AzarNasim

H.V.A.C SYSTEMS

Design & Manufacturing of HAVC Systems

GENERAL CATALOGUE 2014-2015

IN THE NAME OF GOD

AzarNasim

H.V.A.C SYSTEMS

Design & Manufacturing of HAVC Systems

GENERAL CATALOGUE 2014-2015


www.azarnasim.com

CONTENT


AzarNasim
H.V.A.C SYSTEMS

HISTORY

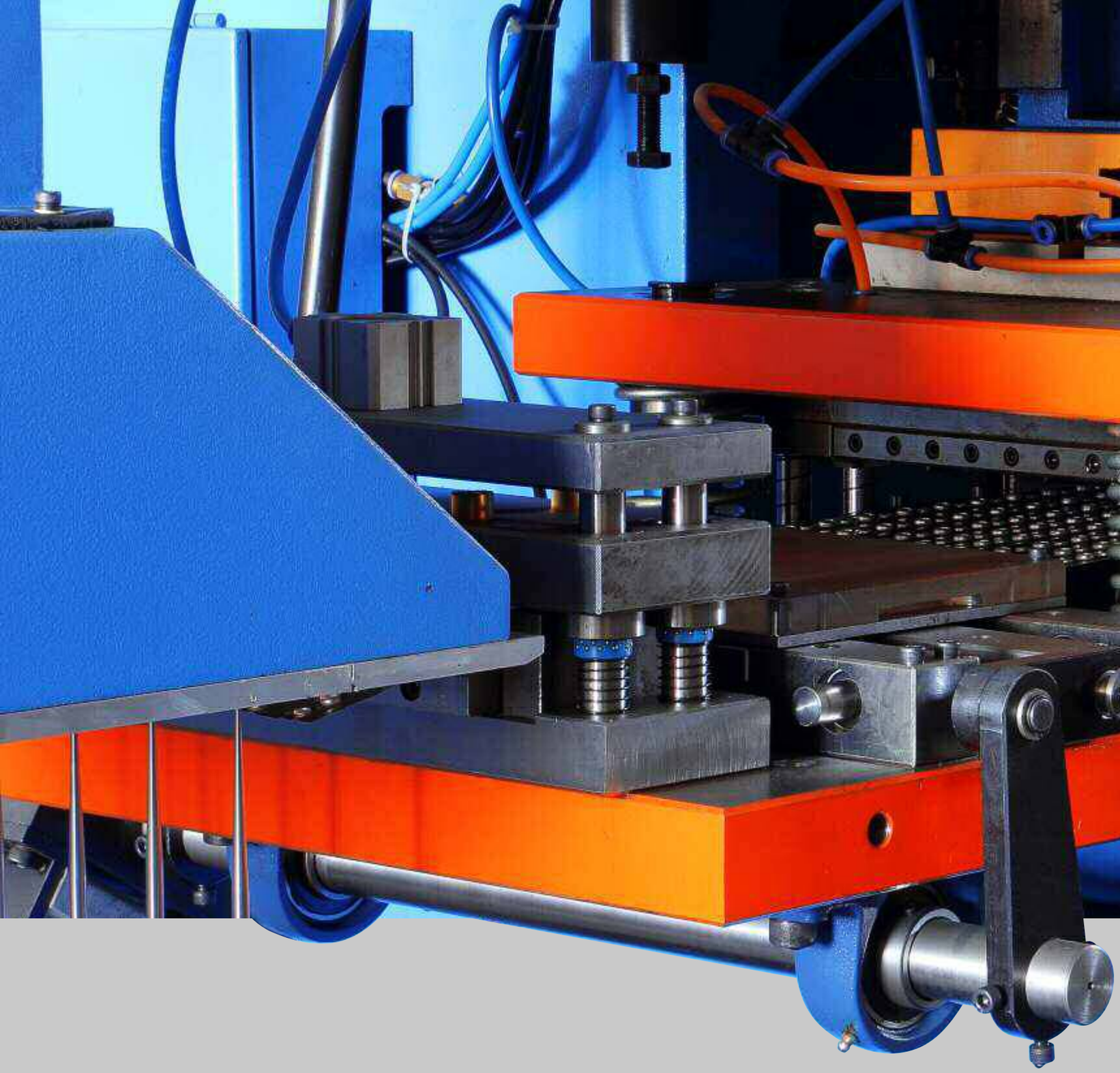
AzarNasim Ventilation company has begun its activity in 1380 (2001) in air conditioning systems industry. This company entered in air conditioning systems industry in such a condition which had no support and only by perseverance and interest for improvement and service to society could have considerable improvement in production of air conditioning systems.

AzarNasim air conditioning company with expert personnel's was built in Mamoonieh industrial city and currently is in range of most complete and biggest producers of air conditioning systems.

AzarNasim productions are such as: compressed chiller (water and air), absorption chillers (single effect, double effects and direct flame), package units (water and air), air handling unit(industrial, air washer and hygienic), zents (industrial and indoor),condensers (air and water), fan coils (decorative, ceiling and ducted), unit heaters (industrial,: warm water and steam/heating room and vertical), warm air furnace and boiler.

This company by optimization and production of air conditioning systems and unique after sale services ,in bid governmental and private industries could satisfy its customers.

AzarNasim air conditioning with its perseverance and attempt and new ideas in air conditioning production industry for decreasing costs and energy consumption is pioneer in air conditioning production industry.



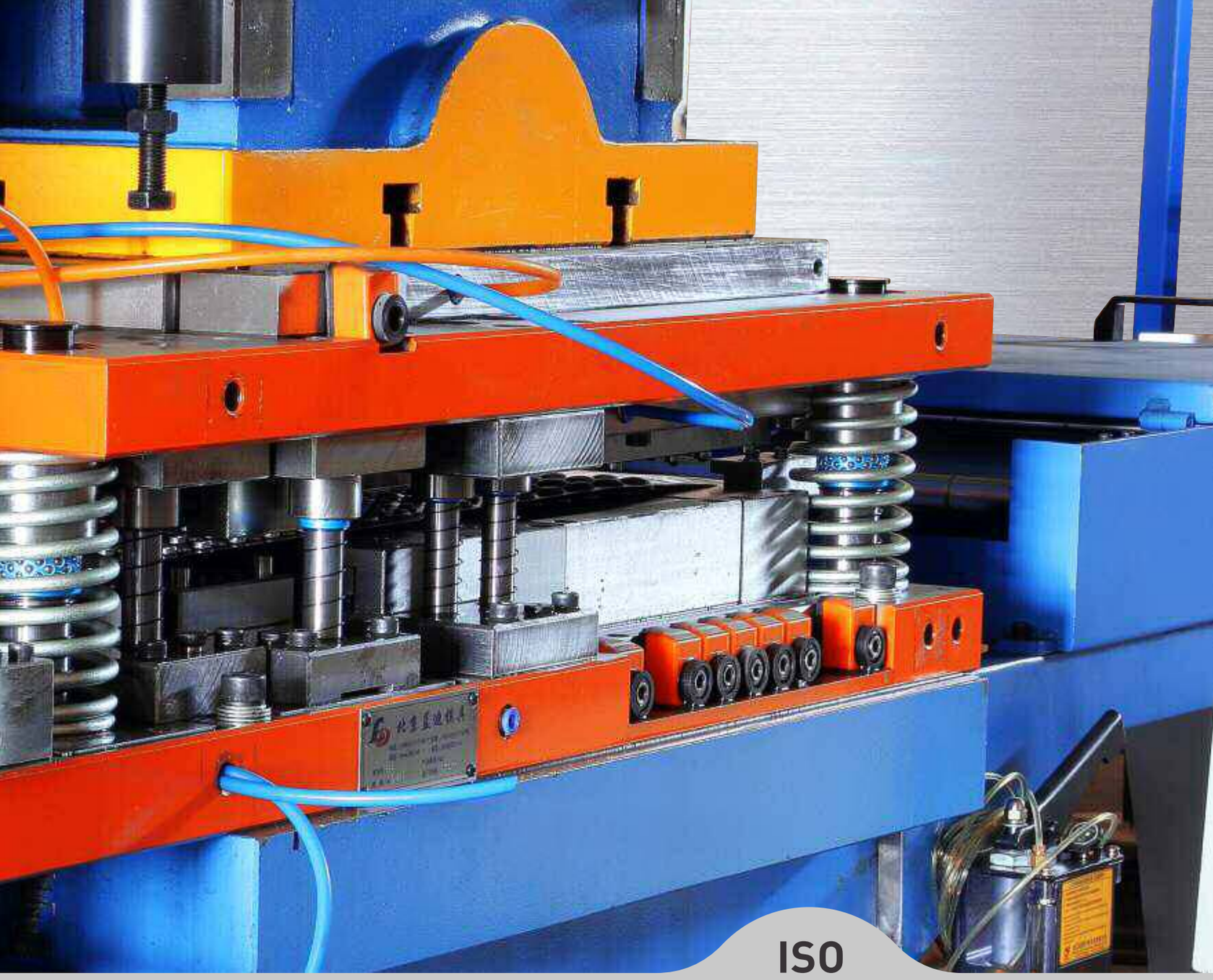
تندیس دیموند طلایی

ISO 9001: 2008

گواهینامه استاندارد کیفیت

رضایتمندی مشتری- سال ۹۰

رضایتمندی مشتری- سال ۹۱



ISO

AzarNasim air conditioning company succeeded to establish quality management system in 1391 (2012) based on standard requirement's of ISO 9001:2008. This system by control and of different units of organization, design and production of all products of organization with unique quality and according to last technical standards of product, guarantees the product.

AzarNasim air conditioning company, by developing quality control unit and adopting expert human power, quality inspection of its products are in four steps including: inlet items inspection, during production inspection, final inspection and warehouse inspection are performed and has a definite program for products of non-conformity with standard requirements.
All inspections of quality control are done with control plan and for all non-conformities observed, action plan of modification is made and performed.
This company is hoping next steps around standardization more of products with medal of European CE will be taken.

WITH COMPLIMENT

ABSORPTION CHILLERSA

AzarNasim
HVAC SYSTEMS

*Advantages of Absorption chillers

The cooling process by a chiller in modern air conditioning systems marking comfort conditions with clean & fresh air for people who live in crowded & polluted cities & also for most of industrial applications plays very Important role. In this regards the LiBr + H2O absorption chillers with coefficient of performance (COP) greater than 0.7 because of following characteristics & many other reasons are more advisable than compression Chillers.

Absorption Chillers in Comparison With Compression Chillers	A - Ozone Friendly B - Non Toxic C - Non Explosive D - Stable Cycle Working Fluid E - Minimal Electrical Power Consumption F - Minimal Total Energy Consumption G - Ability to Function with Wasted Enargy H - Low Noise & Vibration I - Extremely Longer Operating Time J - Wide Product Range & Model Selection for Cooling Capacity K - Lower Initial Price & Operating Costs Especially from Mediun to Super Models L - Simpler Installation, Operation & Maintenance, etc ....

Absorption cooling cycle technology recognized as the First refrigeration cycle has been applied widely to space Conditioning & process cooling since 1886 i.e. for more Than 120 years ago. Absorption chillers are thermally flexible activated systems utilizing steam , hot & warm water , solar energy , clean liquid & gaseous fuels or Exhausted gases to power the absorption cycle.

AZAR NASIM
ABSORPTION CHILLER

* WHY AZAR NASIM HVAC IND.?

The Azar Nasim HVAC Ind. Offers the widest absorption chiller size & model selection available in the HVAC industry . Eighty range sizes from 30~1750 US refrigerantion (USR) tons in single effect and double effect absorption chillers:

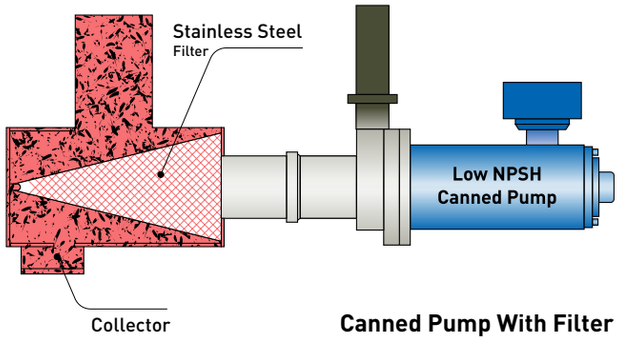
A - Twenty range sizes in single effect hot water or steam from 100~1750 USR tons,
B - Twenty range sizes in single effect warm water from 30~500 USR tons,
C - Twenty range sizes in double effect gas direct-fired from 75~1500 USR tons,
D - Twenty range sizes in double effect hot water or Steam from 75~1500 USR tons.

Base of designing for the above mentioned absorption Chillers in Azar Nasim factory is performed by computer software which has been developed by Azar Nasim since 1995.
Azar Nasim , from its conception has been seriously devoted to increasing its research & development capability with regards to the mentioned product range , sizes & features of its absorption chillers The current product line is the results of its relentless efforts in research & development.
Azar Nasim has utilized innovative measures in its production line as follows:

1 - Upward holes spraying twin copper tubes technoloy, inside the absorber , evaporator & generators , stops the perpetual concern with respect to the cooling capacity decrease generated through clogging.
2 - Automatic de crystallization technology even in sudden shout down circumstances due to electrical failure.
3 - Automatic purge hook type system.
4 - Special anticorrosion coating on inner surfaces.
5 - PLC based control panel.

Azar Nasim Double Effect Direct-Fired Absorption Chiller

1 - Design by computer software
2 - Single shell design for single effect cycles & double Shell design for double effect cycles.
3 - Solution & refrigerant low NPSH canned motor pumps with filters.



Canned Pump With Filter

4 - Complate turnkey package including factory assembled & wired. For transportation, the control Panel may be shipped separately & installed at site. In case of larger sizes , the unit can be broken in to Smaler pieces & shipped in multiple units of Two or three Pieces for shipment.
5 - Upward holes equipted spraying twin copper tubes Technology. Inside the absorber, vaporator, and generators , stops the perpetual concern with respect to the cooling capacity decrease generated thrugh cogging.
6 - Automatic de crystallization technology even insudden shouts down circumstances due to electrical failure.

6 - Special most recent enhancing techiques applied to all Components.

The above mentioned items are very important patents that are the crucial opening key to the world`s LIBr+H_2O absorption chiller industry which had been under the shadow up to recent years.

