



EX-S SERIES COOLING TOWER

SINGLE-CELL UP TO 1250HRT COOLING CAPACITY

High Performance Crossflow Type



PROVEN PERFORMANCE • RELIABILITY • EASY INSTALLATION



EX-S Series is an induced draft cross-flow, film filled, FRP multi-cell rectangular cooling tower designed for the equipment cooling, and industrial process cooling and air conditioning applications.

The EX-S Series Cooling Tower is designed to meet maximum performance and reliability, and minimum maintenance.

The thermal performance of EX-S Series has been certified by CTI in accordance with CTI Standard STD-201.

EX-S Series Cooling Towers are designed and provided with high quality v-belt & pulley drive system or right-angle gear reducer drive system for trouble free operation.

Advantages

- **Proven Reliability**

EX-S Series Cooling Towers have been installed in many applications. Customer satisfaction is testified by its long list of proven installations.

- **Energy Saving**

The low speed, high efficiency fan and low pressure drop fill design optimize the energy consumption.

- **High Efficiency Drift Eliminator**

The efficient drift eliminators remove entrained water droplets from the air stream to less than 0.005%.

- **Proven Corrosion Protection**

Tower components are made of anti-corrosive material suitable for cooling water application.



Bangkok International Airport, Thailand



The Mines, Malaysia

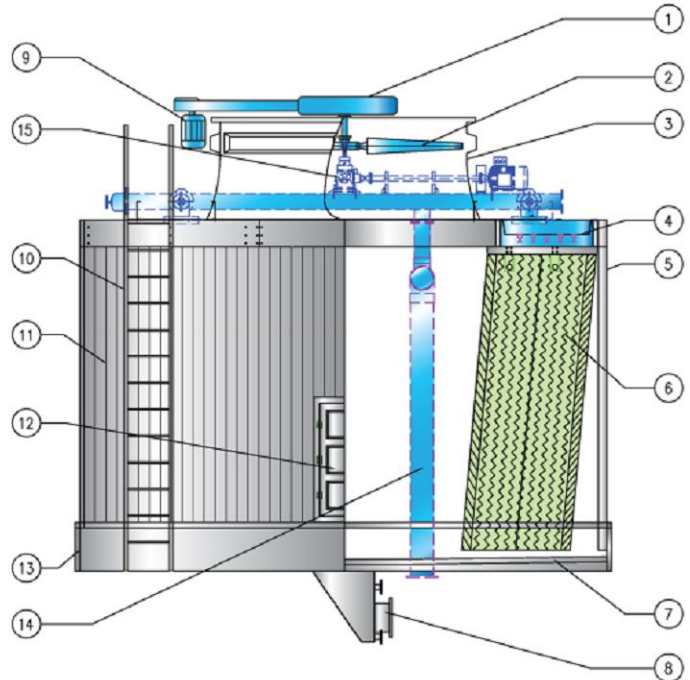


UMC, Singapore

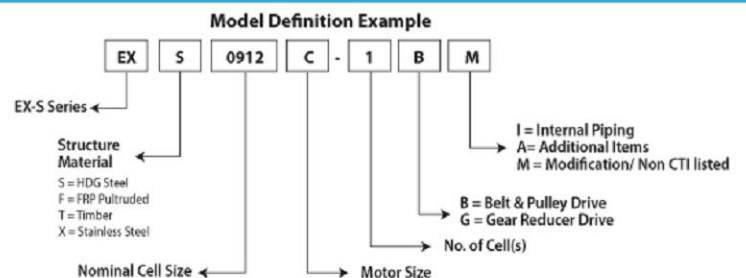


Dolmen City, Pakistan

Features



| No | Description | Material / Specification |
|----|---------------------------------|--------------------------|
| 1 | V-Belt and Pulley System | FRP Pulley Cover |
| 2 | Fan Assembly | Aluminium Alloy |
| 3 | Fan Stack | FRP |
| 4 | Hot Water Basin | FRP |
| 5 | Main Frame Structure | HDG Steel |
| 6 | High Performance Film Fill Pack | PVC |
| 7 | Cold Water Basin Floor | FRP |
| 8 | Suction Sump | FRP |
| 9 | Motor | Weather Proof TEFC type |
| 10 | Ladder | HDG Steel |
| 11 | Casing | PVC |
| 12 | Inspection Door | FRP |
| 13 | Cold Water Basin Frame | HDG Steel |
| 14 | Internal Piping | Optional |
| 15 | Gear Reducer System | Optional |



