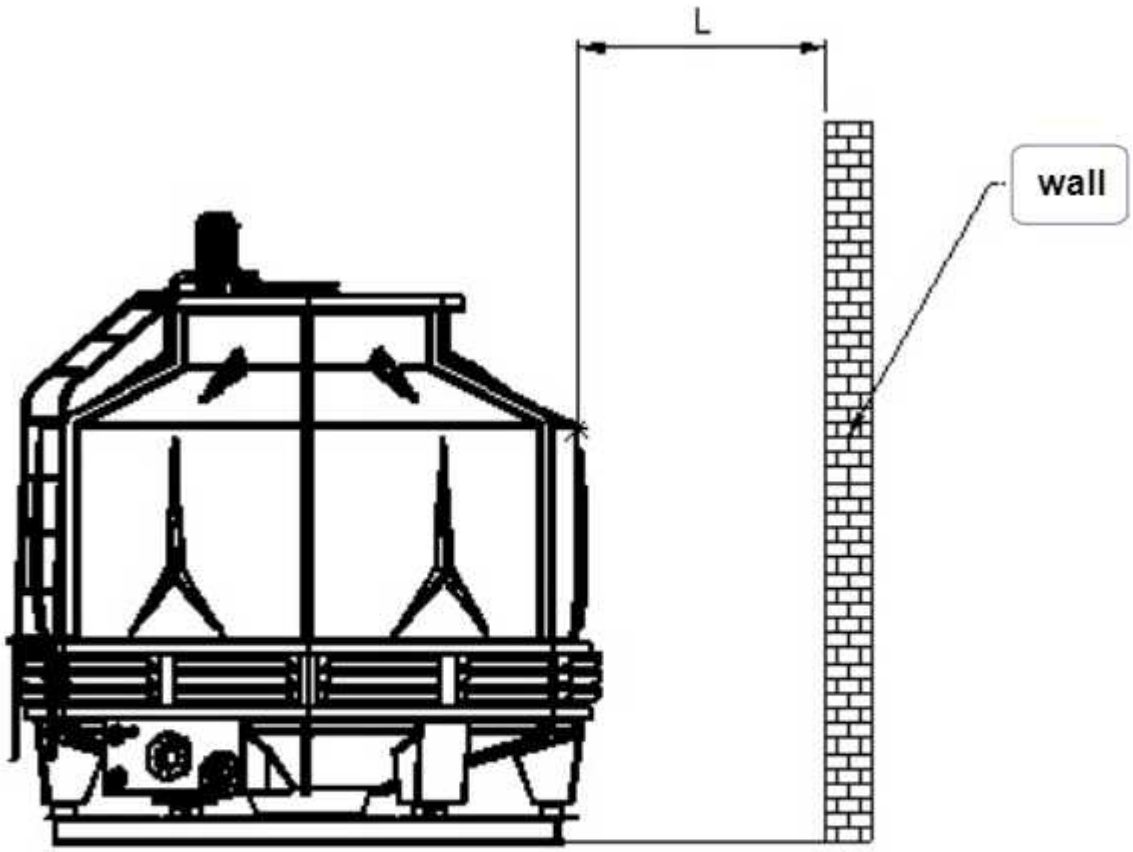
| Model | Connection Size | | | | | | Dimension | |
|---|---|---|---|---|---|---|---|---|
| | Inlet (Inch) | Outlet (Inch) | Over Flow (Inch) | Drain (Inch) | Make Up (Inch) | Quick Fill (Inch) | Dia. (cm) | Height (cm) |
| ATFCT-10 | 1 1/2 | 1 1/2 | 1 | 1 | 1/2 | - | 100 | 160 |
| ATFCT-20 | 2 | 2 | 1 | 1 | 1/2 | - | 140 | 180 |
| ATFCT-30 | 3 | 3 | 1 | 1 | 1/2 | - | 170 | 190 |
| ATFCT-40 | 3 | 3 | 1 | 1 | 1/2 | - | 180 | 200 |
| ATFCT-50 | 3 | 3 | 1 | 1 | 3/4 | - | 190 | 240 |
| ATFCT-60 | 4 | 4 | 1 1/2 | 1 1/2 | 3/4 | 3/4 | 200 | 250 |
| ATFCT-80 | 4 | 4 | 1 1/2 | 1 1/2 | 3/4 | 3/4 | 210 | 265 |
| ATFCT-90 | 4 | 4 | 1 1/2 | 1 1/2 | 3/4 | 3/4 | 260 | 250 |
| ATFCT-100 | 4 | 4 | 1 1/2 | 1 1/2 | 3/4 | 3/4 | 260 | 270 |
| ATFCT-125 | 5 | 5 | 1 1/2 | 1 1/2 | 3/4 | 3/4 | 300 | 275 |
| ATFCT-150 | 5 | 5 | 1 1/2 | 1 1/2 | 3/4 | 3/4 | 300 | 290 |
| ATFCT-175 | 6 | 6 | 1 1/2 | 1 1/2 | 3/4 | 3/4 | 330 | 310 |
| ATFCT-200 | 6 | 6 | 3 | 2 | 1 | 1 | 370 | 330 |
| ATFCT-225 | 6 | 6 | 3 | 2 | 1 | 1 | 380 | 330 |
| ATFCT-250 | 8 | 8 | 3 | 2 | 1 | 1 | 440 | 340 |
| ATFCT-300 | 8 | 8 | 3 | 2 | 1 | 1 | 450 | 360 |
| ATFCT-350 | 8 | 8 | 3 | 2 | 1 | 1 | 480 | 390 |
| ATFCT-400 | 8 | 8 | 3 | 2 | 1 | 1 | 490 | 390 |
| ATFCT-450 | 8 | 8 | 4 | 3 | 2 | 2 | 550 | 430 |
| ATFCT-500 | 10 | 10 | 4 | 3 | 2 | 2 | 560 | 430 |
| ATFCT-600 | 10 | 10 | 4 | 3 | 2 | 2 | 650 | 460 |
| ATFCT-700 | 10 | 10 | 4 | 3 | 2 | 2 | 670 | 480 |
| ATFCT-800 | 12 | 12 | 4 | 3 | 3 | 3 | 760 | 520 |
| ATFCT-1000 | 12 | 12 | 4 | 3 | 3 | 3 | 780 | 540 |
| ATFCT-1250 | 12 | 12 | 4 | 3 | 3 | 3 | 880 | 560 |
| ATFCT-1400 | 12 | 12 | 4 | 3 | 3 | 3 | 880 | 600 |