General Design Features

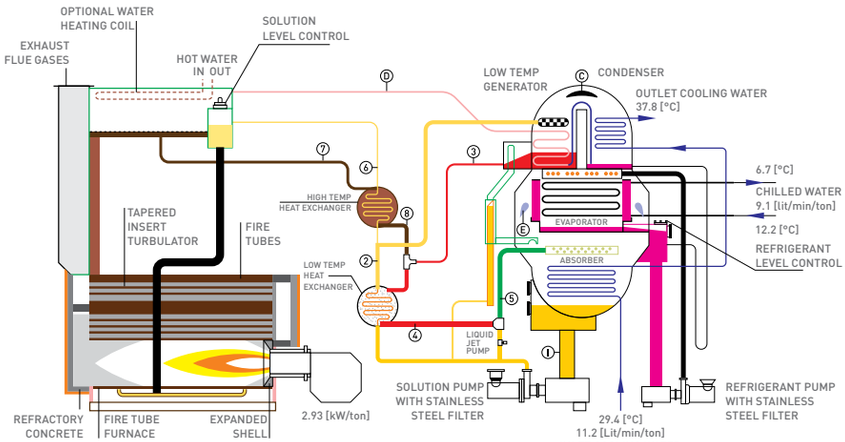
The design , construction operational manulas for Absorption chillers covering all various different Units in operation require many pages of manulas to describe the situation at hand which is well out of the Scope of this brochure. Therefore , this brochure is intended to provide the required engineering data & information for understanding what makes the Azar Nasim absorption chillers product range including the following general design features:

7) Automatic purging hook type system which Continuously & automatically removes non condensable gases from the shell side & stores them in a tank. The purging system vacuum pump is provided as a Standard feature.
8) Special anticorrosion coating on inner surfaces.
9) PLC based control panel with HMI display plugs user friendly interface & most recent enhancing Techniques applied to all components.
10) The chiller is provided with an auto-de crystallization line (overflow J shaped pipe) with PT 100 temperature sensor , protecting itself from crystallizatoin during Operation.
11) Stainless steel eliminator plates between Evaporators to absorbers & generators to condensers.
12) Sprayed twin tubes type generators for increasing the performance of the machine in order to reduce the Size of generators & volume of the solution.
13) Straight tubes in the generators for easy maintenance.
14) Fixed & floated generator supports utilized to Control tubes bundle expansion.
15) Carbon steel tube sheets with inner grooved holes According to TEMA standards.
16) All tubes fitted within the tube sheets duly expanded for a tight fit in along with a sealant adhesive resistant to temperature & pressure increases where all tubes are individually accessible & replaceable from either end of The chiller.
17) The units are supplied with one in single effect & two or three in double effect regenerative heat exchangers In order to increase the performance of the cycle.
18) The heat exchangers are of shell & tube type with Circular shell geometry according to TEMA standards & Constructed with internally enhanced copper& nickel tubes.
19) All headers are of carbon steel (evaporator , absorber, Condenser & generators) , with water connections on the Side , for a easy access to the tube bundles.
20) The absorber to the condenser crossover piping is a Standard feature for it reduces the piping work which also results in the overall reduction in the length of the unit, Welding & fabrication processes at the site.
21) Condenser bypass connection for necessary Circumstances in reducing cooling water line pressure Drop has been adapted as part of the system.
22) Sight glasses are provided on the evaporator, the Absorber & the generator as these glasses facilitate the monitoring of the refrigerant & the solution levels for Easing inspection & maintenance operations.
23) Refrigerant storage box for dilution of the cycle.
24) All the various sections of the chiller are Interconnected by suitably sized seamless carbon Steel piping.
25) Sampling refrigerant & solution valves provided as Standard feature.
26) Balancing refrigerant & solution valves provided as Standard feature.
27) Optional isolation butterfly valves for refrigerant & Solution pumps.

High Temperature Generator Firetube

Upward Type Spray Tubes for Absorber/Evaporator/Generator

Inner Grooved Tube Sheet With Anti Corrosion Coating

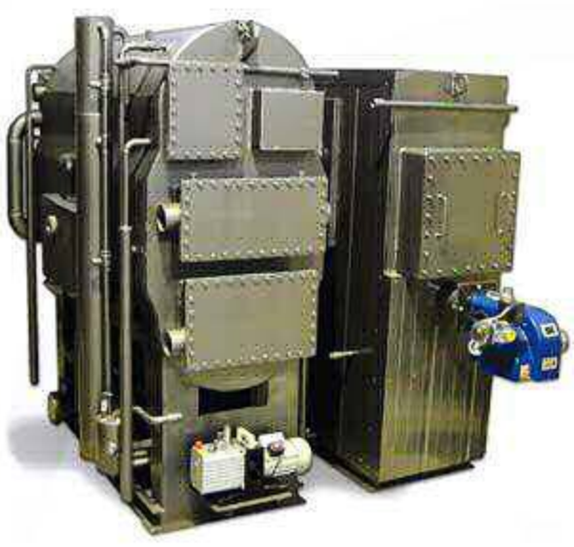


DRY BACK TYPE DIRECT FIRED HIGH TEMPERATURE GENERATOR

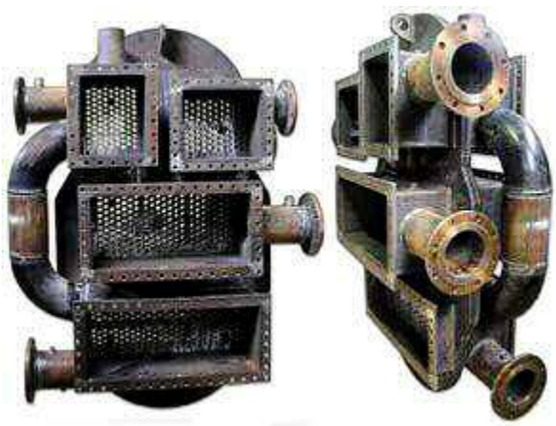
MAIN SHELL OF DIRECT FIRED ABSORPTION CHILLER

28) LiBr solution refrigerant, corrosion inhibitor (Lithium Molybdate) & octyl alcohol provided separately & to be Charged at site.
29) Nitrogen is charged at a pressure slightly greater than atmospheric pressure for shipping , in order to avoid air entering the machine in case of any accidents during Transport.
30) Lifting lugs provided on each side of the unit.

Cycle Components Internally and Externally Enhanced tubes



Azar Nasim Double Effect Direct Fired Absorption Chiller/Heater



Headers with Water Connections on the Side

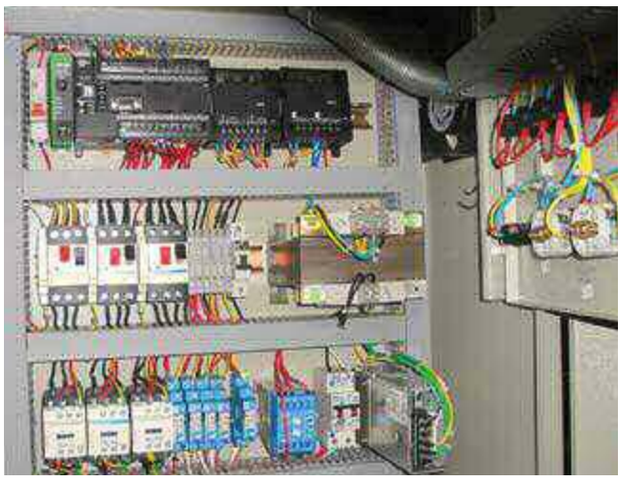
High Stage Generator Fire Tube Turbulator

* CONTROLS & SAFETY FEATURES

1) PLC based control for operational logic & sequence, safety & capacity control through advanced algorithm, with HMI touch screen to input set points & indicate of the unit trip causes, sensor errors , pumps errors & Faults history.
2) Elimination of rigid electro mechanical control Components.
3) Advanced algorithm capable of achieving part load operation from 5 to 100% step less based on leaving chilled water & entering cooling water temperatures by modulation of the hot water or steam three way or two way valve in single effect & double effect absorption model & modulation of the solution pump by invertor controls allows optimum flow of the solution to the High temperature generator.
4) Interlocks for chilled water , cooling water & hot water pumps, cooling tower fans, with individual manual start & stop switch on HMI.
5) Temperature sensors & display the leaving chilled water, entering cooling water, evaporator pan & generator solution Over flow J shape tube.
6) Vacuum pressure control by pressure transmitter sensor.
7) Level magnetic switch in three positions for refrigerant Level monitoring in the evaporator tank.
8) Level magnetic switch in three positions for solution Level monitoring in the high stage generator, (Available Only in the double effect absorption chiller type units.)
9) Flow switches for chilled water , cooling water & hot Water flow lines.
10) Safety Antifreeze protection.
11) Crystallization prevention fulfils including; overflow Pipe for auto de crystallization, low cooling water inlet Temperature cut-out , high temperature Control for high Temperature generator.
12) PLC Controlled double action (leaving chilled water or entering cooling water) temperature feedback adjustment for hot water or steam valve included as Standard item.
13) Burner flame protection in double effect gas directfired absorption chiller.
14) Stack flue gases temperature monitoring protection Capability.
15) Main circuit breaker for safety against electrical short Circuit hazards.
16) Individual motor circuit breakers & contactors for Solution, refrigerant & purge pumps.
17) Isolation control transformer protection for control Circuitry.
18) Terminal blocks for the control of chilled water, cooling water , and hot water pumps & cooling tower Fans.
19) Machine condition status indition on the display.
20) Display of all data & logged on HMI.
21) Weekly unit operation time schedule setup.

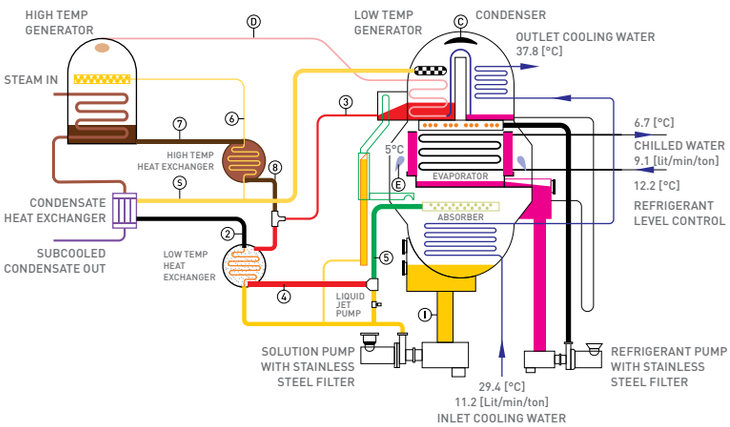
* Optional Items

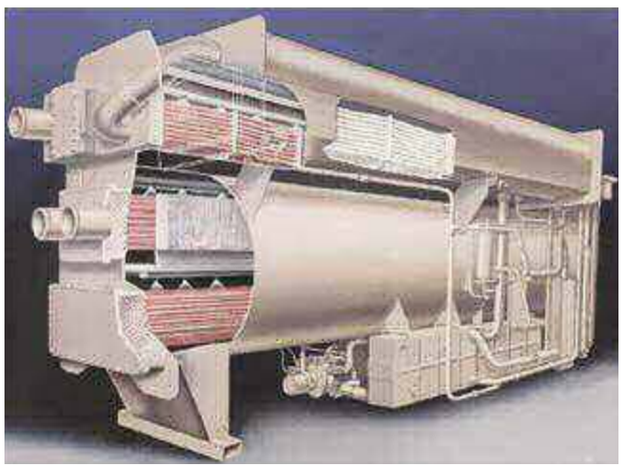
1) Modem connectivity for immediate customer service Call response.
2) Connection to the building client management system.
3) Last 24 hours logging at a sampling time rate of one hour intervals including most recent six alarms logging facility for providing better understanding the function of the unit during alarm conditions providing easy Diagnostics.



* TESTING PROCEDURE

The LiBr type absorption chiller units working pressure is under vacuum conditions, so producing of these units is Very important with respect to leak tightness. Hence it is Necessary to perform the leak detection tests as follows.
1) Tubes & shell sides Nitrogen test with pressure up To 3~5 [barg].
2) Helium test (sniffing method).
3) Tubes side hydraulic test with pressure up to 10 [barg] Or 1.5 times of working pressure.



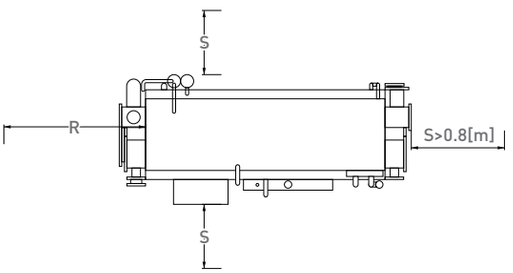


Typical Steam/Hot Water Double Effect Absorption Chiller

Typical Solar Collector to produce heat for viuna - Azar Nasim Vila Model Absorption Chiller

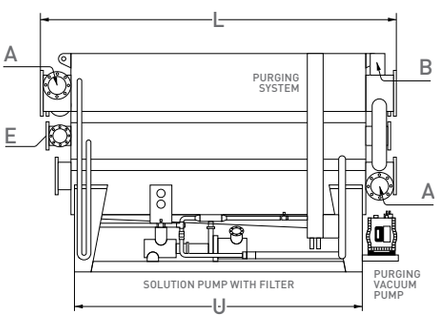
COP = 0.730				Medium Models					Large Models					Heavy Models				
Model No. VSEHW (ST)				35	45	55	60	70	90	110	125	140	160	180	220	250	280	320
Cooling Capacity[USRtons]				100	125	150	175	200	250	300	350	400	450	500	600	700	800	900
Chilled Water Data	Flow Rate		GPM	240	300	360	420	480	600	720	840	960	1080	1200	1440	1680	1920	2160
	Pressure Drop		psi	6	7	11	13	11	14	13	15	7	9	8	12	11	10	14
	In/out Diameter	E	Inch	4	4	5	5	5	6	6	8	8	8	8	8	10	10	10
Cooling Water Data	Flow Rate		GPM	317	396	476	555	634	793	951	1110	1268	1427	1585	1902	2219	2536	2853
	Pressure Drop		psi	6	7	9	12	9	13	13	13	8	10	7	11	11	10	12
	In/out Diameter	A	Inch	4	4	5	5	5	6	6	8	8	8	10	10	10	12	12
Hot Water Generator Data																		
Hot Water Data	Flow Rate		GPM	189	236	284	331	378	473	568	663	757	852	946	1135	1324	1513	1702
	Pressure Drop		psi	3	3	4	5	5	5	6	7	7	9	7	11	11	11	15
	In/out Diameter	G	Inch	3	3	4	4	4	5	5	6	6	6	8	8	8	10	10
Steam Generator Data																		
Steam Data	Flow Rate		Lb/hr	1683	2104	2525	2945	3366	4208	5049	5891	6732	7574	8415	10098	11781	13464	15147
	Pressure Drop		psi	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.7	0.9	0.8	1	1	1.3	1.8
	Inlet Diameter	Gi	Inch	4	4	4	5	5	5	6	6	6	8	8	8	10	10	10
	Outlet Diameter	Go	Inch	1 ¼	1 ¼	1 ½	1 ½	1 ½	2	2	2	2	2 ½	2 ½	2 ½	2 ½	3	3
Electrical Consumption			kw	2	2.5	2.5	3	3	3	4	4	5.5	5.5	6.5	6.5	7.5	7.5	9
Dimension Data	Length	L	m	3.3	3.3	3.6	3.8	3.6	3.8	4	4.2	4.8	5.3	4.9	5.4	5.5	5.6	6
	Height	H	m	2	2	2	2.2	2.2	2.4	2.4	2.6	2.6	2.6	2.8	2.8	2.9	3	3
	Width	W	m	1.4	1.4	1.4	1.6	1.6	.5	1.5	1.6	1.6	1.6	1.8	1.8	1.8	1.9	1.9
	Tube Removal	R	m	2.7	2.7	3	3.3	3	3.3	3.3	3.5	4	4.4	4	4.4	4.4	4.4	4.8
	Unit Ship Weight		t	2.9	3.4	4	4.5	4.9	5.4	5.9	6.4	7.5	8.7	9.7	11	12.7	14	15.7
	Unit Operating Weight		t	3.9	4.5	5.4	5.8	6.3	7	7.9	8.6	9.7	11	12.3	13.8	15	16.6	17.8