Tianjin Eco-City, China



One Shamelin, Malaysia

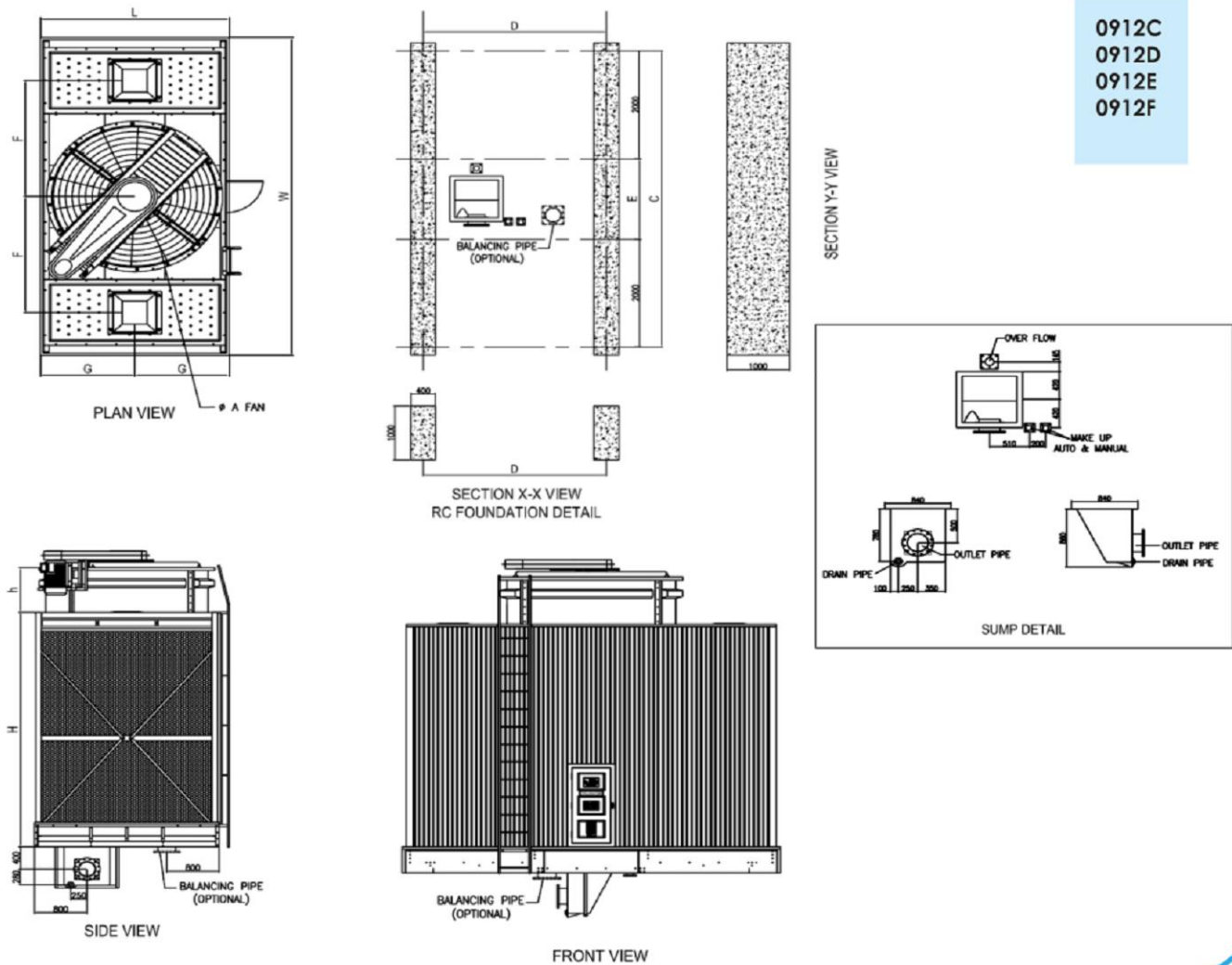


SSAS Shah Alam, Malaysia



DCAP, Thailand

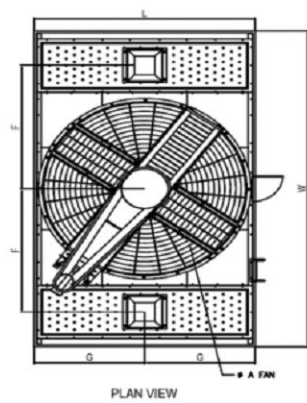
Outline And Foundation Drawings (Single Cell)



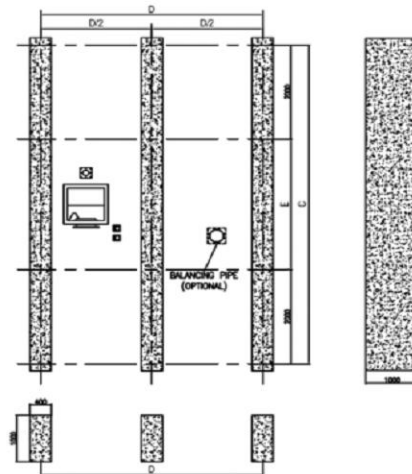
EX-S SERIES RANGE

| Tower Model EXS | HRT @ 36.1/30.6/27.2°C or 97/87/81°F | OVERALL DIMENSION | | | | MOTOR | | | | AXIAL FLOW FAN | | | |
|-----------------|--|-------------------|------|------|-----|-----------------|------------------------|---|--------------------------------|----------------|-----------|---------------------|-------------------|
| | | L | W | H | h | Rated Output kW | Rated Current (A 50Hz) | Type | Power Source | A | Fan Speed | No of blades | Drive System |
| 0912C | 324 | 2820 | 5550 | 4230 | 750 | 7.5 | 13.6 | TEFC, outdoor, 3 phase, induction motor, 4 pole | 3ph/380V/50Hz or 3ph/415V/50Hz | 2440 | 406 | Four (4) to Six (6) | V Belt and Pulley |
| 0912D | 369 | | | | | 11.0 | 20.1 | | | | 406 | | |
| 0912E | 412 | | | | | 15.0 | 26.7 | | | | 406 | | |
| 0912F | 443 | | | | | 18.5 | 33.2 | | | | 406 | | |
| 1110D | 417 | 3430 | 6470 | 3620 | 750 | 11.0 | 20.1 | | | 3050 | 368 | | |
| 1110E | 464 | | | | | 15.0 | 26.7 | | | | 368 | | |
| 1110G | 530 | | | | | 22.0 | 39.3 | | | | 368 | | |
| 1110H | 588 | | | | | 30.0 | 51.9 | | | | 368 | | |
| 1112E | 512 | 3430 | 6470 | 4230 | 750 | 15.0 | 26.7 | | | 3050 | 368 | | |
| 1112F | 552 | | | | | 18.5 | 33.2 | | | | 368 | | |
| 1112G | 585 | | | | | 22.0 | 39.3 | | | | 368 | | |
| 1112H | 649 | | | | | 30.0 | 51.9 | | | | 368 | | |
| 1112I | 697 | 3430 | 6470 | 4840 | 750 | 37.0 | 66.0 | | | 3050 | 368 | | |
| 1114E | 555 | | | | | 15.0 | 26.7 | | | | 368 | | |
| 1114F | 597 | | | | | 18.5 | 33.2 | | | | 368 | | |
| 1114H | 716 | | | | | 30.0 | 51.9 | | | | 368 | | |
| 1114I | 767 | 3430 | 6470 | 4840 | 750 | 37.0 | 66.0 | | | 3050 | 368 | | |
| 1210D | 447 | | | 3620 | 750 | 11.0 | 20.1 | | | 3350 | 330 | | |
| 1210E | 497 | | | | | 15.0 | 26.7 | | | | 330 | | |
| 1210G | 567 | | | | | 22.0 | 39.3 | | | | 330 | | |
| 1210H | 629 | | | | | 30.0 | 51.9 | | | | 330 | | |
| 1210I | 675 | 3620 | 6830 | 3620 | 750 | 37.0 | 66.0 | | | 3350 | 330 | | |
| | | | | | | | | | | | 330 | | |
| | | | | | | | | | | | 330 | | |
| | | | | | | | | | | | 330 | | |

Outline And Foundation Drawings (Single Cell)



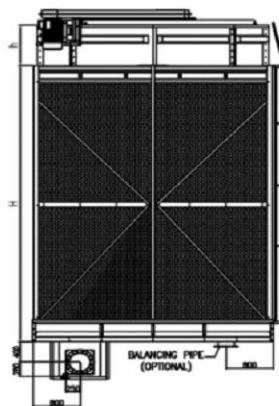
PLAN VIEW



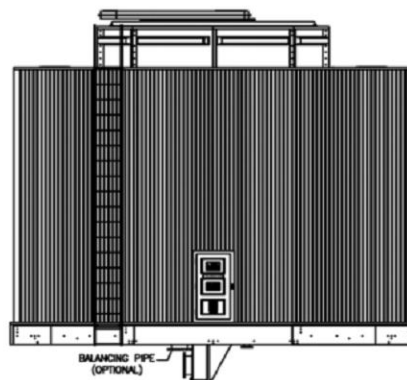
SECTION X-X VIEW
RC FOUNDATION DETAIL

SECTION Y-Y VIEW

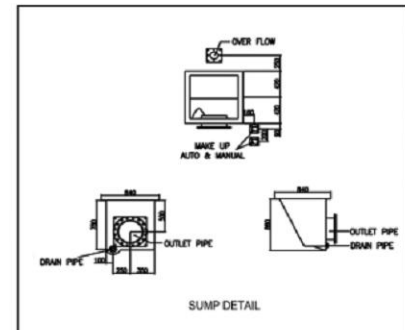
1110D 1112H
1110E 1112I
1110G 1114E
1110H 1114F
1112E 1114H
1112F 1114I
1112G



SIDE VIEW



FRONT VIEW

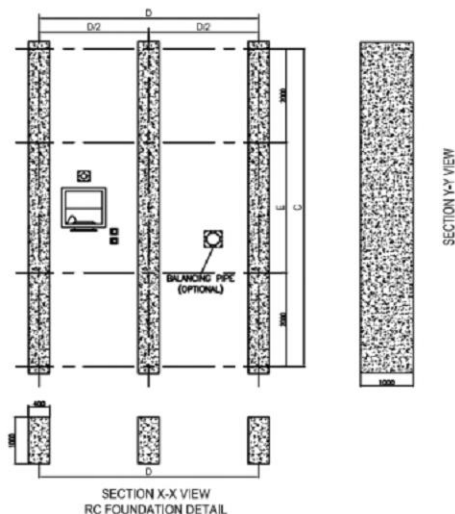
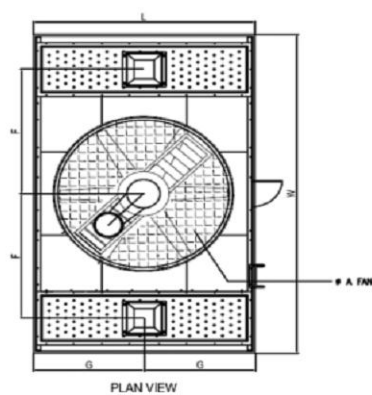