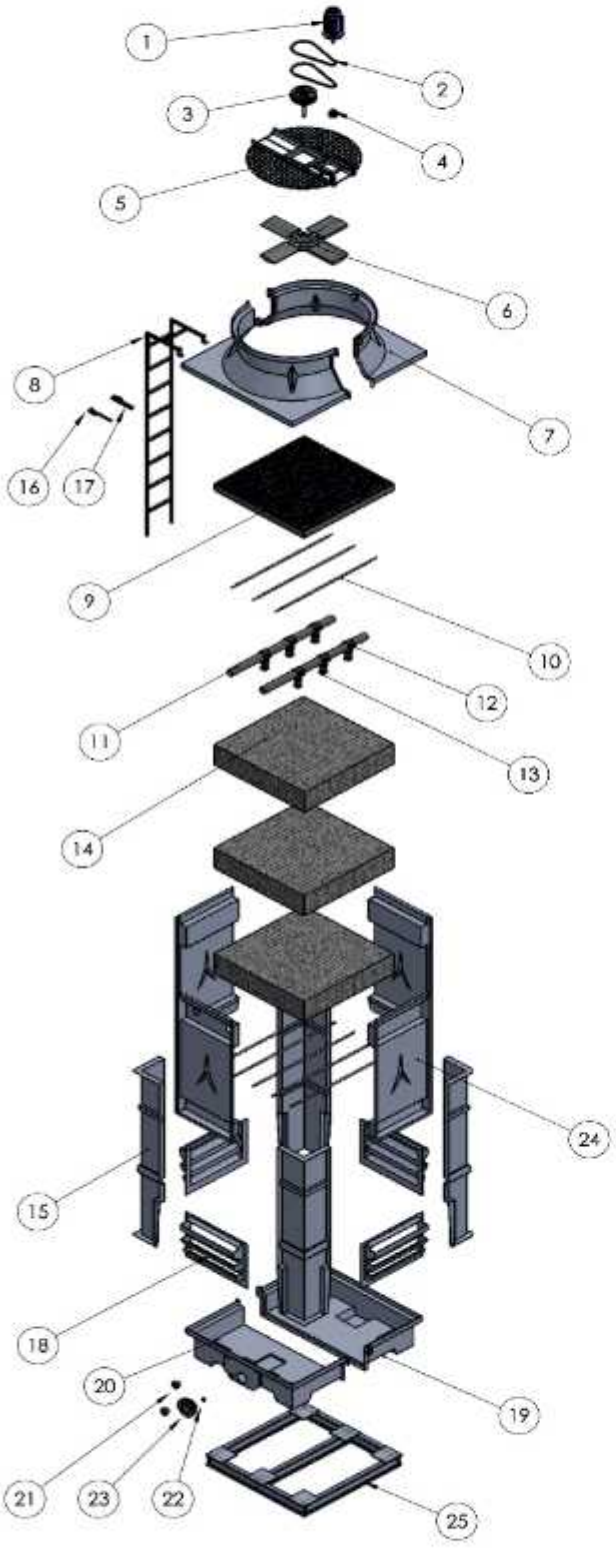
NOTE:
Unit height does not include the electric motor.