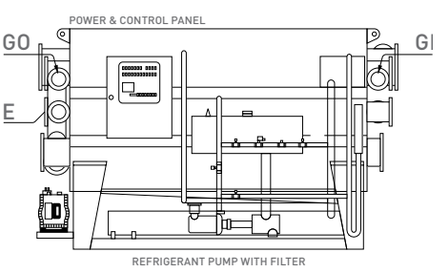
Azar Nasim Single Effect Hot Water and Steam Absorption Chillers Dimension [SI]

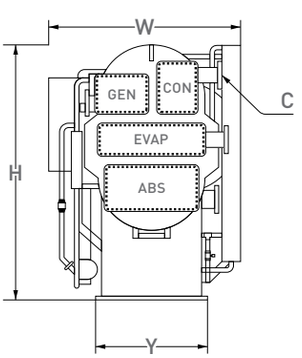


Remarks

A : Absorber Cooling Water Inlet Connection
B : Cooling Water Bypass Connection
C : Condenser Cooling Water Outlet Connection
E : Fan Coils Chilled Water Inlet/Outlet Connections
Gi : Generator steam / Hot Water inlet Connection
Go : Generator Condensate / Hot Water Outlet Connection
U : R Y: 0.7 w







Azar Nasim Single Effect Hot Water and Steam Absorption Chillers Performance Data [EN]

COP = 0.730				Super Models				
Model No. VSEHW (ST)				350	400	460	530	600
Cooling Capacity[USRtons]				1000	1150	1300	1500	1750
Chilled Water Data	Flow Rate		GPM	2400	2760	3120	3600	4200
	Pressure Drop		psi	8	10	14	13	13
	In/out Diameter	E	Inch	12	12	12	12	14
Cooling Water Data	Flow Rate		GPM	3170	3646	4121	4755	5548
	Pressure Drop		psi	9	11	14	14	14
	In/out Diameter	A	Inch	12	12	14	14	14
Hot Water Generator Data								
Hot Water Data	Flow Rate		GPM	1890	2174	2457	2835	3310
	Pressure Drop		psi	8	11	14	13	13
	In/out Diameter	G	Inch	3	3	4	4	4
Steam Generator Data								
Steam Data	Flow Rate		Lb/hr	16830	19355	21879	25245	29453
	Pressure Drop		psi	1	1.3	1.8	1.7	1.6
	Inlet Diameter	Gi	Inch	10	10	12	12	12
	Outlet Diameter	Go	Inch	3	3	3	4	4
Electrical Consumption			kw	9	12	12	15	15
Dimension Data	Length	L	m	6	6.5	7.2	7.2	7.4
	Height	H	m	3	3	3.2	3.2	3.2
	Width	W	m	2	2	2	2.2	2.2
	Tube Removal	R	m	5	5.5	6	6	6
	Unit Ship Weight		t	18	20.7	22.8	24.7	27.5
	Unit Operating Weight		t	21	23.8	26.2	28.6	31.2

General Conditions

1. Rated Chilled Water Outlet/Inlet Temperature: 44 / 54 [°F]
2. Rated Cooling Water Inlet/Outlet Temperature: 85 / 103 [°F]
3. Rated Hot Water Inlet/Outlet Temperature: 230 / 212 [°F]
4. Rated Steam Pressure / Degree of Subcooling: 6[psig]/18 [°F]
5. Lowest Permitted Outlet Temperature for Chilled Water: 40 [°F]
6. Pressure Limit For Chilled, Cooling, & Hot Water Except Special Orders: 120[psi]
7. Fouling Factor For Chilled & Cooling Water: 0.5[[°F].ft²/MBH]
8. And for Hot Water: 0.25 [°F. ft2/MBH]
9. Adjustable Chilled, Cooling, & Hot Water Flow Rate: 70~120[%]
10. LiBr Solution Concentration: 54 [%]
11. Machine Room Temperature: 40 ~ 110 [°F] & Relative Humidity <85%

Cycle Components Heat Capacity (H.C.) based on chiller capacity(USRtons)

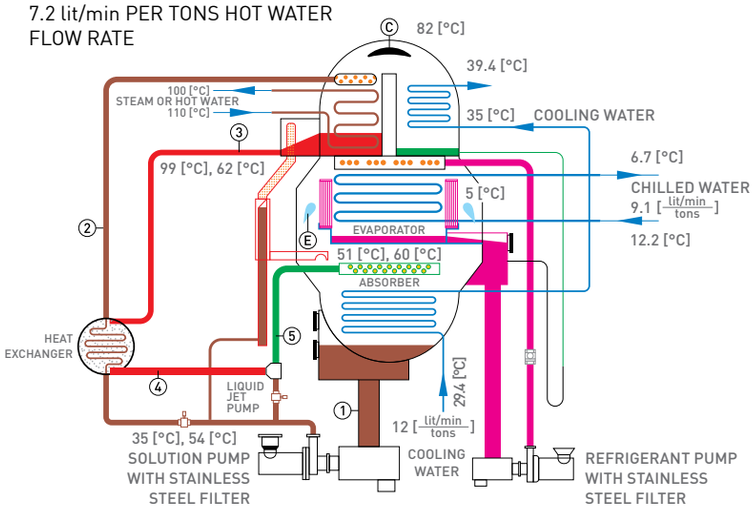
12[MBH]×Q_{chw}=USRtons 1-Chilledwater H.C: (1+COP^{-1})×2-Cooling water H.C.: Q_{clw}= Q_{chw}
COP^{-1}×3-Generator H.C.: Q_{gen}= Q_{chw}

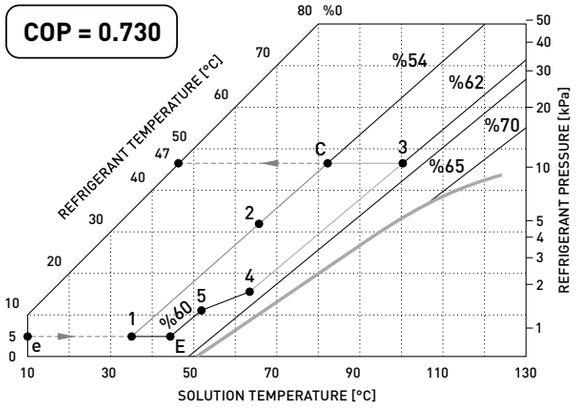
Conversion Table

$1m^3/hr$ = 4.4 GPM	1 MBH = 252 kcal/hr
°Cx1.8+32=°F	1 USRtons = 3.517 kW
1 psi = 6895 Pa	1 lb = 0.454 kg

Azar Nasim Single Effect Hot Water and Steam Absorption Chillers Actual Cycle [SI]

7.7 kg/hr PER TONS STEAM
FLOW RATE @P=143 [kPa-abs]
7.2 lit/min PER TONS HOT WATER
FLOW RATE





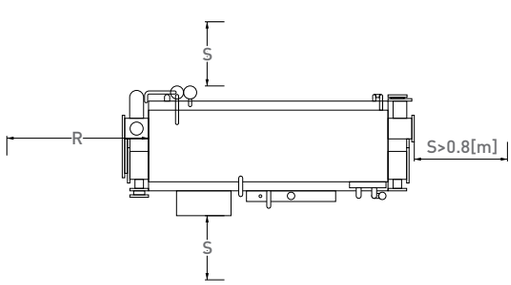
"PTX" DIAGRAM FOR STEAM & HOT WATER UNIT

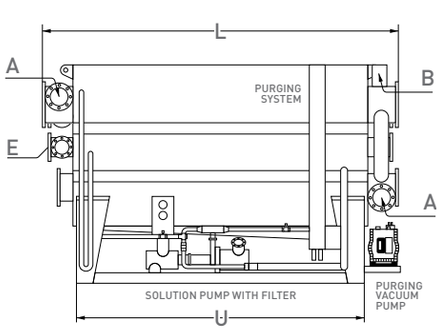
COP = 0.730				Small Models					Medium Models						Large Models					
Model No. VSELW				11	14	18	21	25	28	32	35	45	55	60	70	80	90	100	
Cooling Capacity[USRtons]				30	40	50	60	70	80	90	100	125	150	175	200	225	250	275	
Chilled water data	Flow Rate		GPM	72	96	120	144	168	192	216	240	300	360	420	480	540	600	660	
	Pressure Drop		psi	6	6	7	8	6	9	11	6	7	10	13	11	14	13	13	
	In/out Diameter	E	Inch	3	3	3	3	4	4	4	4	4	5	5	5	5	6	6	
Cooling water data	Flow Rate		GPM	114	152	190	228	266	304	342	380	476	571	666	761	856	951	1046	
	Pressure Drop		psi	7	7	8	8	7	10	12	7	6	8	12	8	11	10	11	
	In/out Diameter	A	Inch	3	3	3	3	4	4	4	5	5	5	5	6	6	8	8	
Warm WaterGenerator Data																			
Warm water data	Flow Rate		GPM	68	90	113	136	158	181	203	226	282	339	395	451	508	564	621	
	Pressure Drop		psi	3	3	4	4	3	4	4	4	4	4	5	3	4	4	4	
	In/out Diameter	G	Inch	2 ½	2 ½	2 ½	3	3	3	3	3	4	4	4	5	5	5	6	
Electrical Consumption			Kw	1.7	1.8	1.8	2	2	2	2.5	2.5	3.5	3.5	3.5	4.5	4.5	6	6	
Dimension data	Length	L	m	2.1	2.1	2.1	2.1	2.7	3	3	3.4	3.4	3.6	3.8	3.7	3.8	3.8	3.8	
	Height	H	m	1.9	2	2	2	2	2	2	2	2	2.1	2.2	2.2	2.2	2.5	2.5	
	Width	W	m	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.7	1.7	
	Tube Removal	R	m	1.6	1.6	1.6	1.6	2.2	2.5	2.5	2.7	2.7	3	3.3	3	3.3	3.3	3.3	
	Unit Ship Weight		t	1.5	1.6	1.8	2	2.6	3	3.4	3.9	4	4.5	5	6.3	6.9	8	8.7	
	Unit Operating Weight		t	2.0	2.2	2.5	2.8	3.6	4.3	4.5	5.3	5.8	6.3	7	8.5	9.2	10.3	11	

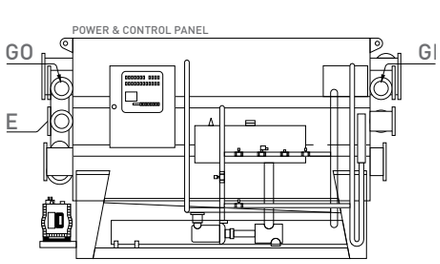
Azar Nasim Single Effect Warm Water Absorption Chillers Dimension [SI]

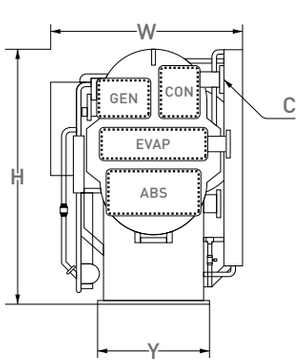
Remarks

A : Absorber Cooling Water Inlet Connection
B : Cooling Water Bypass Connection
C : Condenser Cooling Water Outlet Connection
E : Fan Coils Chilled Water Inlet/Outlet Connections
Gi : Generator Warm Water inlet Connection
Go : Generator Warm Water Outlet Connection
U : R Y: 0.7 w









Azar Nasim Single Effect Warm Water Absorption Chillers Performance Data [EN]

COP = 0.730				Heavy Models				
Model No. VSELW				110	125	140	160	180
Cooling Capacity[USRtons]				300	350	400	450	500
Chilled water data	Flow Rate		GPM	720	840	960	1080	1200
	Pressure Drop		psi	13	13	6	9	6
	In/out Diameter	E	Inch	6	8	8	8	8
Cooling water data	Flow Rate		GPM	1141	1331	1521	1712	1902
	Pressure Drop		psi	10	10	6	9	8
	In/out Diameter	A	Inch	8	8	10	10	10
Warm Water Generator Data								
Warm water data	Flow Rate		GPM	677	790	903	1016	1128
	Pressure Drop		psi	4	4	5	6	5
	In/out Diameter	G	Inch	6	6	8	8	8
Electrical Consumption			Kw	6	8	8	10	10
Dimension data	Length	L	m	4	4	4.8	5.3	4.9
	Height	H	m	2.5	2.6	2.6	2.6	2.8
	Width	W	m	1.7	1.8	1.8	1.8	1.8
	Tube Removal	R	m	3.3	3.3	4	4.4	4
	Unit Ship Weight		t	9.3	10.5	12	13	14.5
	Unit Operating Weight		t	11.8	13.6	15.8	17	19

General Conditions

1. Rated Chilled Water Outlet/Inlet Temperature: 44/54 [°F]
2. Rated Cooling Water Inlet/Outlet Temperature: 85/100 [°F]
3. Rated Hot Water Inlet/Outlet Temperature: 195/180 [°F]
4. Lowest Permitted Leaving Chilled Water Temp.: 40[°F]
5. Pressure Limit For Chilled, Cooling, & Hot Water Except Special Orders: 100[psig]
6. Fouling Factor For Chilled, Cooling Water: 0.5[°F ft2/MBH]
7. And for Hot Water: 0.25 [°F. ft²/MBH]
8. Adjustable Chilled, Cooling, & Hot Water Flow Rate: 70~120[%]
9. LiBr Solution Concentration: 54 [%]
10. Machine Room Temperature: 40 ~ 110 [°F] & Relative Humidity <85%