SUMP DETAIL

EX-S SERIES RANGE

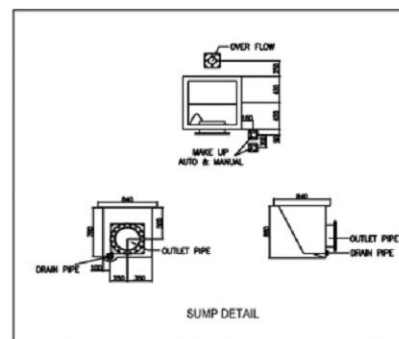
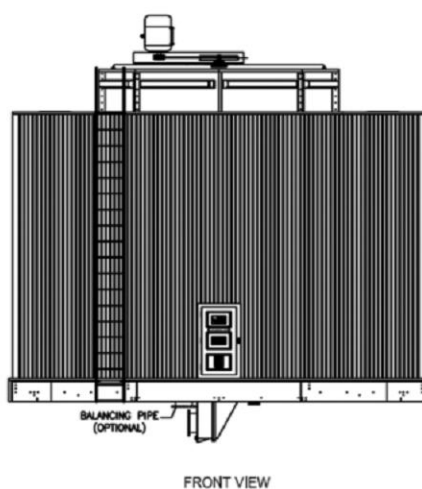
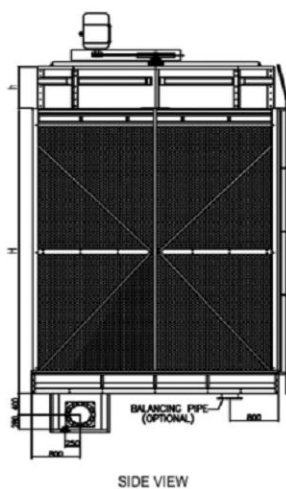
| Tower Model EXS | ANCHOR BOLTS DATA | | | | PIPING DATA | | PIPING SIZE | | | | | WEIGHT (KG) | |
|-----------------|-------------------|------|------|------|-------------|------|-------------|--------------|----------|-------|-----------------------|-------------|--------------|
| | B | C | D | E | F | G | Water Inlet | Water Outlet | Overflow | Drain | Make Up Auto & Manual | Dry Weight | Oper. Weight |
| 0912C | - | 5490 | 2920 | 1490 | 2025 | 1410 | 125 x 2 | 250 | 50 | 50 | 50 | 3430 | 8100 |
| 0912D | | | | | | | 150 x 2 | 250 | 80 | 50 | 50 | 3480 | 8150 |
| 0912E | | | | | | | 150 x 2 | 250 | 80 | 50 | 50 | 3530 | 8200 |
| 0912F | | | | | | | 150 x 2 | 250 | 80 | 50 | 50 | 3580 | 8250 |
| 1110D | - | 6410 | 3530 | 2410 | 2485 | 1715 | 150 x 2 | 250 | 80 | 50 | 50 | 4390 | 10940 |
| 1110E | | | | | | | 150 x 2 | 250 | 80 | 50 | 50 | 4460 | 11010 |
| 1110G | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4530 | 11080 |
| 1110H | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4600 | 11150 |
| 1112E | - | 6410 | 3530 | 2410 | 2485 | 1715 | 200 x 2 | 300 | 100 | 50 | 50 | 4700 | 11800 |
| 1112F | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4750 | 11850 |
| 1112G | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4800 | 11900 |
| 1112H | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4850 | 11950 |
| 1112I | - | 6410 | 3530 | 2410 | 2485 | 1715 | 200 x 2 | 300 | 100 | 50 | 50 | 4900 | 12000 |
| 1114E | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 5120 | 12420 |
| 1114F | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 5180 | 12480 |
| 1114H | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 5240 | 12540 |
| 1114I | - | 6770 | 3720 | 2770 | 2665 | 1810 | 200 x 2 | 300 | 100 | 50 | 50 | 5300 | 12600 |
| 1210D | | | | | | | 150 x 2 | 250 | 80 | 50 | 50 | 4300 | 12300 |
| 1210E | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4350 | 12350 |
| 1210G | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4400 | 12400 |
| 1210H | - | 6770 | 3720 | 2770 | 2665 | 1810 | 200 x 2 | 300 | 100 | 50 | 50 | 4450 | 12450 |
| 1210I | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4500 | 12500 |

Outline And Foundation Drawings (Single Cell)



SECTION Y-Y VIEW

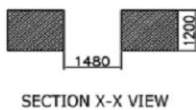
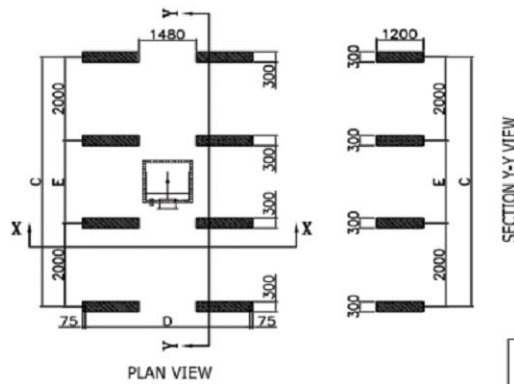
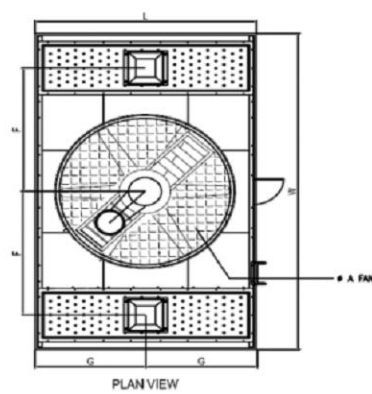
1210D 1314F
1210E 1314G
1210G 1314H
1210H 1314I
1210I 1314J
1212E 1314K
1212F 1316G
1212H 1316H
1212I 1316I
1212J 1316J
1312E 1316K
1312F
1312G
1312H
1312I
1312J