## Location Data

| TR | 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 |








**DIS ASSEMBLY**
**100T**

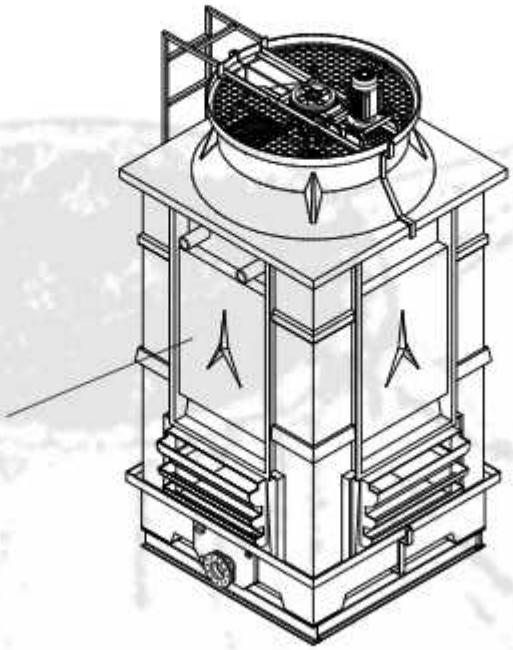
| BOM Table | | |
|---|---|---|
| ITEM NO . | PART NUMBER | QTY. |
| 1 | ELECTRO MOTOR | 1 |
| 2 | BELT | 2 |
| 3 | FOLEY -L | 1 |
| 4 | FOLEY -S | 1 |
| 5 | MECHANICAL SUPORT | 1 |
| 6 | FAN | 1 |
| 7 | FANSTAK | 2 |
| 8 | LADDER | 1 |
| 9 | DROPPER | 1 |
| 10 | RADIUS ARM | 8 |
| 11 | PIP | 2 |
| 12 | KEEPER | 6 |
| 13 | NOZZEL | 6 |
| 14 | FILLING | 3 |
| 15 | colomn | 4 |
| 16 | CLAMP-RIGHT | 1 |
| 17 | CLAMP-LEFT | 1 |
| 18 | LOUVER | 4 |
| 19 | BASIN STAND | 1 |
| 20 | BASIN STAND - FLANGES | 1 |
| 21 | FLANGES 4/3 | 1 |
| 22 | FLANGES 1.5 | 2 |
| 23 | FLANGES 5 | 2 |
| 24 | CASING | 4 |
| 25 | FOUNDATION | 1 |