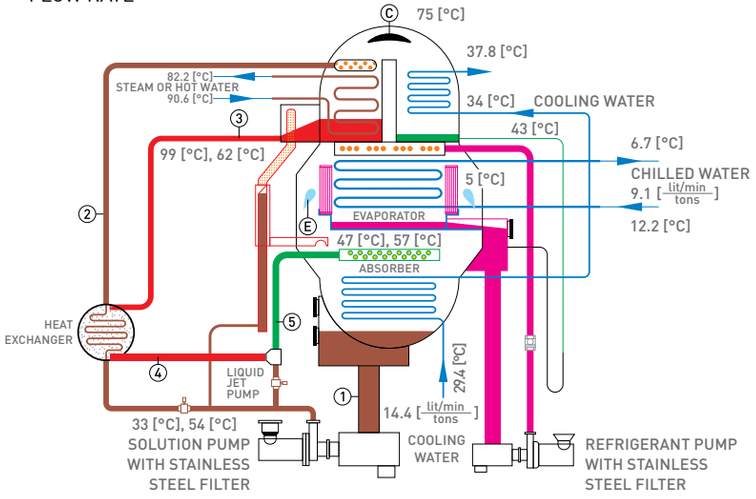
Cycle Components Heat Capacity (H.C.) based on chiller capacity(USRtons)

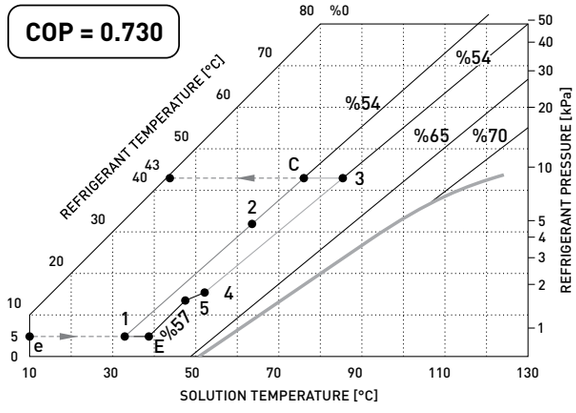
12[MBH]×Q_{chw}=USRtons 1-Chilledwater H.C:
(1+COP^{-1})×2-Cooling water H.C.: Q_{clw}= Q_{chw}
COP^{-1}×3-Generator H.C.: Q_{gen}= Q_{chw}

Conversion Table	
1m^3/hr = 4.4 GPM	1 USRtons = 3.517 kW
1 MBH = 252 kcal/hr	1 psi = 6895 Pa
C + 32×1 F=1.8	1 lb = 0.454 kg

Azar Nasim Single Effect Warm Water Absorption Chillers Actual Cycle [SI]

8.6 lit/min PER TONS WARM WATER FLOW RATE

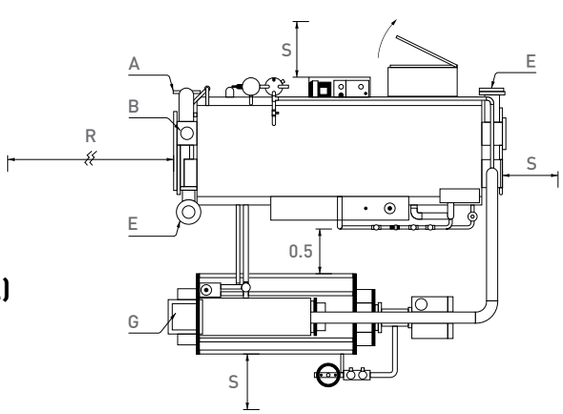




"PTX" DIAGRAM FOR WARM WATER UNIT

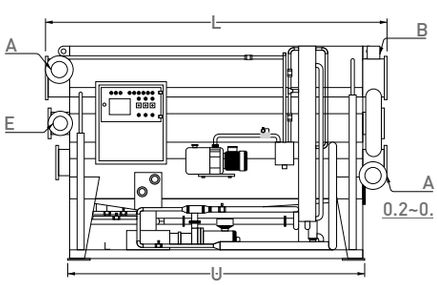
COP = 1.200				Small Models							Medium Models								Large Models				
Model No.			VDEDF	11	14	18	21	25	28	32	35	45	55	60	70	80	90	100	110	125	140	160	180
Cooling Capacity			[USRtons]	30	40	50	60	70	80	90	100	125	150	75	200	225	250	275	300	350	400	450	500
Heating Capacity			[MBH]	300	400	500	600	700	800	900	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000
Chilled water data	Flow Rate		GPM	72	96	120	144	168	192	216	240	300	360	420	480	540	600	660	720	840	960	1080	1200
	Pressure Drop		psi	6	6	7	8	6	9	11	6	7	10	13	11	14	13	13	13	13	6	9	6
	In/out Diameter	E	Inch	3	3	3	3	4	4	4	4	4	5	5	5	5	6	6	6	8	8	8	8
Cooling water data	Flow Rate		GPM	89	118	148	177	207	236	267	295	369	443	516	590	664	738	811	885	1033	180	1328	1475
	Pressure Drop		psi	7	7	8	8	7	10	12	7	6	8	12	8	11	10	11	10	10	6	9	8
	In/out Diameter	A	Inch	3	3	3	3	4	4	4	5	5	5	5	6	6	6	6	8	8	8	8	10
Heating water data	Flow Rate		GPM	60	80	100	120	140	160	180	200	250	300	350	400	450	500	550	600	700	800	900	100
	Pressure Drop		psi	7	7	8	9	7	9	11	7	8	10	13	11	14	13	13	13	13	7	10	7
	In/out Diameter	F	Inch	2 ½	2 ½	2 ½	3	3	3	3	4	4	4	4	5	5	5	6	6	6	8	8	8
Natural Gas Flow	Cooling/Heating		GPM	6	8	10	12	14	16	18	20	25	30	35	40	45	50	55	60	70	80	90	100
	Min. Inlet Pressure		psig	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Exhaust Dim.	G	Inch	6	6	6	7	7	8	8	9	9	10	10	12	12	12	14	14	14	16	16	18
Electrical Consumption			Kw	2.2	2.2	2.2	2.5	2.5	2.5	3.2	3.2	4.5	4.5	4.5	6	6	7	8	8	9	10	11	11
Dimension data [SI]	Length	L	m	2.1	2.1	2.1	2.1	2.7	3	3	3.4	3.4	3.6	3.8	3.7	3.8	3.8	3.8	4	4	4.8	5.3	4.9
	Height	H	m	1.9	2	2	2	2	2	2	2	2	2	2.2	2.2	2.2	2.2	2.4	2.4	2.5	2.5	2.6	2.6
	Width	W	m	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.	2.2	2.3	2.4	2.5	2.6
	Tube Removal	R	m	1.6	1.6	1.6	1.6	2.2	2.5	2.5	2.7	2.7	3	3.3	3	3.3	3.3	3.3	3.3	3.3	4	4.4	4
	Unit Ship Weight		t	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.3	3.5	3.9	4.3	4.6	4.9	5.3	5.6	6.5	7.2	7.9	8.6	9.5
	Unit Operating Weight		t	2.5	2.8	3.2	3.5	3.8	4	4.4	4.8	5.2	5.8	6.3	6.7	7.2	7.8	8.4	9.5	10.4	11.5	12.7	13.9

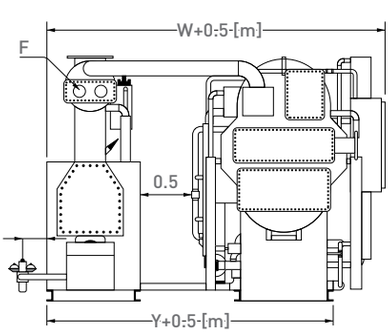
Azar Nasim Double Effect Direct-Fired Absorption Chillers Dimension [SI]

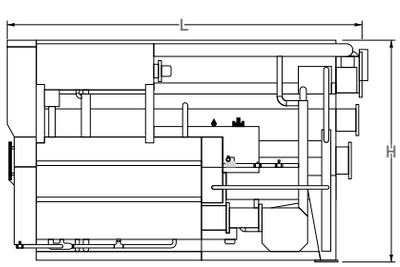


Remarks

A : Absorber Cooling Water Inlet Connection
B : Cooling Water Bypass Connection
C : Condenser Cooling Water Outlet Connection
E : Fan Coils Chilled Water Inlet/Outlet Connections
F : Fan Coils Hot Water Inlet / Outlet Connections (Optional)
G : Fleur Gases Oulet Connection
U : R
Y: 0.85 w







Azar Nasim Double Effect Direct-Fired Absorption Chillers/ Heaters Performance Data [EN]

COP = 1.200				Heavy Models						
Model No.			VDEDF	220	250	280	320	350	400	460
Cooling Capacity			[USRtons]	600	700	800	900	1000	1150	1300
Heating Capacity			[MBH]	6000	7000	8000	9000	10000	11500	13000
Chilled water data	Flow Rate		GPM	1440	1680	1920	2160	2400	2760	3120
	Pressure Drop		psi	12	11	10	14	8	10	14
	In/out Diameter	E	Inch	8	10	10	10	12	12	12
Cooling water data	Flow Rate		GPM	1770	2065	2360	2655	2950	3393	3835
	Pressure Drop		psi	10	10	9	10	8	10	12
	In/out Diameter	A	Inch	8	10	10	10	12	12	12
Heating water data	Flow Rate		GPM	1200	1400	1600	1800	2000	2300	2600
	Pressure Drop		psi	8	9	8	10	8	9	12
	In/out Diameter	F	Inch	6	8	8	8	10	10	10
Natural Gas Flow	Cooling/Heating		GPM	120	140	160	180	200	230	260
	Min. Inlet Pressure		psig	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Exhaust Dim.	G	Inch	18	20	20	22	24	26	28
Electrical Consumption			Kw	12	13	14	16	18	22	26
Dimension data [SI]	Length	L	m	5.4	5.5	5.6	6	6	6.5	7.2
	Height	H	m	2.8	2.9	3.0	3.0	3.0	3.0	3.2
	Width	W	m	2.8	3.0	3.0	3.2	3.2	3.4	3.4
	Tube Removal	R	m	4.4	4.4	4.4	4.8	5	5.5	6.0
	Unit Ship Weight		t	13.0	14.8	16.0	17.8	19.8	22.0	24.0
	Unit Operating Weight		t	17.8	19.8	21.5	23.5	25.5	28.0	30.0

General Conditions

1. Rated Chilled Water Outlet/Inlet Temperature: 44/54 [°F]
2. Rated Cooling Water Inlet/Outlet Temperature: 85/100 [°F]
3. Rated Heating Water Outlet / Inlet Temperature: 150/140 [°F]
4. Lowest Permitted Outlet Temperature for Chilled Water : 40[°F]
5. Pressure Limit For Chilled, Cooling, & Heating Water Except Special Orders: 120[psi]
6. Fouling Factor For Chilled , Cooling & Heating Water: 0.5[°F.ft²/MBH]
7. Adjustable Chilled, Cooling, & Heating Water Flow Rate: 70~120[%]
8. Natural gas consumption is calculated by heating value: 50[MBH/CFM] or 7400 [kcal/m3]
9. LiBr Solution Concentration: 54 [%]
10. Machine Room Temperature: 40 ~ 110 [°F] & Relative Humidity <85%

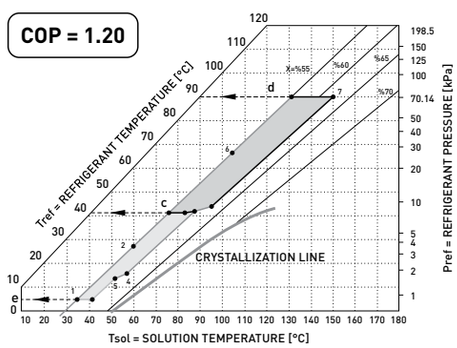
Cycle Components Heat Capacity (H.C.) based on chiller capacity(USRtons)

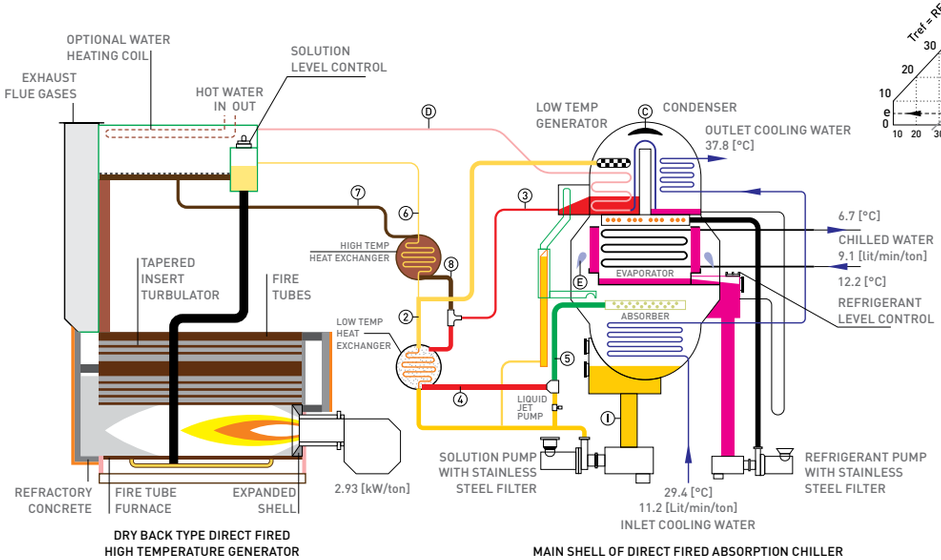
12[MBH]×Q_{chw}=USRtons 1-Chilledwater H.C: $(1+COP^{-1})$×2-Cooling water H.C.: Q_{clw}= Q_{chw}
COP^{-1}×3-High Temp. Generator H.C.: Q_{gen}= Q_{chw}

Conversion Table

1m³/hr = 4.4 GPM	1 MBH = 252 kcal/hr
°Cx1.8+32=°F	1 USRtons = 3.517 kW
1 psi = 6895 Pa	1 lb = 0.454 kg
1CFM = 1.699 m³/hr	1 inch = 25.4 mm