EX-S SERIES RANGE

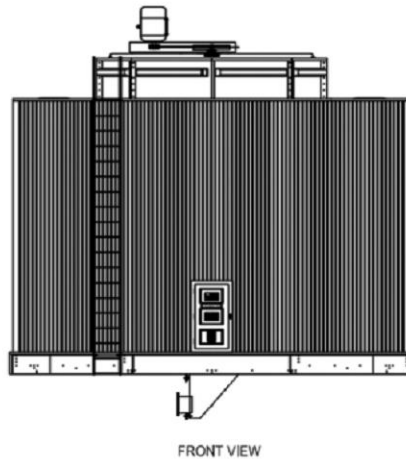
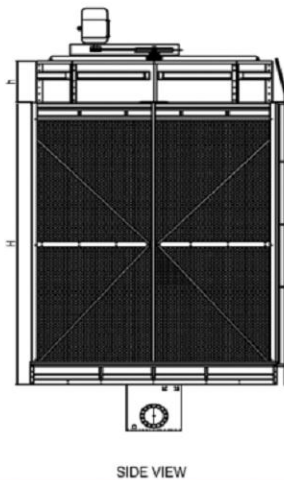
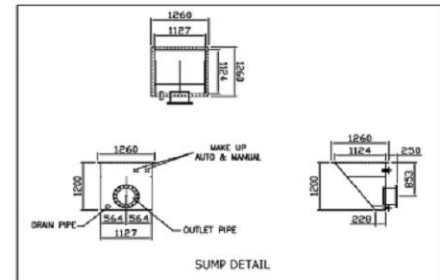
| Tower Model EXS | HRT @ 36.1/30.6/27.2°C or 97/87/81°F | OVERALL DIMENSION | | | | MOTOR | | | | AXIAL FLOW FAN | | | |
|--------------------|--|-------------------|------|------|-----|-----------------|------------------------|---|--------------------------------|----------------|-----------|---------------------|-------------------|
| | | L | W | H | h | Rated Output kW | Rated Current (A 50Hz) | Type | Power Source | A | Fan Speed | No of blades | Drive System |
| 1212E | 555 | 3620 | 6830 | 4230 | 750 | 15.0 | 26.7 | TEFC, outdoor, 3 phase, induction motor, 4 pole | 3ph/380V/50Hz or 3ph/415V/50Hz | 3350 | 330 | Four (4) to Six (6) | V Belt and Pulley |
| 1212F | 596 | | | | | 18.5 | 33.2 | | | | 330 | | |
| 1212H | 704 | | | | | 30.0 | 51.9 | | | | 330 | | |
| 1212I | 757 | | | | | 37.0 | 66.0 | | | | 330 | | |
| 1212J | 808 | | | | | 45.0 | 78.7 | | | | 330 | | |
| 1312E | 614 | 4070 | 6830 | 4230 | 750 | 15.0 | 26.7 | | | 3660 | 250 | | |
| 1312F | 655 | | | | | 18.5 | 33.2 | | | | 250 | | |
| 1312G | 695 | | | | | 22.0 | 39.3 | | | | 250 | | |
| 1312H | 772 | | | | | 30.0 | 51.9 | | | | 250 | | |
| 1312I | 829 | | | | | 37.0 | 66.0 | | | | 310 | | |
| 1312J | 886 | 4070 | 6830 | 4840 | 750 | 45.0 | 78.7 | | | | 310 | | |
| 1314F | 716 | | | | | 18.5 | 33.2 | | | 3660 | 250 | | |
| 1314G | 757 | | | | | 22.0 | 39.3 | | | | 250 | | |
| 1314H | 842 | | | | | 30.0 | 51.9 | | | | 250 | | |
| 1314I | 904 | | | | | 37.0 | 66.0 | | | | 310 | | |
| 1314J | 972 | 4070 | 6830 | 5450 | 750 | 45.0 | 78.7 | | | 3660 | 310 | | |
| 1314K | 1036 | | | | | 55.0 | 93.5 | | | | 310 | | |
| 1316G | 818 | | | | | 22.0 | 39.3 | | | | 250 | | |
| 1316H | 900 | | | | | 30.0 | 51.9 | | | | 250 | | |
| 1316I | 972 | | | | | 37.0 | 66.0 | | | | 310 | | |
| 1316J | 1035 | 4070 | 6830 | 5450 | 750 | 45.0 | 78.7 | | | | 310 | | |
| 1316K | 1109 | | | | | 55.0 | 93.5 | | | | 310 | | |

Outline And Foundation Drawings (Single Cell)



SECTION Y-Y VIEW

Alternative RC Foundation applies to all tower models.



EX-S SERIES RANGE

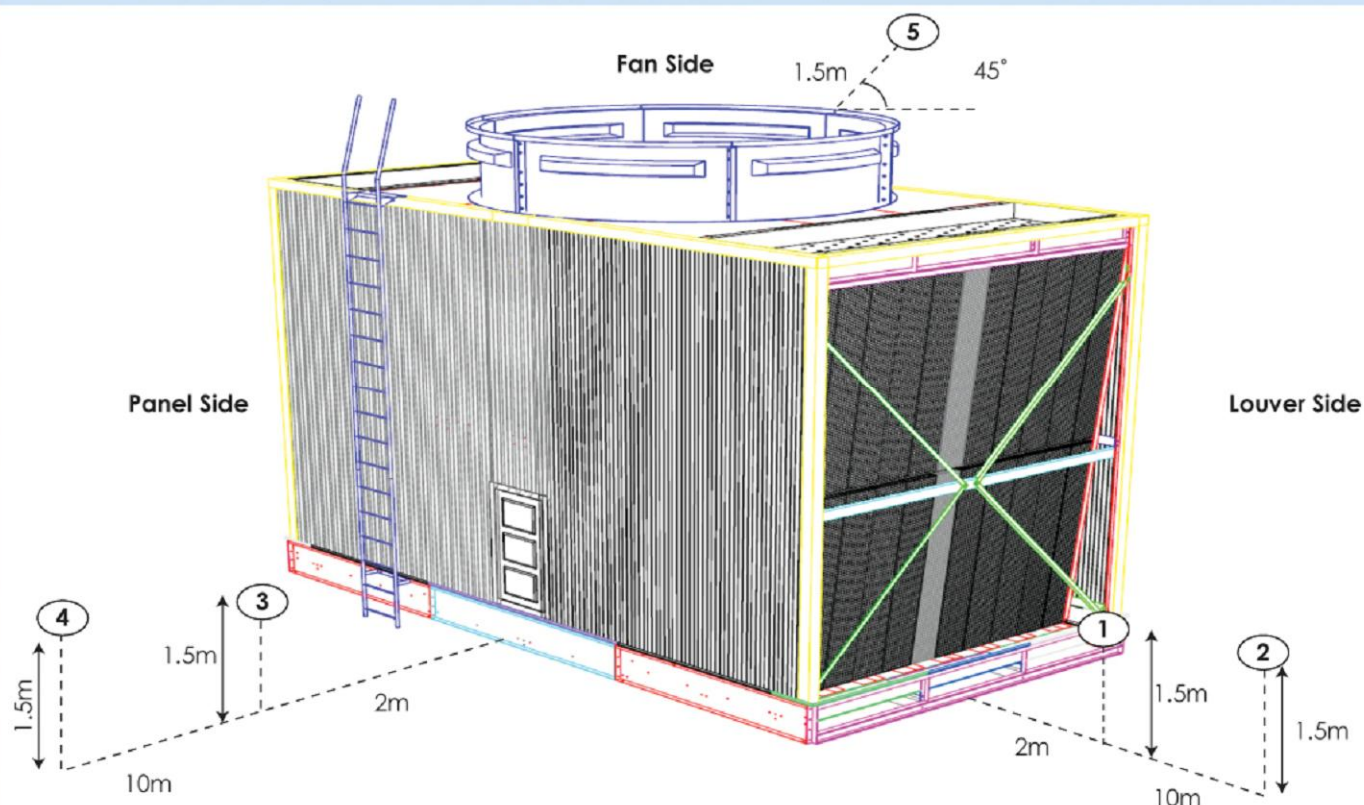
| Tower Model EXS | ANCHOR BOLTS DATA | | | | PIPING DATA | | PIPING SIZE | | | | | WEIGHT (KG) | |
|-----------------|-------------------|------|------|------|-------------|------|-------------|--------------|----------|-------|-----------------------|-------------|--------------|
| | B | C | D | E | F | G | Water Inlet | Water Outlet | Overflow | Drain | Make Up Auto & Manual | Dry Weight | Oper. Weight |
| 1212E | - | 6770 | 3720 | 2770 | 2665 | 1810 | 200 x 2 | 300 | 100 | 50 | 50 | 4450 | 12450 |
| 1212F | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4500 | 12500 |
| 1212H | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4550 | 12550 |
| 1212I | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4600 | 12600 |
| 1212J | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4650 | 12650 |
| 1312E | - | 6770 | 4170 | 2770 | 2665 | 2035 | 200 x 2 | 300 | 100 | 50 | 50 | 4500 | 12500 |
| 1312F | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4560 | 12560 |
| 1312G | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4620 | 12620 |
| 1312H | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4680 | 12680 |
| 1312I | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 4740 | 12740 |
| 1312J | - | 6770 | 4170 | 2770 | 2665 | 2035 | 200 x 2 | 300 | 100 | 50 | 50 | 4800 | 12800 |
| 1314F | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 5180 | 13180 |
| 1314G | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 5260 | 13260 |
| 1314H | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 5340 | 13340 |
| 1314I | | | | | | | 200 x 2 | 350 | 100 | 50 | 50 | 5420 | 13420 |
| 1314J | - | 6770 | 4170 | 2770 | 2665 | 2035 | 200 x 2 | 350 | 100 | 50 | 50 | 5500 | 13500 |
| 1314K | | | | | | | 200 x 2 | 350 | 100 | 50 | 50 | 5580 | 13580 |
| 1316G | | | | | | | 200 x 2 | 300 | 100 | 50 | 50 | 6035 | 14960 |
| 1316H | | | | | | | 200 x 2 | 350 | 100 | 50 | 50 | 6115 | 15040 |
| 1316I | | | | | | | 200 x 2 | 350 | 100 | 50 | 50 | 6195 | 15120 |
| 1316J | - | 6770 | 4170 | 2770 | 2665 | 2035 | 200 x 2 | 350 | 100 | 50 | 50 | 6275 | 15200 |
| 1316K | | | | | | | 200 x 2 | 350 | 100 | 50 | 50 | 6355 | 15280 |