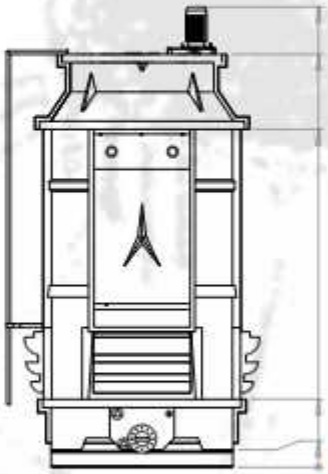
## Technical Data

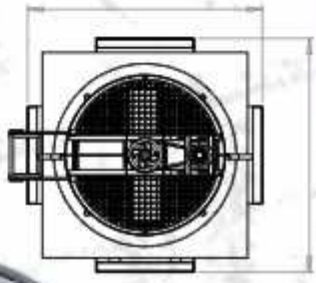
| Model | Nominal Tonnage | Pump | | Fan | | Weights | | Connection Size | |
|---|---|---|---|---|---|---|---|---|---|
| | | Water Flow Rate (GPM) | Nozzle Head (Ft) | Motor Power (HP) | Dia. (cm) | Net (Kg) | Opr. (Kg) | Inlet (Inch) | Outlet (Inch) |
| ATFCT-10 | 10 | 65 | 4.3 | 1 | 53 | 210 | 400 | 1 * 2 | 1 * 2 |
| ATFCT-30 | 30 | 132 | 6.8 | 1.5 | 85 | 240 | 700 | 1 * 3 | 1 * 3 |
| ATFCT-50 | 50 | 176 | 7.4 | 1.5 | 85 | 270 | 670 | 1 * 3 | 1 * 3 |
| ATFCT-60 | 60 | 198 | 8 | 2.1 | 85 | 320 | 950 | 1 * 4 | 1 * 4 |
| ATFCT-80 | 80 | 220 | 8 | 2.1 | 85 | 320 | 950 | 1 * 4 | 1 * 4 |
| ATFCT-100 | 100 | 264 | 10 | 2.1 | 115 | 340 | 1000 | 2 * 3 | 1 * 4 |
| ATFCT-120 | 120 | 330 | 11 | 3 | 115 | 480 | 1670 | 2 * 3 | 1 * 5 |
| ATFCT-150 | 150 | 440 | 11 | 4 | 145 | 520 | 1740 | 2 * 3 | 1 * 5 |
| ATFCT-180 | 180 | 506 | 13 | 5.3 | 145 | 580 | 1850 | 2 * 3 | 1 * 6 |
| ATFCT-200 | 200 | 572 | 14 | 5.3 | 160 | 760 | 2750 | 2 * 3 | 1 * 6 |
| ATFCT-250 | 250 | 704 | 15 | 7.3 | 160 | 770 | 2850 | 2 * 3 | 1 * 6 |
| ATFCT-300 | 300 | 792 | 15 | 7.3 | 185 | 1000 | 3850 | 4 * 3 | 1 * 8 |
| ATFCT-350 | 350 | 1012 | 16 | 10 | 185 | 1200 | 3950 | 4 * 3 | 1 * 8 |
| ATFCT-400 | 400 | 1100 | 16 | 10 | 223 | 1600 | 5650 | 4 * 3 | 1 * 8 |
| ATFCT-500 | 500 | 1452 | 17 | 15 | 223 | 1680 | 5730 | 4 * 3 | 1 * 8 |
| ATFCT-600 | 600 | 1628 | 18 | 15 | 280 | 2200 | 8200 | 6 * 3 | 1 * 10 |
| ATFCT-700 | 700 | 1980 | 18 | 20 | 280 | 2300 | 8300 | 6 * 3 | 1 * 10 |
| ATFCT-800 | 800 | 2134 | 19 | 24 | 280 | 2400 | 8400 | 6 * 3 | 1 * 10 |

## Physical Data

| Model | Dimension L * W * H (cm) | Model | Dimension L * W * H (cm) | Model | Dimension L * W * H (cm) |
|---|---|---|---|---|---|
| ATFCT-10 | 80 * 80 * 200 | ATFCT-100~120 | 180 * 180 * 350 | ATFCT-300~350 | 270 * 270 *420 |
| ATFCT-30 ~ 50 | 125 * 125 * 300 | ATFCT-150~180 | 220 * 220 *350 | ATFCT-400~500 | 340 * 340 * 430 |
| ATFCT-60 ~ 80 | 150 * 150 * 350 | ATFCT-200~250 | 250 * 250 *370 | ATFCT-600~800 | 440 * 440 * 450 |







# Equipment Cooling Tower

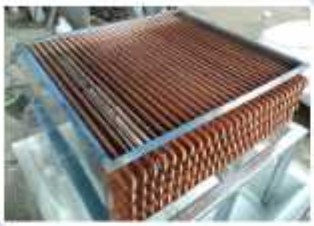
Fan

Distributer Water

Packing

Louver

Coil ( Closed_Circuit)



Pulley & Reducer