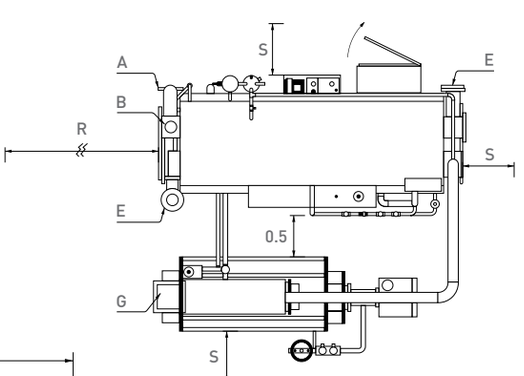
Azar Nasim Double Effect Direct-Fired Absorption Chillers Actual Cycle [SI]





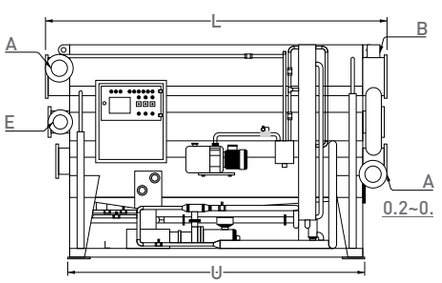
COP = 1.200			Medium Models				Large Models				Heavy Models					Super Models					
Model No.	VDEST (HW)		35	55	70	90	110	125	140	160	180	220	250	280	320	350	400	460	530	600	700
Cooling Capacity	[USRtons]		100	150	200	250	300	350	400	450	500	600	700	800	900	1000	1150	1300	1500	1750	2000
Chilled Water Data (54°F → 44°F Fouling Factor 0.5 [R.ft²/MBH])																					
Chilled water data	Flow Rate	GPM	240	360	480	600	720	840	960	1080	1200	1440	1680	1920	2160	2400	2760	3120	3600	4200	4800
	Pressure Drop	psi	6	11	11	14	13	15	7	9	8	12	11	10	14	8	10	14	13	13	13
	In/out Diameter E	Inch	4	5	5	6	6	8	8	8	8	8	10	10	10	12	12	12	12	14	14
Cooling Water Data (85°F → 100°F Fouling Factor 0.5 [R.ft²/MBH])																					
Cooling water data	Flow Rate	GPM	295	443	590	738	885	1033	1180	1328	1475	1770	2065	2360	2655	2950	3393	3835	4425	5163	5900
	Pressure Drop	psi	7	8	8	10	10	10	6	9	8	10	10	9	10	8	10	12	12	13	14
	In/out Diameter A	Inch	4	5	5	6	6	8	8	8	8	8	10	10	10	12	12	12	12	14	14
Hot Water Generator Data (320°F → 302°F Fouling Factor 0.25 [R.ft²/MBH])																					
Hot water data	Flow Rate	GPM	118	177	236	295	354	413	472	531	590	708	826	944	1062	1180	1357	1534	1770	2065	2360
	Pressure Drop	psi	3	4	4	5	5	6	6	7	7	9	10	11	12	7	9	11	10	11	12
	In/out Diameter G	Inch	3	4	4	5	5	6	6	6	8	8	8	10	10	10	10	10	12	12	12
Steam Generator Data (74[PSIg], 320°F → 203°F)																					
Steam Data	Flow Rate	Lb/hr	986	1479	1972	2465	2958	3451	3944	4437	4930	5916	6902	7888	8874	9860	11339	12818	14790	17255	19720
	Pressure Drop	psi	0.2	0.2	0.3	0.4	0.3	0.4	0.5	0.6	0.6	0.8	0.8	1	1.2	0.8	1	1.2	1.4	1.4	1.8
	Inlet Diameter Gi	Inch	2½	2½	3	3	3	4	4	4	5	5	5	6	6	6	6	8	8	8	8
	Outlet Diameter Go	Inch	1	1	1¼	1¼	1¼	1½	1½	1½	2	2	2	2½	2½	2½	2½	3	3	3	3
Electrical Consumption		kw	3	4	5.5	6.5	7	8	9	10	11	12	13	14	15	16	18	20	22	24	26
Dimension Data [SI]	Length L	m	3.4	3.6	3.7	3.8	4.0	4.0	4.8	5.3	4.9	5.4	5.5	5.6	6.0	6.0	6.5	7.2	7.2	7.4	8.0
	Height H	m	2	2	2.2	2.2	2.4	2.5	2.5	2.6	2.6	2.8	2.9	3.0	3.0	3.0	3.0	3.2	3.2	3.2	3.2
	Width W	m	1.8	1.8	2.0	2.0	2.3	2.3	2.3	2.5	2.5	2.5	2.7	2.7	2.8	2.8	2.8	3.0	3.0	3.0	3.0
	Tube Removal R	m	2.7	3	3	3.3	3.3	3.3	4.0	4.4	4.0	4.4	4.4	4.4	4.8	5.0	5.5	6.0	6.0	6.0	6.6
	Unit Ship Weight	t	3.0	3.5	4	4.5	5.5	6.2	7	7.8	9	10.5	13	14.5	16	18	20	22	24	26	28
	Unit Operating Weight	t	4.0	4.6	5.2	5.8	7	7.7	8.3	9	10	11.5	12.8	14	15	17	18	20	22	24	26

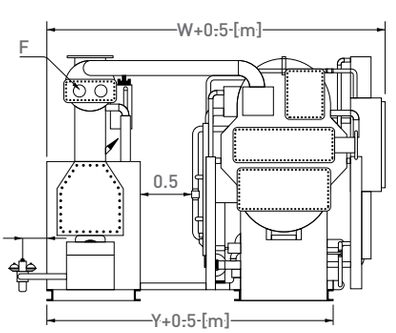
Azar Nasim Double Effect Steam-Fired Absorption Chillers Dimension [SI]

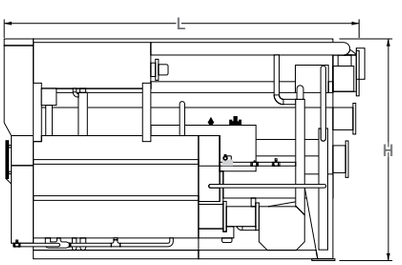


Remarks

A : Absorber Cooling Water Inlet Connection
B : Cooling Water Bypass Connection
C : Condenser Cooling Water Outlet Connection
E : Fan Coils Chilled Water Inlet/Outlet Connections
Gi : High Stage Generator Inlet Connection
Go : High Stage Generator Outlet Connection
U : R







Azar Nasim Villa Model Warm Water Absorption Chillers Performance Data [EN]

(Special Model for Operating with Solar System)

COP = 0.750				Performance Data [EN]				
Model No.			VSEV	2	4	6	8	10
Cooling Capacity			[USRtons]	5	10	15	20	25
Chilled water data	Flow Rate		GPM	12	24	36	48	60
	Pressure Drop		psi	8	10	10	12	12
	Connection	F	Inch	1 ½	1 ½	2	2	2 ½
Cooling water data	Flow Rate		GPM	28	56	84	112	140
	Pressure Drop		psi	10	12	10	10	12
	Connection	A	Inch	2	2	2 ½	2 ½	3
Warm water data	Flow Rate		GPM	16.5	33	49.5	66	82.5
	Pressure Drop		psi	6	7	7	8	9
	Connection	G	Inch	1 ½	1 ½	2	2	2 ½
Electrical Consumption			Kw	0.35	0.35	0.65	0.65	0.75
Dimension data	Length	L	m	1.1	1.2	1.4	1.6	1.8
	Height	H	m	1.7	1.7	1.8	1.8	1.9
	Width	W	m	1.0	1.0	1.2	1.4	1.4
	Unit Operating Weight		Kg	550	750	900	1000	1200

General Conditions

1. Rated Chilled Water Outlet/Inlet Temperature: 44 / 54 [°F]
2. Rated Cooling Water Inlet/2-Outlet Temperature: 85/95 [°F]
3. 3- Rated Hot Water Inlet/Outlet Temperature: 185 175 [°F]
4. Fouling Factor For Chilled, Cooling and Warm Water: 0.25 [°F.ft²/MBH].
5. Electrical Specification: 50 [HZ] x 1 [PH] x 220 [Volt]

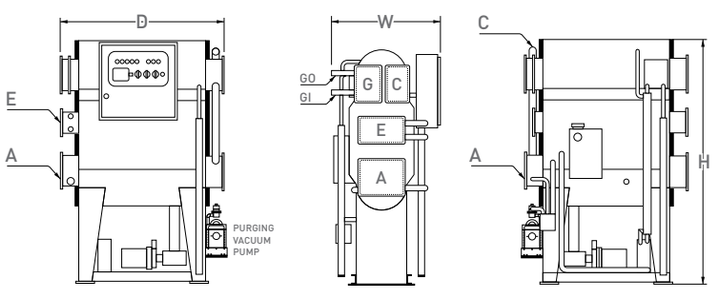
Cycle Components Heat Capacity (H.C.) based on chiller capacity (USRtons)

12[MBH]×Q_{chw}=USRtons 1-Chilledwater H.C:
$(1+COP^{-1})$×2-Cooling water H.C.: $Q_{clw} = Q_{chw}$
COP^{-1}×3-Generator H.C.: $Q_{gen} = Q_{Hot\ Water} = Q_{chw}$

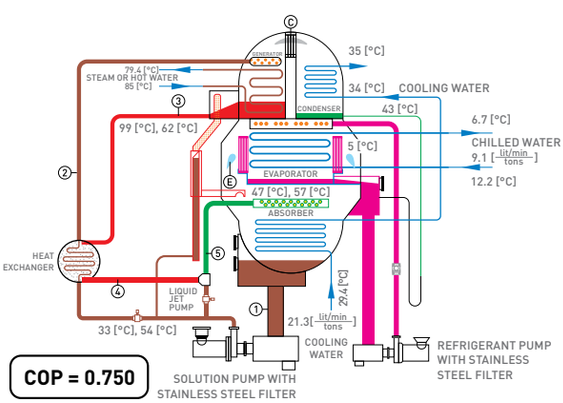
Conversion Table

1 m^3/hr = 4.4 GPM	1MBH = 252 kcal/hr
°Cx1.8+32=°F	1USRtons = 3.517 kW
1psi = 6895 Pa	1lb = 0.454 kg

Azar Nasim Model Absorption Chillers Actual Cycle [SI]

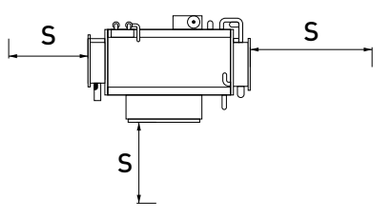


12.4 lit/min PER TONS WARM WATER FLOW RATE



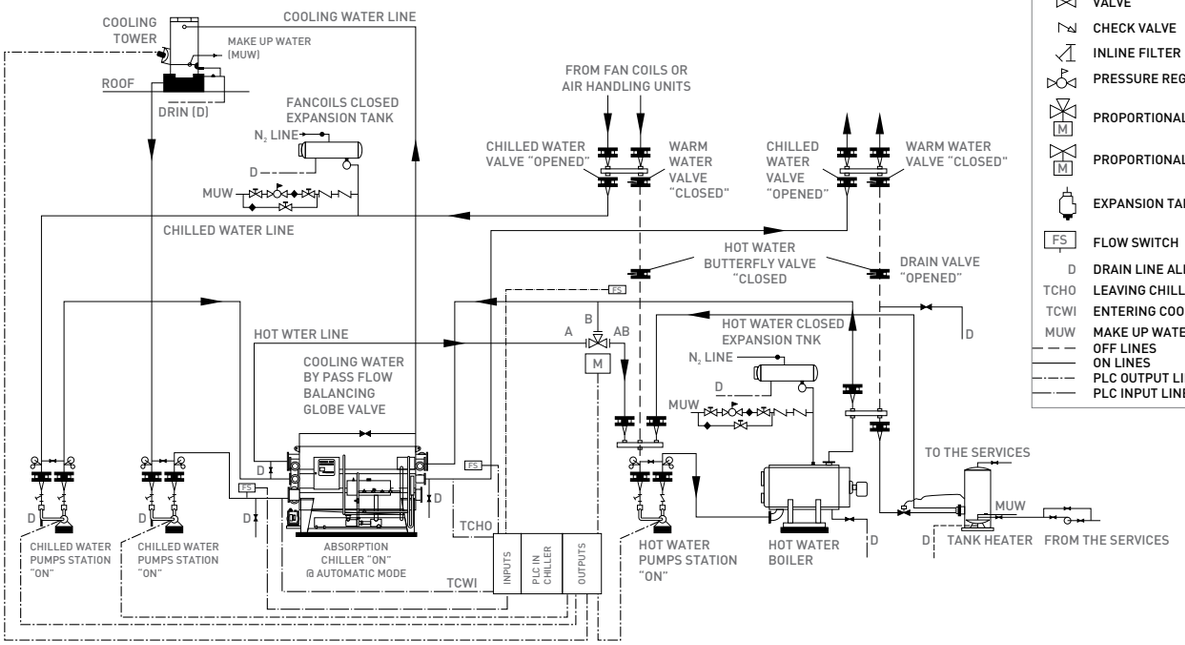
Remarks

A : Absorber Cooling Water Inlet Connection
C : Condenser Cooling Water Outlet Connection
E : Fan Coils Chilled Water Inlet/Outlet Connections
Gi : Generator Warm Water Inlet Connection
Go : Generator Warm Water Oulet Connection

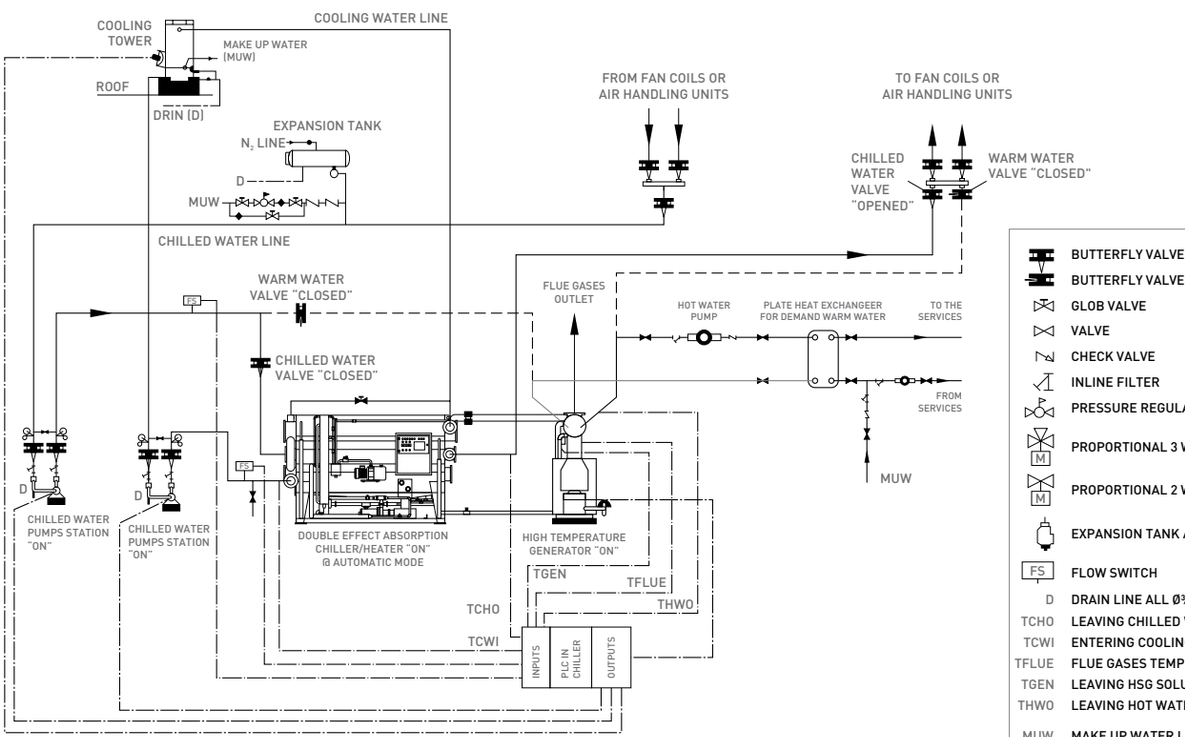


Azar Nasim Vila model have the same function as the Azar Nasim Outdoor packages but with low capacities between 5 to 25 USR tons. The features Are as follows.
1) Easy installation, when the chiller is delivered to jobsite, only the chilled water Pipe, cooling water pipe & warm water pipe are connected to the chiller.
2) No location requirement, chiller can be located on the rooftop or margin of the Building.
3) Portable chiller, it can be carried on a vehicle & used for temporary exhibitions Or other areas.
4) Special modeL, it can be operated with solar system.