EX-S Series Quick Selection Table

| EX-S Series Quick Selection Table | | | | | | | | | | | | | | |
|-----------------------------------|---------------|----------|-------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | Temp. | Water flow rate at indicated HWT, CWT & WBT (m ³ /hr) | | | | | | | | | | |
| | | | HWT | 95.0 | 98.6 | 95.0 | 97.0 | 98.0 | 98.6 | 97.0 | 100.0 | 98.6 | 100.0 | 98.6 |
| | | | CWT | 85.1 | 89.6 | 86.0 | 87.0 | 88.0 | 89.6 | 87.0 | 90.0 | 89.6 | 90.0 | 89.6 |
| | | | WBT | 80.6 | 80.6 | 81.0 | 81.0 | 82.0 | 81.5 | 82.0 | 82.0 | 82.4 | 83.0 | 84.2 |
| Tower Model EXS | Design HRT | Motor kW | HWT | 35.00 | 37.00 | 35.00 | 36.11 | 36.67 | 37.00 | 36.11 | 37.78 | 37.00 | 37.78 | 37.00 |
| | | | CWT | 29.50 | 32.00 | 30.00 | 30.56 | 31.11 | 32.00 | 30.56 | 32.22 | 32.00 | 32.22 | 32.00 |
| | | | WBT | 27.00 | 27.00 | 27.22 | 27.22 | 27.78 | 27.50 | 27.78 | 28.00 | 28.33 | 28.89 | 29.00 |
| | | | | | | | | | | | | | | |
| 0912C-350 | 317 | 7.5 | | 138.50 | 252.00 | 159.50 | 171.70 | 176.00 | 236.00 | 154.50 | 221.00 | 219.50 | 204.00 | 184.00 |
| 0912D-400 | 361 | 11.0 | | 157.72 | 286.98 | 181.64 | 195.53 | 200.43 | 268.76 | 175.94 | 251.68 | 249.97 | 232.32 | 209.54 |
| 0912E-450 | 403 | 15.0 | | 176.07 | 320.37 | 202.77 | 218.28 | 223.75 | 300.03 | 196.41 | 280.96 | 279.05 | 259.34 | 233.92 |
| 0912F-500 | 433 | 18.5 | | 189.18 | 344.21 | 217.87 | 234.53 | 240.40 | 322.36 | 211.04 | 301.87 | 299.82 | 278.65 | 251.33 |
| | | | | | | | | | | | | | | |
| 1110D-450 | 408 | 11.0 | | 178.26 | 324.34 | 205.29 | 220.99 | 226.52 | 303.75 | 198.85 | 284.44 | 282.51 | 262.56 | 239.39 |
| 1110E-500 | 454 | 15.0 | | 198.36 | 360.91 | 228.43 | 245.90 | 252.06 | 337.99 | 221.27 | 316.51 | 314.36 | 292.16 | 266.38 |
| 1110G-550 | 518 | 22.0 | | 226.32 | 411.79 | 260.63 | 280.57 | 287.60 | 385.64 | 252.46 | 361.13 | 358.68 | 333.35 | 303.94 |
| 1110H-600 | 575 | 30.0 | | 251.22 | 457.10 | 289.31 | 311.44 | 319.24 | 428.08 | 280.24 | 400.87 | 398.15 | 370.03 | 337.38 |
| | | | | | | | | | | | | | | |
| 1112E-550 | 501 | 15.0 | | 218.89 | 398.27 | 252.08 | 271.36 | 278.16 | 372.98 | 244.18 | 349.28 | 346.91 | 322.41 | 293.96 |
| 1112F-600 | 540 | 18.5 | | 235.93 | 429.27 | 271.70 | 292.49 | 299.81 | 402.02 | 263.19 | 376.47 | 373.91 | 347.51 | 316.85 |
| 1112G-650 | 572 | 22.0 | | 249.91 | 454.71 | 287.80 | 309.82 | 317.58 | 425.84 | 278.78 | 398.78 | 396.07 | 368.10 | 335.62 |
| 1112H-700 | 635 | 30.0 | | 277.44 | 504.79 | 319.50 | 343.94 | 352.56 | 472.74 | 309.49 | 442.70 | 439.69 | 408.64 | 372.59 |
| 1112I-750 | 682 | 37.0 | | 297.97 | 542.16 | 343.15 | 369.40 | 378.65 | 507.74 | 332.39 | 475.46 | 472.24 | 438.89 | 400.16 |
| | | | | | | | | | | | | | | |
| 1114E-600 | 543 | 15.0 | | 237.24 | 431.66 | 273.21 | 294.11 | 301.48 | 404.25 | 264.65 | 378.56 | 375.99 | 349.44 | 318.61 |
| 1114F-650 | 584 | 18.5 | | 255.15 | 464.25 | 293.84 | 316.32 | 324.24 | 434.78 | 284.63 | 407.14 | 404.38 | 375.82 | 342.66 |
| 1114H-750 | 700 | 30.0 | | 305.84 | 556.47 | 352.21 | 379.15 | 388.64 | 521.14 | 341.17 | 488.01 | 484.70 | 450.47 | 410.73 |
| 1114I-800 | 750 | 37.0 | | 327.68 | 596.21 | 377.37 | 406.23 | 416.40 | 558.36 | 365.54 | 522.87 | 519.32 | 482.65 | 440.06 |
| | | | | | | | | | | | | | | |
| 1210D-500 | 437 | 11.0 | | 190.93 | 347.39 | 219.88 | 236.70 | 242.62 | 325.34 | 212.99 | 304.66 | 302.59 | 281.22 | 256.41 |
| 1210E-550 | 486 | 15.0 | | 212.34 | 386.35 | 244.53 | 263.24 | 269.83 | 361.82 | 236.87 | 338.82 | 336.52 | 312.76 | 285.16 |
| 1210G-600 | 554 | 22.0 | | 242.05 | 440.40 | 278.75 | 300.07 | 307.58 | 412.44 | 270.01 | 386.23 | 383.61 | 356.52 | 325.06 |
| 1210H-650 | 615 | 30.0 | | 268.70 | 488.90 | 309.44 | 333.11 | 341.45 | 457.85 | 299.74 | 428.75 | 425.84 | 395.77 | 360.85 |
| 1210I-700 | 660 | 37.0 | | 288.36 | 524.67 | 332.08 | 357.48 | 366.44 | 491.36 | 321.67 | 460.13 | 457.00 | 424.73 | 387.26 |
| | | | | | | | | | | | | | | |
| 1212E-600 | 543 | 15.0 | | 237.24 | 431.66 | 273.21 | 294.11 | 301.48 | 404.25 | 264.65 | 378.56 | 375.99 | 349.44 | 318.61 |
| 1212F-650 | 583 | 18.5 | | 254.72 | 463.46 | 293.34 | 315.78 | 323.68 | 434.03 | 284.14 | 406.44 | 403.69 | 375.18 | 342.08 |
| 1212H-750 | 688 | 30.0 | | 300.59 | 546.93 | 346.17 | 372.65 | 381.98 | 512.20 | 335.32 | 479.65 | 476.39 | 442.75 | 403.68 |
| 1212I-800 | 740 | 37.0 | | 323.31 | 588.26 | 372.33 | 400.81 | 410.85 | 550.91 | 360.66 | 515.90 | 512.40 | 476.21 | 434.20 |
| 1212J-850 | 790 | 45.0 | | 345.16 | 628.01 | 397.49 | 427.90 | 438.61 | 588.14 | 385.03 | 550.76 | 547.02 | 508.39 | 463.53 |
| | | | | | | | | | | | | | | |
| 1312E-650 | 600 | 15.0 | | 262.15 | 476.97 | 301.89 | 324.98 | 333.12 | 446.69 | 292.43 | 418.30 | 415.46 | 386.12 | 352.05 |
| 1312F-700 | 640 | 18.5 | | 279.62 | 508.77 | 322.02 | 346.65 | 355.33 | 476.47 | 311.92 | 446.18 | 443.15 | 411.86 | 375.52 |
| 1312G-750 | 680 | 22.0 | | 297.10 | 540.57 | 342.15 | 368.32 | 377.54 | 506.25 | 331.42 | 474.07 | 470.85 | 437.60 | 398.99 |
| 1312H-800 | 755 | 30.0 | | 329.87 | 600.19 | 379.88 | 408.94 | 419.18 | 562.08 | 367.97 | 526.36 | 522.78 | 485.87 | 443.00 |
| 1312I-850 | 811 | 37.0 | | 354.33 | 644.71 | 408.06 | 439.27 | 450.27 | 603.77 | 395.27 | 565.40 | 561.56 | 521.91 | 475.85 |
| 1312J-900 | 866 | 45.0 | | 378.36 | 688.43 | 435.73 | 469.06 | 480.81 | 644.72 | 422.07 | 603.74 | 599.64 | 557.30 | 508.13 |
| | | | | | | | | | | | | | | |
| 1314F-750 | 700 | 18.5 | | 305.84 | 556.47 | 352.21 | 379.15 | 388.64 | 521.14 | 341.17 | 488.01 | 484.70 | 450.47 | 410.73 |
| 1314G-800 | 740 | 22.0 | | 323.31 | 588.26 | 372.33 | 400.81 | 410.85 | 550.91 | 360.66 | 515.90 | 512.40 | 476.21 | 434.20 |
| 1314H-850 | 823 | 30.0 | | 359.58 | 654.25 | 414.10 | 445.77 | 456.93 | 612.71 | 401.12 | 573.76 | 569.87 | 529.63 | 482.90 |
| 1314I-950 | 884 | 37.0 | | 386.23 | 702.74 | 444.79 | 478.81 | 490.80 | 658.12 | 430.85 | 616.29 | 612.11 | 568.88 | 518.69 |
| 1314J-1000 | 950 | 45.0 | | 415.06 | 755.21 | 478.00 | 514.56 | 527.44 | 707.26 | 463.01 | 662.30 | 657.81 | 611.36 | 557.41 |
| 1314K-1100 | 1013 | 55.0 | | 442.59 | 805.29 | 509.70 | 548.68 | 562.42 | 754.16 | 493.72 | 706.22 | 701.43 | 651.90 | 594.38 |
| | | | | | | | | | | | | | | |
| 1316G-900 | 800 | 22.0 | | 349.53 | 635.96 | 402.52 | 433.31 | 444.16 | 595.58 | 389.91 | 557.73 | 553.94 | 514.83 | 469.40 |
| 1316H-950 | 880 | 30.0 | | 384.48 | 699.56 | 442.78 | 476.64 | 488.58 | 655.14 | 428.90 | 613.50 | 609.34 | 566.31 | 516.34 |
| 1316I-1000 | 950 | 37.0 | | 415.06 | 755.21 | 478.00 | 514.56 | 527.44 | 707.26 | 463.01 | 662.30 | 657.81 | 611.36 | 557.41 |
| 1316J-1100 | 1012 | 45.0 | | 442.15 | 804.49 | 509.19 | 548.14 | 561.87 | 753.41 | 493.23 | 705.53 | 700.74 | 651.26 | 593.79 |
| 1316K-1250 | 1084 | 55.0 | | 473.61 | 861.73 | 545.42 | 587.14 | 601.84 | 807.02 | 528.32 | 755.72 | 750.59 | 697.59 | 636.04 |

SOUND LEVEL CHART (SINGLE CELL)

The measuring point at 45 degrees is diagonally above the top edge of the fan stack, opposite of motor driver side. If fan diameter is less than 1.5m, the measuring distance should be limited to 1.5m standard.



SOUND LEVEL dBA(A) - SINGLE CELL

| Tower Model EXS | Louver | | Panel | | Fan |
|-----------------|--------|------|-------|------|--------------|
| | 2m | 10m | 2m | 10m | 45 deg @1.5M |
| Point | 1 | 2 | 3 | 4 | 5 |
| 0912C | 70.5 | 61.0 | 67.5 | 58.0 | 75.0 |
| 0912D | 72.0 | 62.5 | 69.0 | 59.5 | 76.5 |
| 0912E | 74.0 | 64.5 | 71.0 | 61.5 | 78.0 |
| 0912F | 76.0 | 67.5 | 74.0 | 64.5 | 80.5 |
| 1110D | 73.5 | 64.0 | 71.0 | 61.5 | 78.0 |
| 1110E | 75.0 | 65.5 | 73.0 | 63.5 | 78.0 |
| 1110G | 77.0 | 67.5 | 74.5 | 65.0 | 81.0 |
| 1110H | 80.0 | 71.0 | 77.5 | 68.0 | 82.5 |
| 1112E | 75.0 | 65.5 | 73.0 | 63.5 | 78.0 |
| 1112F | 76.0 | 66.5 | 73.0 | 63.5 | 81.0 |
| 1112G | 77.0 | 67.5 | 74.5 | 65.0 | 81.0 |
| 1112H | 80.0 | 71.0 | 77.5 | 68.0 | 82.5 |
| 1112I | 82.0 | 72.5 | 79.0 | 69.5 | 83.5 |
| 1114E | 74.5 | 65.0 | 71.0 | 61.5 | 78.0 |
| 1114F | 76.0 | 66.5 | 73.0 | 63.5 | 81.0 |
| 1114H | 80.0 | 71.0 | 77.5 | 68.0 | 82.5 |
| 1114I | 82.0 | 72.5 | 79.0 | 69.5 | 83.5 |
| 1210D | 72.0 | 62.5 | 69.0 | 59.5 | 75.0 |
| 1210E | 74.0 | 64.5 | 71.0 | 61.5 | 78.0 |
| 1210G | 76.5 | 67.0 | 73.5 | 64.0 | 81.0 |
| 1210H | 80.0 | 71.0 | 77.5 | 68.0 | 82.5 |
| 1210I | 82.0 | 72.5 | 79.0 | 69.5 | 83.5 |