Azar Nasim Single Effect Hot Water Absorption Chillers
Typical Piping System (Summer Condition)



Azar Nasim Double Effect Direct-Fired Absorption Chillers
Typical Piping System (Summer Condition)



* Technical Notes to Engineers

Location	It is possible to locate the chiller in the basement on the same level, on the floor for it is safety & proper operation with the feature of little vibration & low noise . It is recommended that the chiller machine room should be separated from boilers & Pump Rooms as possible. Well ventilation of machine room is strongly recommended. The Chillers foundation must be on a higher level with load capacity as 1.5 times the Operation Weight in the machine room.
Quantities	To decide the quantity , you should take cooling capacity , cooling capacity fluctuating, Building function ,installation site & economic factors in to consideration .You need not consider the stand by unit because continuous operation is better for the life time than intermittent operation , but in high cooling capacity chillers with stand by Canned pumps may be suggested.
Special dimensions	If your machine room or entrance is smaller than the mentioned dimensions ,please contact Azar Nasim to discuss for a solution and finally chiller dimensions Are adjustable.
Split shipment	If it's limited by transportation or machine room entrance height, split shipment shall Be selected.
Low chilled water temp erature	Provide chilled water at 32[°F] for special processing requirements .For example food and fruit plant , medical plant ,power station cooling system ,etc...
Seawater	Use seawater as cooling water, applications to coastal buildings, ship's air conditioning & seawater desalination plant.
Piping system	1. Soft connector must be installed at inlet / outlet of chilled, cooling, & hot water. The weight of the piping system can never be borne by the chiller. 2. Cooling tower must be equipped with a protective screen to prevent foreign matters From entering the cooling water system. 3. The cooling tower must be far away from heat resource & dust resource. 4. No pipes or valves must hang over the chiller to prevent the chiller from being Damaged during installation, maintenance, or valve leakage.

* Technology Extension

Outdoor package	Azar Nasim outdoor packages are warm & hot water types small & medium models additionally equipped with hot water boiler, cooling tower, cooling water pumps , chilled water pumps & hot water pumps .
CCHP system	The perfect combination between Azar Nasim absorption chillers and turbo generator or Diesel generator made in the U.S.A. , Europe or any other countries Can increase the energy efficiency greatly.

Note:

LIQUID CHILLER
(Water and Air Cooled Chiller)

AzarNasim
HVAC SYSTEMS

Features

Azar nasim reciprocating water chillers are available in two types of air cooled and water cooled in capacity range of 3 to 240 tons of refrigeration and compressor configurations of one to four.
Evaporators and condensers are high efficiency shell and tube heat exchangers which designed **based on time** (Tubular Exchanger Manufactures Association) standards.
Safety controls installed on all units include high and low pressure cut-outs, compressor oil pressure safety cut – out, water anti freeze thermostat, water flow switch and evaporator entering water thermostat.
The above mentioned are all chosen from the most recognized controlled manufacturers in the air conditioning industry.
Compressors are by DWM COPELAND which happened to be one of the best and the most reliable brands.
Raw materials such as copper tubes, fittings and valves are supplied by well-respected manufacturers.
Electrical safety measures such as three phase controller, circuit breakers are available on all units.
A fault detection system for the whole unit is available upon request.
Microprocessor based PLC controller is also available as needed.

General

Cooling Capacity is tabulated for all chiller models at a variety of conditions to cover most comfort
Cooling and industrial system requirements. The water cooled ANCH-W series are rated over a range of Leaving water temperatures of 42 °F to 46 °F and condenser leaving water temperatures of 85 °F to 105 ° F . The ANCH-A series are rated over the same evaporator chilled water range at condensing Temperatures of 115 °F to 135 °F.

Chilled water quantity and range:
Required cooling capacity and the desired chilled water range are the two important factors in determining the amount of water to be circulated in the evaporator. This flow rate in (GPM) is given in the performance data tables.
The Flowing formula can also be used when needed.

$$GPM = \frac{Tons \times 24}{\text{Chilled water range } (\Delta T)\ \{^\circ F\}}$$

Water cooled chiller (ANCH-W) series:
A 10 °F condenser water range is generally the best compromise for the most economical cooling tower selection to satisfy the chiller requirements. Based on the above suggestion and referring to performance data tables under different condenser leaving water temperatures, we can extract the required condenser water flow rate are in (GPM) and the water side pressure drop (PD) . Refer to the Azar Nasim cooling tower catalogue for an appropriate cooling tower selection.

Condenser water temperature and heat pressure control:
Since cooling towers are used in conjunction with water cooled condensers, the available condenser water temperature available shall be at least 5 °F above the ambient wet bulb temperature. For example if the ambient wet bulb temperature is 80 °F, a properly sized tower will provide 85 °F Condenser water temperatures.
For proper operation of a reciprocating water cooled chiller, it is necessary to maintain a condenser leaving water
temperature not lower than 85 °F. This means that a method of head pressure control such as controlling cooling
tower fan via a thermostat or using a condenser water regulating valve in order to control the condenser water flow rate shall be employed.

Air cooled chiller (ANCH-A) series:
ANCH-A units require the use of remotely located air cooled condensers. The column headed QC in the performance
data tables show the required THR capacity at each condensing temperature condition. Refer to the Azar Nasim air cooled condenser catalogue for an appropriate condenser selection.

Head pressure control and winter start in air cooled chillers:
Air cooled condensers used with chillers must always include an accurate method of controlling the condensing pressure at 185 (psig) or higher.
It is also necessary to determine the minimum outside air temperature at which the system will be operated. At an ambient temperature below 55 °F, a winter start system should be furnished with the condenser to enable the chiller to start without any difficulty.

Water cooled models:

Given:
Water flow rate to be chilled = 110 GPm
Design chilled water range = 10˚F
Evaporator leaving water temp. = 45˚F
Design condenser water range = 10˚F
Condenser leaving water temp. = 95˚ F

Determine unit model and size:
Required cooling capacity:

$$Qe = \frac{GPM \times Chilled\ water\ range}{24} = \frac{110 \times 10}{24} =$$

45.83 tons of refrigeration

From the corresponding performance data table (Evap. Lvg water temp. = 45 ˚F) we select unit ANCH-60-2-W, offering 46.3 tons at 95 ˚F condenser leaving water temperature. From the same table we extract the evap. Water flow rate of 110.8 GPM and P.D. of 12.8 (ft² .in.wg) for ΔT = 10 ˚F.
We can also determine the condenser water flow rate of 135.1 (GPM) and PD of 7.1 (ft² .in.wg), which the condenser (GPM) valve given above , refer to Azar Nasim cooling tower catalogue and select the required unit or units.

Air cooled models:

Given:
Water flow rate to be chilled = 110 GPM
Design chilled water range = 10 ˚F
Evaporator leaving water temp. = 45 ˚F
Design condensing temp. = 120 ˚F
Ambient temp. = 100 ˚F

Determine unit model and Size:
Required cooling capacity:

$$Qe = \frac{GPM \times Chilled\ water\ range}{24} = \frac{110 \times 10}{24} =$$

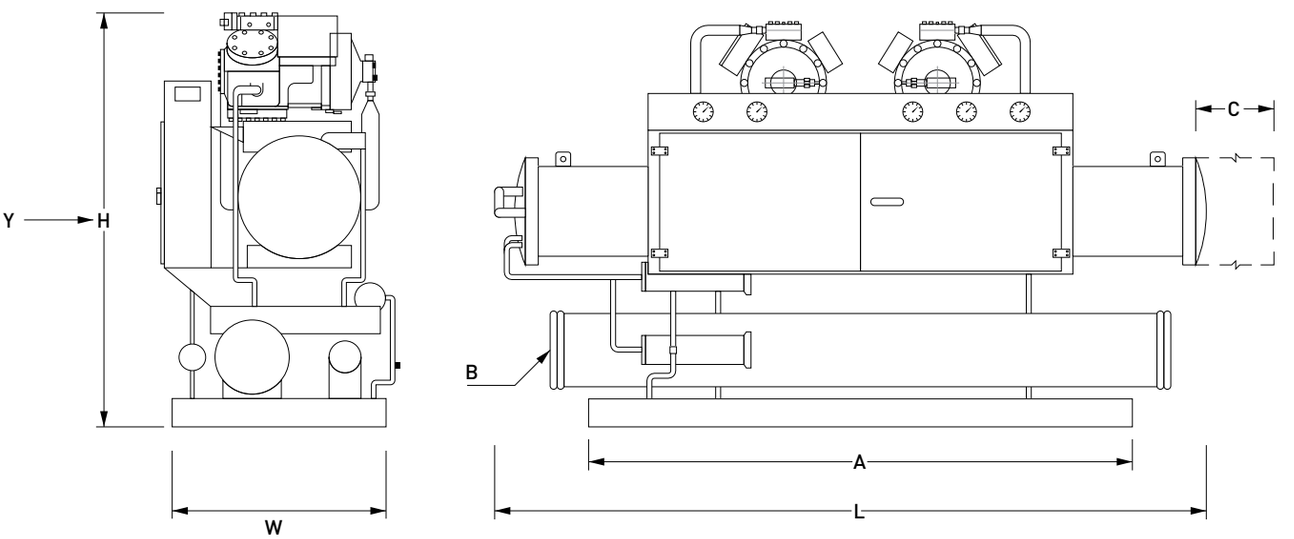
45.83 tons of refrigeration

From the corresponding performance data table (Evap. Lvg. Water temp. = 45 ˚F) we select unit ANCH-70-2-A, offering 52.2 tons at 120˚F condensing temp. From the same table we extract the evap water flow rate of 125 (GPM) and PD of 17.2 (ft². in.wg) for ΔT = 10 ˚F.

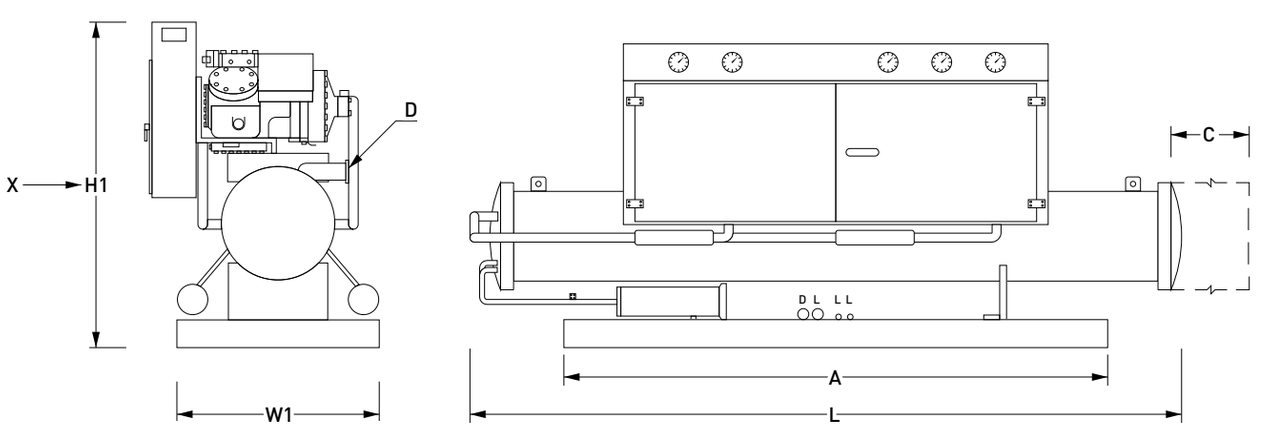
We can also extract the condenser THR capacity of 808.7 MBH. With this valve, refer to Azar Nasim air cooled condenser catalogue and selected the required unit or units.