SOUND LEVEL dBA(A) - SINGLE CELL

| Tower Model EXS | Louver | | Panel | | Fan |
|-----------------|--------|------|-------|------|--------------|
| | 2m | 10m | 2m | 10m | 45 deg @1.5M |
| Point | 1 | 2 | 3 | 4 | 5 |
| 1212E | 75.0 | 65.5 | 73.0 | 63.5 | 78.0 |
| 1212F | 76.0 | 66.5 | 73.0 | 63.5 | 81.0 |
| 1212H | 80.0 | 70.5 | 77.5 | 68.0 | 82.5 |
| 1212I | 82.0 | 72.5 | 79.0 | 69.5 | 83.5 |
| 1212J | 83.5 | 74.0 | 80.5 | 71.0 | 84.5 |
| 1312E | 73.0 | 63.5 | 70.0 | 60.5 | 78.0 |
| 1312F | 76.0 | 66.5 | 73.0 | 63.5 | 81.0 |
| 1312G | 76.5 | 67.0 | 73.5 | 64.0 | 81.0 |
| 1312H | 80.0 | 70.5 | 77.5 | 68.0 | 82.5 |
| 1312I | 82.0 | 72.5 | 79.0 | 69.5 | 83.5 |
| 1312J | 83.5 | 74.0 | 80.5 | 71.0 | 84.5 |
| 1314F | 76.0 | 66.5 | 73.0 | 63.0 | 78.0 |
| 1314G | 77.0 | 67.5 | 74.5 | 64.0 | 79.0 |
| 1314H | 78.0 | 68.5 | 75.5 | 66.0 | 80.0 |
| 1314I | 80.0 | 70.5 | 77.5 | 68.0 | 82.0 |
| 1314J | 82.0 | 72.5 | 79.0 | 69.5 | 83.0 |
| 1314K | 84.0 | 74.5 | 80.5 | 71.0 | 85.0 |
| 1316G | 77.0 | 67.5 | 74.5 | 64.0 | 79.0 |
| 1316H | 78.0 | 68.5 | 75.5 | 66.0 | 80.0 |
| 1316I | 80.0 | 70.5 | 77.5 | 68.0 | 82.0 |
| 1316J | 82.0 | 72.5 | 79.0 | 69.5 | 83.0 |
| 1316K | 84.0 | 74.5 | 80.5 | 71.0 | 85.0 |

RECOMMENDED UNIT LAYOUT

It is advisable to select and design the best layout or location to avoid air recirculation. Recirculation occurs when some of the hot moist discharge air leaving the cooling tower flows back into the fresh air inlet. The following guidelines will provide the best location or layout which will minimize recirculation, maximize fresh air flow and allow adequate maintenance accessibility.

A. SINGLE UNIT INSTALLATIONS

The best place for EX-S Series Cooling Tower is in an open space. However, when this is not possible, correct layout guidelines must be followed to provide satisfactory installation.

Ensure that the top of the cooling tower is higher than any adjacent walls, buildings or other structures.

Figure 1(a) and 1(b) are examples of incorrect installation. These conditions can be corrected by elevating the unit on structural steel/concrete plinths so that the top is higher than the wall as shown in Figure 1(c).

INCORRECT : Wind effect with top of unit lower than top of wall

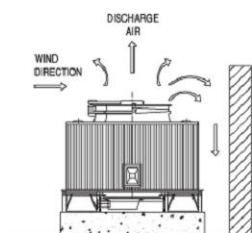


FIGURE 1(a)

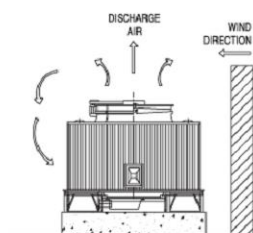


FIGURE 1(b)

CORRECT : Installation elevated so that top of unit is higher than top of wall

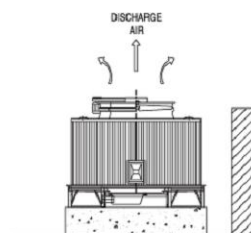


FIGURE 1(c)

When a cooling tower is located near a wall, consideration must be given to the clearance distance between the air inlets of the tower and the wall structure(s). See Figure 2, Recommended Dimensions D1 and D2.

The minimum dimensions, D1 and D2, as shown in Table 1 must be maintained to ensure that the unit is provided adequate air flow. In some installation, consideration must also be given to access to the unit for maintenance. Room must be provided for piping, removals of access panels, etc.

Sometimes other pieces of equipment such as pumps, filters, piping etc are placed in front of the air inlets. These obstructions should not be located any closer than the minimum dimensions in Table 1.

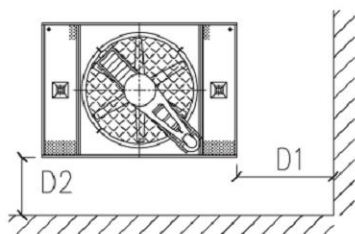


FIGURE 2 : Installation next to a wall.

TABLE 1 SINGLE UNIT INSTALLATION

| Tower Model EXS | Minimum Dimension, mm D1 (At Louver Side) | Minimum Dimension, mm D2 (At Panel Side) |
|---------------------------------|---|--|
| 0912 | 2000 | 1000 |
| 1110, 1112, 1114, 1210, 1212 | 3000 | 1000 |
| 1312, 1314, 1316 | 4000 | 1000 |

TABLE 2 MULTIPLE UNIT INSTALLATION

| Tower Model EXS | End Wall Length, L mm | Minimum Dimension, mm D3 (End-to-End) |
|---------------------------------|--------------------------|--|
| All models | All sizes | 1000 |
| Tower Model EXS | Louver Width, W mm | Minimum Dimension, mm D4 (Side-by-Side) |
| 0912 | Below 6000 | 3500 |
| 1110, 1112, 1114, 1210, 1212 | Below 8000 | 4500 |
| 1312, 1314, 1316 | Below 10000 | 5000 |

B. MULTIPLE UNIT INSTALLATIONS

When more than one cooling tower is installed at the same location, recirculation becomes a bigger problem.

With the installations of two cooling towers, they should be placed end to end with the narrow ends adjacent as shown in Figure 3. Another method is to locate the units side-by-side with the longer sides parallel to each other as shown in Figure 4. In either configuration, the distance between the units must provide adequate airflow as well as room for piping to the unit and access for maintenance. The minimum dimensions are as listed in Table 2.

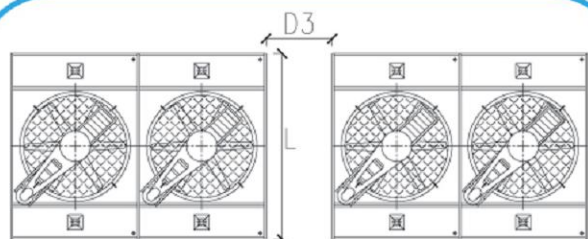


FIGURE 3: MULTIPLE UNITS PLACED END TO END

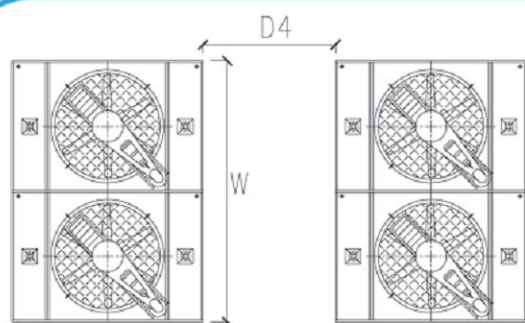


FIGURE 4: MULTIPLE UNITS PLACED SIDE-BY-SIDE

C. SPECIAL ENCLOSURE INSTALLATION

1) Solid Wall Enclosures or Wells

Figure 5 shown a cooling tower is installed in a well. When considering a multiple-cell unit located in a well, the D5 and D6 dimensions, found in Table 3, must be used as absolute minimums.

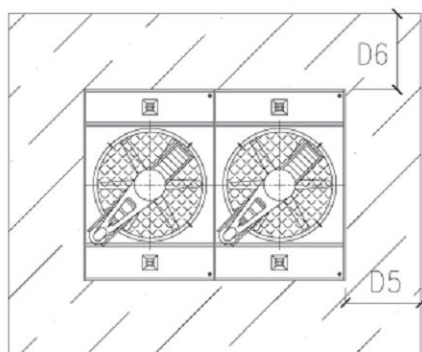


FIGURE 5 WELL INSTALLATION

The unit should be oriented so that the air flow uniformly to the air inlets on all louver sides of the unit. The air discharge of the unit must be level with or higher than surrounding walls.

TABLE 3

| Tower Model EXS | End Wall Length, L mm | Minimum Dimension, mm D5 (End Wall Panel Side) |
|---------------------------------|--------------------------|---|
| All models | All sizes | 1000 |
| Tower Model EXS | Louver Width, W mm | Minimum Dimension, mm D6 (Louder Side to Solid wall) |
| 0912 | Below 6000 | 3500 |
| 1110, 1112, 1114, 1210, 1212 | Below 8000 | 4500 |
| 1312, 1314, 1316 | Below 10000 | 5000 |

2) Louvered Wall Enclosures

EX-S Series Cooling Tower can also be installed in enclosures with louvered or slotted walls and an open top (Figure 6) with this type of enclosure, the air flow patterns will be a mixture of the open type and well installation. The inlet air will be drawn from the top as well as through the louvers or slots

When considering a multiple-cell unit located in a louvered wall enclosures, the D7 and D8 dimensions, found in Table 4, must be used as absolute minimums.

LOUVER WALL

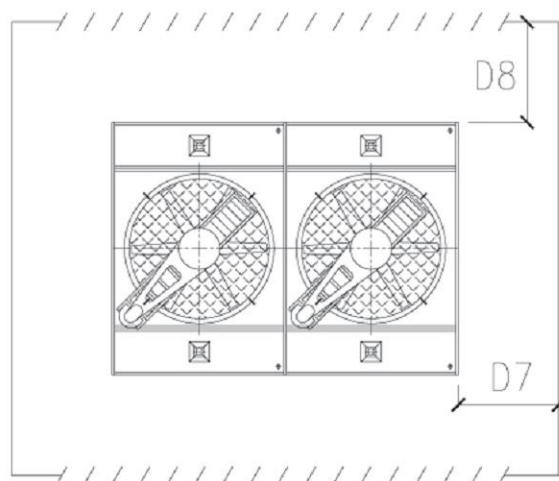


FIGURE 6 : LOUVERED WALL ENCLOSURE

TABLE 4

| Tower Model EXS | End Wall Length, L mm | Minimum Dimension, mm D7 (End Wall Panel Side) |
|--------------------|--------------------------|--|
| All models | All sizes | 1000 |
| Tower Model EXS | Louver Width, W mm | Minimum Dimension, mm D8 (Louder Side to Louvered wall) |
| All models | All sizes | 2500 |

EX-S SERIES CROSSFLOW COOLING TOWER SPECIFICATION

1.0 GENERAL

The cooling tower shall be induced-draft vertical discharge type, crossflow, rectangular, film filled, FRP Cooling Tower. It shall be designed with high efficiency drift eliminators to meet current environmental standards and guidelines for microbial control.

2.0 CAPACITY

Cooling Tower shall be capable of providing the thermal performance scheduled.

3.0 PERFORMANCE WARRANTY

The rated capacity shall be certified by the Cooling Tower Institute (CTI). The cooling tower manufacturer shall guarantee that the tower supplied will meet the specified performance conditions when the tower is installed according to plans.

4.0 CONSTRUCTION

The cooling tower main frame structure shall be hot dip galvanized steel (HDG). The casing shall be made from polyvinyl chloride (PVC).

5.0 MECHANICAL EQUIPMENT

5.1 Fan(s) shall be propeller-type, incorporating heavy-duty blades of aluminum alloy. Blades shall be individually adjustable.

5.2 The V-belts shall be of rubber with fabric impregnated able to withstand the adverse ambient conditions of 50°C and 100% R.H. The pulleys shall be cast iron with the grooves of standard dimensions. The entire V-belt & pulley set must be fully enclosed in a FRP molded case to protect the v-belts from in contact with the humid discharge air.

5.3 Motor(s) shall be TEFC, weatherproof sq. caged induction type suitable for 3ph /50Hz/415V power supply and with 1450 rpm.

6.0 FILLS, LOUVERS AND DRIFT ELIMINATORS

6.1 Fill shall be high efficiency film-type, rigid, corrugated PVC sheets with integral louver and drift eliminator that are conducive to cooling water and UV protected.



Inlet Louver



Belt & Pulley Drive System



Gear Reducer Drive System



Make Up Water Line

6.2 Fills shall be resistance to rot, decay and biological attack with maximum flame-spread rating of 5 according to ASTM E84. Fill module shall be solvent bonded supported from the bottom supporting beam. Hanging fill with structural tubing supported from the upper tower structure shall not be allowed.

6.3 Drift eliminators shall be efficient enough to effectively limit drift loss to 0.005% of the designed flow rate.

7.0 HOT WATER DISTRIBUTION SYSTEM

An open basin above the fill bank shall receive hot water piped to each cell of the tower. Water shall enter the basin through a removable splash box. Removable and replaceable polypropylene nozzles installed in the floor of the basin shall provide full coverage of the fill by gravity flow.

8.0 COLD WATER BASIN

The cold water basin shall be of FRP and supported on HDG steel framework. The basin shall be designed with sufficient water capacity to avoid air entrainment in the outlet during operating conditions. The basin shall be equipped with suction strainer, make-up ball valve, overflow and drain. For multiple tower arrangement, equalizing pipes between basins shall be provided to maintain the same level of water in each basin.

9.0 ACCESS AND SAFETY

Ladder shall be provided for inspection & maintenance purposes. HDG steel fan guard shall be provided over each fan cylinder.



Truwater Cooling Towers Sdn Bhd (188113-A)

Executive Suite 702, Block B, Kelana Business Centre, No. 97, Jalan SS7/2, Kelana Jaya, 47301 Petaling Jaya, Selangor, Malaysia.

Tel. : +603 7880 8800 Fax : +603 7804 5519

E-mail : Tw.Cooling@truwater.com.my Website : www.truwater.com.my

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