Table 1		Dimensions										
Model		A	B	C	D	L	W	H	W1	H1	D.L	L.L
AN CH 5 - 1	W,A	700	2×1½"	1500	1½"	1700	600	1150	650	1000	⅝"	⅝"
AN CH 10 - 1	W,A	700	2×2"	1500	2"	1700	600	1250	650	1100	1⅛"	⅞"
AN CH 15 - 1	W,A	700	2×2"	1800	2"	2000	600	1300	650	1100	1⅛"	⅞"
AN CH 20 - 1	W,A	700	2×2½"	1800	2½"	2000	600	1300	650	1100	1⅛"	⅞"
AN CH 25 - 1	W,A	700	2×2½"	2300	2½"	2500	600	1300	650	1100	1⅛"	1⅛"
AN CH 30 - 1	W,A	1000	2×2½"	2300	3"	2500	600	1300	650	1100	1⅜"	1⅛"
AN CH 35 - 1	W,A	1000	2×2½"	2300	3"	2500	600	1300	650	1100	1⅜"	1⅛"
AN CH 40 - 1	W,A	1000	2×3"	2300	3"	2500	600	1450	650	1250	1⅜"	1⅛"
AN CH 50 - 1	W,A	1000	2×3"	2300	3"	2500	600	1650	700	1400	1⅝"	1⅜"
AN CH 60 - 1	W,A	1000	2×3"	2300	3"	2500	600	1650	700	1400	1⅝"	1⅜"
AN CH 30 - 2	W,A	1400	4×2"	2300	3"	2500	750	1350	850	1150	2×1⅛"	2×⅞"
AN CH 40 - 2	W,A	1400	4×2½"	2300	3"	2500	750	1400	850	1200	2×1⅛"	2×⅞"
AN CH 50 - 2	W,A	1400	4×2½"	2300	3"	2500	750	1400	850	1200	2×1⅛"	2×1⅛"
AN CH 60 - 2	W,A	1400	4×2½"	2711	3"	2900	750	1400	850	1200	2×1⅜"	2×1⅛"
AN CH 70 - 2	W,A	1400	4×2½"	2711	4"	2900	750	1450	850	1250	2×1⅜"	2×1⅛"
AN CH 80 - 2	W,A	1400	4×3"	2711	4"	2900	750	1500	850	1300	2×1⅜"	2×1⅛"
AN CH 100 - 2	W,A	1500	4×3"	2711	5"	2900	850	1800	950	1550	2×1⅝"	2×1⅜"
AN CH 120 - 2	W,A	1500	4×3"	2711	5"	2900	850	1800	950	1550	2×1⅝"	2×1⅜"
AN CH 60 - 3	W,A	1800	2×3" 4×2½"	2811	3"	3000	800	1450	900	1200	1⅛" 1⅜"	⅞" 1⅛"
AN CH 75 - 3	W,A	1800	2×3" 4×2½"	2811	4"	3000	850	1500	950	1200	1⅛" 1⅝"	1⅛" 1⅜"
AN CH 90 - 3	W,A	1800	2×3" 4×2½"	3311	4"	3500	850	1500	950	1200	1⅜" 1⅝"	1⅛" 1⅜"
AN CH 105 - 3	W,A	1800	2×3" 4×2⅛"	3111	5"	3200	850	1600	950	1300	1⅜" 1⅛"	1⅛" 1⅜"
AN CH 120 - 3	W,A	1800	4×3"	3311	5"	3500	900	1650	1000	1300	1⅜" 2⅛"	1⅛" 1⅜"
AN CH 150 - 3	W,A	2050	2×4" 2×3"	3311	5"	3500	950	1850	1050	1500	1⅝" 2⅝"	3×1⅜"
AN CH 180 - 3	W,A	2050	2×4" 2×3"	3811	6"	4000	1000	1900	1100	1500	1⅝" 2⅝"	3×1⅜"
AN CH 80 - 4	W,A	2250	4×3"	3300	5"	3500	800	150	900	1250	2×1⅝"	2×1⅛"
AN CH 100 - 4	W,A	2250	4×3"	3300	5"	3500	900	155	1000	1300	2×1⅝"	2×1⅜"
AN CH 120 - 4	W,A	2250	4×3"	3300	5"	3500	900	155	1000	1300	2×2⅛"	2×1⅜"
AN CH 140 - 4	W,A	2250	4×3"	3300	5"	3500	900	170	1000	1350	2×2⅛"	2×1⅜"
AN CH 160 - 4	W,A	2250	4×3"	3300	5"	3500	1000	180	1100	1400	2×2⅛"	2×1⅜"
AN CH 200 - 4	W,A	2600	4×4"	3800	6"	4000	1000	190	1100	1550	2×2⅝"	4×1⅜"
AN CH 240 - 4	W,A	2600	4×4"	4300	6"	4600	1100	200	1200	1550	2×2⅝"	4×1⅜"

Note: For air cooled models, discharge & liquid line sizes are based on a maximum distance of 15 meters between chiller & air cooled condenser. D.L = Discharge Line L.L = Liquid Line



VIEW = Y



VIEW = X

PERFORMANCE DATA; FOR Water COOLED CHILLERS

EVAPORATOR LEAVING WATER TEMP. = 42°(F)

Table 2	Condenser Leaving Water Temperature (°F)																	
Model	85						95						105					
	QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]		QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]		QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]	
	Tons	KW	GPM	PD	GPM	PD	Tons	KW	GPM	PD	GPM	PD	Tons	KW	GPM	PD	GPM	PD
AN CH 5 1 W	5.2	4.0	12.4	2.8	15.5	2.5	4.7	4.4	11.2	1.6	14.4	2.3	4.3	4.8	10.3	1.3	13.7	2.1
AN CH 10 1 W	9.7	7.1	23.2	2.8	27.8	5.9	9.0	7.9	21.6	2.5	26.7	5.5	8.4	8.4	20.1	2.2	25.6	5.1
AN CH15 1 W	12.7	9.4	30.4	3.4	36.5	5.0	11.9	10.3	28.5	3.0	35.2	4.6	11.1	11.2	26.6	2.1	34.0	4.2
AN CH 20 1 W	15.4	10.9	36.9	3.3	44.1	5.9	14.2	11.8	34.0	2.9	42.7	5.5	13.7	12.7	32.8	2.7	41.3	5.1
AN CH 25 1 W	19.3	13.8	46.2	4.0	55.1	9.2	18.1	15.1	36.2	3.5	53.3	8.6	17.1	16.4	40.9	3.1	51.7	8.0
AN CH 30 1 W	23.1	17.0	55.3	5.3	66.3	7.1	21.7	18.3	52.0	4.6	63.9	6.6	20.4	19.8	48.8	4.0	61.8	6.0
AN CH 35 1 W	28.7	21.4	68.7	8.2	82.9	5.2	27.0	23.3	64.6	7.4	80.2	4.7	25.2	25.5	60.3	6.5	77.4	4.2
AN CH 40 1 W	32.8	25.7	78.5	5.7	95.0	4.6	30.8	27.5	73.7	4.7	91.6	4.2	28.9	29.8	69.2	4.0	88.6	3.8
AN CH 50 1 W	42.0	29.5	100.5	9.5	121.3	6.2	39.0	32.5	93.3	8.8	116.4	5.5	36.3	35.5	86.9	8.0	112.2	5.3
AN CH 60 1 W	49.0	36.0	117.3	7.5	142.6	8.0	44.8	38.6	107.3	6.5	132.9	7.2	42.9	43.0	102.7	5.5	131.5	6.4
AN CH 30 2 W	25.3	18.8	60.6	6.2	72.7	4.9	23.8	20.4	57.0	5.0	70.3	4.5	22.2	22.2	53.2	4.0	67.8	4.1
AN CH 40 2 W	30.7	21.8	73.5	5.3	87.4	5.8	28.9	23.4	69.0	4.3	84.4	5.4	27.2	25.4	65.1	3.6	81.8	5.0
AN CH 50 2 W	38.5	27.6	92.2	8.7	109.9	9.1	36.2	30.2	86.7	7.8	106.2	8.5	34.1	32.7	81.6	6.8	103.0	7.9
AN CH 60 2 W	46.2	34.2	110.6	13.2	132.5	7.1	43.4	36.7	103.9	12.0	127.7	6.6	40.8	39.6	97.7	11.1	123.6	6.0
AN CH 70 2 W	57.5	42.9	137.7	17.5	165.9	5.2	53.9	47.0	129.1	17.0	160.1	4.7	50.6	51.0	121.1	16.6	155.1	4.2
AN CH 80 2 W	65.0	51.2	155.6	16.5	188.4	4.5	61.0	54.9	146.1	16.1	181.5	4.1	57.2	59.3	137.0	15.5	175.5	3.7
AN CH 100 2 W	84.0	53.0	201.1	14.5	242.0	6.1	78.4	64.5	187.7	13.3	233.7	5.5	73.0	71.0	174.0	12.5	224.7	5.3
AN CH 120 2 W	98.2	71.0	235.1	14.9	285.0	8.0	89.6	77.2	214.5	11.6	269.1	7.2	85.9	85.9	205.6	10.5	266.5	6.4
AN CH 60 3 W	46.0	32.7	110.1	12.7	131.1	5.8	43.4	35.1	103.9	11.7	126.6	5.4	40.9	38.2	97.9	10.7	122.8	5.0
AN CH 75 3 W	57.2	41.3	137.0	16.5	163.3	9.1	53.7	45.2	128.6	14.7	157.8	8.5	50.6	48.9	121.1	13.0	153.0	7.9
AN CH 90 3 W	69.2	51.1	165.7	14.0	197.2	7.1	65.1	54.9	155.9	12.4	190.0	6.6	61.2	59.3	146.5	11.0	183.9	6.0
AN CH 105 3 W	86.3	64.1	206.6	14.0	246.7	5.2	80.7	70.2	193.2	12.3	238.0	4.7	75.8	76.2	181.5	10.8	230.4	4.2
AN CH 120 3 W	95.7	75.2	229.1	18.0	275.4	4.5	89.8	81.4	215.0	16.3	265.8	4.1	83.8	88.3	200.6	14.4	256.4	3.7
AN CH 150 3 W	124.7	88.5	298.5	18.3	360.8	6.1	116.2	97.2	278.2	15.7	347.1	5.5	108.1	106.5	258.8	13.8	334.6	5.3
AN CH 180 3 W	145.8	106.8	349.0	19.0	424.0	8.0	134.6	115.8	322.3	15.5	403.0	7.2	128.0	127.5	306.4	13.2	397.2	6.4
AN CH 80 4 W	60.9	43.3	145.8	15.0	172.3	4.5	57.3	46.7	137.2	13.3	166.2	4.1	54.0	50.6	129.3	11.9	161.1	3.7
AN CH 100 4 W	76.9	55.1	184.1	8.5	218.0	6.1	72.3	60.3	173.1	7.8	210.7	5.5	68.1	65.2	163.0	6.9	204.3	5.3
AN CH 120 4 W	92.3	66.9	221.0	9.5	262.1	8	86.5	73.1	207.1	8.4	252.8	7.2	81.4	78.9	194.9	7.4	244.7	6.4
AN CH 140 4 W	115.0	85.4	275.3	17.8	328.8	6.4	108.3	93.1	258.6	16.9	317.7	5.8	101.0	101.6	241.8	15.8	307.0	5.3
AN CH 160 4 W	127.4	100.5	305.0	15.3	367.2	8	119.9	108.4	287.1	13.4	355.0	7.5	111.8	117.7	267.7	11.7	342.3	6.9
AN CH 200 4 W	165.8	117.7	397.0	16.1	479.8	9.7	154.8	130.0	370.6	14.0	462.7	9.0	144.0	141.6	344.7	11.5	445.6	8.6
AN CH 240 4 W	194.3	142.0	465.1	16.8	565.0	9.8	179.0	154.5	428.6	13.4	537.2	9.1	171.0	171.2	409.4	11.8	529.2	8.7

QE = Actual Evaporator Cooling Capacity. [1 tons of ref. = 12000 BTU / HR] **WC =** Compressor Motor- Power Input at 380 V, 3Ø, 50 Hz **PD =** Water Pressure Drop [Ft. WG] **W.F.D. =** Water Flow Data

Table 3	Condensing Temperature (°F)																			
Model	115					120					125					135				
	QE	WC	QC	Cond. W.F.D. [ΔT=10°F]		QE	WC	QC	Cond. W.F.D. [ΔT=10°F]		QE	WC	QC	Cond. W.F.D. [ΔT=10°F]		QE	WC	QC	Cond. W.F.D. [ΔT=10°F]	
	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD
AN CH 5 1 A	4.3	4.8	61.2	10.2	1.4	4.1	5.0	59.1	9.8	1.2	4.0	5.2	57.0	9.6	1.2	3.6	5.6	53.4	8.6	1.0
AN CH 10 1 A	8.4	8.9	128.5	20.1	2.2	8.1	9.1	125.4	19.4	2.1	7.8	9.4	122.4	18.7	2.0	7.1	10.0	116.5	17.0	1.7
AN CH15 1 A	11.3	11.7	172.0	27.1	2.2	10.9	12.1	168.5	26.1	2.0	10.5	14.5	165.0	25.1	1.7	9.7	13.3	158.0	23.2	1.4
AN CH 20 1 A	14.1	13.5	210.7	33.5	2.8	13.6	14.1	206.7	32.6	2.6	13.1	14.6	202.7	31.4	2.4	12.2	15.5	194.6	29.2	2.1
AN CH 25 1 A	17.5	17.3	263.5	41.9	3.2	16.9	18.0	258.6	40.5	3.0	16.3	18.6	253.5	39.0	2.8	15.2	19.7	243.2	36.4	2.5
AN CH 30 1 A	20.8	20.9	314.8	49.8	4.2	20.1	21.7	308.4	48.1	3.9	19.4	22.4	301.8	46.5	3.6	17.9	23.6	288.5	42.9	3.1
AN CH 35 1 A	25.9	27.0	394.7	62.0	6.6	25.0	28.0	387.1	59.9	6.1	24.1	29.0	379.5	57.7	5.7	22.4	30.9	364.3	53.6	5.1
AN CH 40 1 A	29.4	31.5	450.8	70.4	4.3	28.4	32.6	441.8	68.0	4.0	27.3	33.7	432.7	65.4	3.7	25.2	35.8	414.5	60.3	3.2
AN CH 50 1 A	37.8	36.9	570.1	90.5	8.2	36.4	38.2	558.7	87.2	8.0	35.0	39.5	546.1	83.8	7.8	32.3	41.9	521.4	77.3	7.4
AN CH 60 1 A	43.7	45.5	669.7	104.6	5.8	42.0	44.1	654.6	100.6	5.6	40.3	48.6	638.9	96.5	5.4	36.5	50.5	598.8	87.4	5.0
AN CH 30 2 A	22.7	23.5	354.7	54.4	4.4	22.0	24.3	338.8	52.7	4.2	21.1	25.1	331.8	50.5	4.0	19.6	26.7	317.7	46.9	3.7
AN CH 40 2 A	27.9	27.0	417.5	66.8	3.8	26.9	28.0	409.6	64.4	3.5	26.0	29.0	401.6	62.3	3.2	24.2	30.8	385.6	57.9	2.7
AN CH 50 2 A	34.9	34.6	525.3	83.6	7.0	33.7	35.9	515.4	80.7	6.7	32.5	37.1	505.3	77.8	6.4	30.2	39.3	484.9	72.3	5.9
AN CH 60 2 A	41.6	41.9	629.3	99.6	10.4	40.2	43.3	616.5	96.3	11.0	38.7	44.7	603.5	92.7	10.6	35.8	47.3	576.9	85.7	10.0
AN CH 70 2 A	51.9	54.0	790.5	124.3	16.8	50.1	56.1	775.4	120.0	16.4	48.3	58.0	760.1	115.6	16.0	44.7	61.7	729.7	107.0	15.3
AN CH 80 2 A	58.1	62.8	893.3	139.1	15.8	56.0	65.0	875.4	134.1	15.4	53.9	67.2	857.4	129.1	15.0	49.9	71.2	821.3	119.5	14.2
AN CH 100 2 A	75.0	74.3	1139.0	179.6	13.3	72.4	77.0	1117.0	173.3	12.8	69.6	79.6	1091.0	166.6	12.3	64.6	84.5	1046.0	154.7	11.4
AN CH 120 2 A	87.0	90.9	1336.0	208.3	12.0	83.7	94.1	1306.0	200.4	11.4	80.1	97.0	1272.0	191.8	10.8	72.7	102.0	1199.0	174.1	9.7
AN CH 60 3 A	41.7	40.5	626.4	99.8	11.1	40.3	42.0	614.6	96.5	10.6	38.9	43.5	602.7	93.1	10.1	36.2	46.2	578.8	86.7	8.8
AN CH 75 3 A	51.6	51.8	780.3	123.5	13.6	49.9	53.6	765.7	119.5	12.7	48.1	55.4	750.7	115.2	12.0	44.7	58.8	720.5	107.0	10.4
AN CH 90 3 A	61.8	62.6	936.1	148.0	11.1	59.6	64.8	917.1	142.7	10.4	57.4	66.9	897.7	137.4	9.7	53.1	70.7	858.2	127.1	8.5
AN CH 105 3 A	76.8	80.8	1174.0	183.9	11.1	74.2	83.8	1152.0	177.7	10.3	71.5	86.7	1129.0	171.2	9.5	66.3	92.2	1084.0	158.7	8.0
AN CH 120 3 A	84.4	93.2	1305.0	202.1	14.6	81.3	96.5	1279.0	194.7	13.7	78.3	99.6	1252.0	187.5	12.8	72.3	105.4	1199.0	173.1	11.0
AN CH 150 3 A	112.4	112.6	1710.0	269.1	13.4	108.2	116.6	1672.0	259.1	12.6	104.0	120.5	1636.0	249.0	11.8	96.9	127.7	1574.0	232.0	11.1
AN CH 180 3 A	130.1	135.4	1996.0	311.5	14.0	125.0	140.1	1951.0	299.3	13.6	120.0	145.0	1905.0	287.3	12.0	108.5	151.5	1788.0	259.8	10.0
AN CH 80 4 A	54.4	53.7	816.6	130.2	12.1	52.7	55.7	801.5	126.2	11.4	50.9	57.6	786.1	121.9	10.7	47.3	61.2	755.2	113.3	9.2
AN CH 100 4 A	68.9	69.0	1036.0	165.0	7.1	66.6	71.6	1017.0	159.5	6.6	64.3	74.0	996.9	154.0	6.1	59.8	78.4	957.1	143.2	5.2
AN CH 120 4 A	82.1	83.4	1238.0	196.6	7.5	79.2	86.3	1213.0	189.6	6.9	76.4	89.1	1188.0	182.9	6.3	70.7	94.1	1136.0	169.3	5.4
AN CH 140 4 A	102.4	108.0	1556.0	245.2	16.0	98.8	111.7	1527.0	236.6	15.4	95.3	115.6	1497.0	228.2	14.8	88.4	122.8	1438.0	211.7	13.7
AN CH 160 4 A	112.6	124.3	1733.0	269.6	11.9	108.6	128.7	1698.0	260.0	11.0	104.5	132.9	1664.0	250.2	10.1	96.7	140.6	1594.0	231.5	8.4
AN CH 200 4 A	149.2	150.5	2275.0	357.2	12.7	144.5	155.9	2236.0	346.0	12.2	139.0	161.1	2188.0	332.8	11.7	128.2	170.8	2081.0	306.1	10.7
AN CH 240 4 A	173.0	181.0	2652.0	414.2	14.4	167.0	187.4	2608.0	399.8	13.1	162.2	192.4	2568.0	389.3	12.0	145.0	202.6	2392.0	347.2	10.0

QE = Actual Evaporator Cooling Capacity. [1 tons of ref. = 12000 BTU/HR]
WC = Compressor Motor-Power Input at 380 V, 3Ø, 50 Hz
QC = Condenser total heat - rejection {MBH = 1000 BTU/HR}
PD = Water Pressure Drop [Ft. WG]
W.F.D. = Water Flow Data

PERFORMANCE DATA; FOR Water COOLED CHILLERS

EVAPORATOR LEAVING WATER TEMP. = 44°(F)

Table 4	Condenser Leaving Water Temperature (°F)																	
Model	85						95						105					
	QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]		QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]		QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]	
	Tons	KW	GPM	PD	GPM	PD	Tons	KW	GPM	PD	GPM	PD	Tons	KW	GPM	PD	GPM	PD
AN CH 5 1 W	5.3	4.4	12.7	1.9	15.6	2.6	4.9	4.5	11.7	1.7	15.0	2.7	4.6	4.9	11.0	1.5	13.9	2.5
AN CH 10 1 W	9.9	7.3	23.7	2.9	28.4	6.1	9.3	7.9	22.2	2.6	27.3	5.7	8.6	8.5	20.6	2.3	26.2	5.5
AN CH15 1 W	13.2	9.5	31.6	3.6	37.6	5.2	12.4	10.4	29.6	3.2	36.4	4.8	11.6	11.2	27.8	2.2	35.2	4.5
AN CH 20 1 W	16.0	10.9	38.4	3.5	45.4	6.1	15.1	11.9	36.2	3.0	44.0	5.7	14.2	12.8	34.0	2.6	42.5	5.3
AN CH 25 1 W	20.1	13.9	48.2	4.2	57.1	9.6	19.0	15.1	45.5	3.8	55.3	9.0	17.9	16.5	42.7	3.4	53.6	8.5
AN CH 30 1 W	24.1	17.2	57.6	5.7	68.7	7.4	22.7	18.7	54.2	5.0	66.4	6.9	21.3	20.0	51.0	4.4	64.1	6.4
AN CH 35 1 W	29.9	21.5	71.5	9.1	85.7	5.5	28.2	23.5	67.4	8.3	83.0	5.0	26.3	25.7	63.0	7.3	80.2	4.8
AN CH 40 1 W	34.2	25.8	82.0	6.0	98.6	5.0	32.1	27.8	76.9	5.1	95.0	4.6	30.2	30.1	72.3	4.4	91.9	4.3
AN CH 50 1 W	43.2	29.6	103.6	10.1	124.7	7.0	41.0	32.5	98.2	9.5	120.6	6.4	38.2	36.0	91.4	9.0	117.1	6.0
AN CH 60 1 W	51.5	36.0	123.3	8.5	148.6	8.6	48.5	39.8	116.1	7.5	143.9	8.2	44.8	43.4	107.2	6.5	137.2	7.9
AN CH 30 2 W	26.4	19.0	63.2	6.6	75.4	5.2	24.8	20.7	59.4	5.6	72.8	4.8	23.2	22.5	55.6	4.8	70.4	4.5
AN CH 40 2 W	32.0	21.9	76.6	6.1	90.5	6.0	30.1	23.8	72.1	5.1	87.6	5.6	28.3	25.7	67.9	4.4	84.7	5.2
AN CH 50 2 W	40.0	27.7	95.8	9.0	113.5	9.4	37.7	30.2	90.3	8.0	109.9	8.8	35.4	33.0	84.8	7.0	106.4	8.3
AN CH 60 2 W	48.2	34.4	115.4	13.8	137.4	7.4	45.3	36.5	108.5	12.6	132.8	6.9	42.6	40.1	102.1	11.6	128.3	6.4
AN CH 70 2 W	59.7	43.1	142.9	18.0	171.2	5.5	56.3	46.9	134.8	17.4	165.8	5.0	52.6	51.4	125.9	16.7	160.1	4.8
AN CH 80 2 W	67.1	51.5	160.7	17.0	193.5	4.8	62.9	55.3	150.6	16.6	186.5	4.4	59.0	59.9	141.3	16.0	180.4	4.1
AN CH 100 2 W	86.5	59.2	207.0	15.2	248.0	7.0	81.8	64.9	195.8	13.8	241.2	6.4	76.3	71.6	182.6	19.5	233.7	6.3
AN CH 120 2 W	102.6	79.3	245.6	14.5	296.5	8.6	96.0	79.8	229.8	13.0	286.2	8.2	89.6	86.7	214.5	11.5	275.3	73.9
AN CH 60 3 W	48.0	32.8	114.9	13.1	135.8	6.0	45.3	35.7	108.5	12.1	131.7	5.6	42.7	38.4	102.2	11.0	127.3	5.2
AN CH 75 3 W	59.6	41.5	142.7	17.1	169.3	9.4	56.3	45.2	134.8	15.5	164.1	8.8	52.8	49.4	126.4	13.9	158.7	8.3
AN CH 90 3 W	72.0	51.4	172.4	14.5	203.9	7.4	67.7	55.2	162.1	12.9	196.7	6.9	63.7	59.9	152.5	11.5	190.3	6.4
AN CH 105 3 W	89.5	64.3	214.3	14.5	254.7	5.5	84.0	70.2	201.6	13.0	246.4	5.0	78.7	76.9	188.4	11.6	237.9	4.8
AN CH 120 3 W	100.0	75.7	239.4	18.7	285.7	4.8	94.9	82.0	227.2	17.1	278.1	4.4	87.8	89.4	210.2	14.8	266.4	4.1
AN CH 150 3 W	129.0	89.0	308.8	19.0	371.5	7.0	121.8	97.6	291.6	17.5	360.2	6.4	113.6	107.5	272.0	15.8	348.4	6.0
AN CH 180 3 W	153.5	107.4	367.5	19.8	443.1	8.6	149.0	119.8	356.7	18.5	441.2	8.2	133.5	130.0	319.6	15.0	412.2	7.9
AN CH 80 4 W	63.7	43.5	152.5	16.2	179.2	4.8	60.0	47.0	143.7	14.4	172.9	4.4	56.6	51.2	135.5	12.9	267.6	4.1
AN CH 100 4 W	80.2	55.4	192.0	9.3	226.0	7.0	75.8	60.3	181.5	8.6	219.0	6.4	71.2	65.9	170.5	7.7	211.9	6.0
AN CH 120 4 W	96.1	68.5	230.1	10.3	272.1	8.6	90.9	73.2	217.6	9.4	263.2	8.2	85.0	79.9	203.5	8.2	254.0	7.9
AN CH 140 4 W	119.4	85.8	285.9	18.5	339.5	6.7	112.4	93.6	269.1	17.6	328.4	6.2	105.0	102.6	251.4	16.4	317.2	5.6
AN CH 160 4 W	133.2	101.2	318.9	16.6	381.4	8.2	125.5	109.5	300.5	14.7	368.9	7.6	117.1	119.2	280.4	12.9	355.8	7.1
AN CH 200 4 W	171.5	118.5	410.6	16.7	493.3	10.4	162.0	130.0	387.8	15.2	479.8	9.8	151.2	143.5	362.0	13.5	442.0	8.5
AN CH 240 4 W	204.0	144.5	488.4	17.5	590.0	10.8	196.0	159.8	457.3	15.5	570.0	10.0	177.5	173.5	425.0	12.9	548.6	9.3

QE = Actual Evaporator Cooling Capacity. [1 tons of ref. = 12000 BTU/HR]
WC = Compressor Motor-Power Input at 380 V, 3Ø, 50 Hz **PD =** Water Pressure Drop [Ft. WG]
W.F.D. = Water Flow Data

Table 5	Condensing Temperature (°F)																			
Model	115					120					125					135				
	QE	WC	QC	Evap. W.F.D. [ΔT=10°F]		QE	WC	QC	Evap. W.F.D. [ΔT=10°F]		QE	WC	QC	Evap. W.F.D. [ΔT=10°F]		QE	WC	QC	Evap. W.F.D. [ΔT=10°F]	
	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD
AN CH 5 1 A	4.4	4.9	62.2	10.5	1.5	4.3	5.1	60.0	10.2	1.3	4.2	5.2	59.0	10.0	1.2	3.7	5.7	54.9	8.9	1.1
AN CH 10 1 A	8.6	8.9	131.9	20.6	2.3	8.3	9.3	128.8	19.9	2.2	7.9	9.6	125.7	18.9	2.1	7.3	10.1	119.8	17.5	1.8
AN CH15 1 A	11.7	11.9	178.2	28.0	2.2	11.3	12.4	174.7	27.1	2.0	10.9	12.8	171.2	26.1	1.7	10.1	13.6	164.1	24.2	1.4
AN CH 20 1 A	14.3	13.6	215.5	34.2	2.6	13.9	14.2	211.5	33.3	2.4	13.4	14.7	207.4	32.1	2.2	12.5	15.7	199.3	29.9	2.0
AN CH 25 1 A	18.0	17.5	271.6	43.1	3.4	17.4	18.2	266.5	41.7	3.2	16.8	18.8	261.4	40.3	3.0	15.6	20.0	250.9	37.4	2.6
AN CH 30 1 A	21.5	21.2	324.6	51.5	4.5	20.7	22.0	318.2	49.6	4.2	19.9	22.7	311.5	47.7	4.0	18.4	24.0	298.0	44.1	3.5
AN CH 35 1 A	26.6	27.3	406.3	63.7	7.4	25.7	28.4	398.7	61.5	6.9	24.8	29.4	390.9	59.4	6.4	23.0	31.3	375.5	55.1	5.8
AN CH 40 1 A	30.3	32.9	389.7	72.5	4.4	29.2	33.1	456.4	69.9	4.1	28.1	34.2	447.2	67.3	3.8	26.0	36.4	428.8	62.3	3.1
AN CH 50 1 A	39.0	37.4	587.4	93.4	8.9	37.6	38.8	574.6	90.9	8.6	36.2	40.1	561.7	86.7	8.3	33.4	42.6	536.3	80.0	7.8
AN CH 60 1 A	45.3	46.1	690.6	108.9	6.7	43.6	47.8	675.5	104.4	6.2	41.8	49.3	658.7	100.1	5.8	37.9	51.8	620.2	90.8	5.0
AN CH 30 2 A	23.4	23.9	357.2	56.0	5.0	22.6	24.7	350.2	54.1	4.7	21.8	25.6	343.2	52.2	4.4	20.2	27.2	329.0	48.4	3.9
AN CH 40 2 A	28.6	27.3	429.7	68.5	4.5	27.6	28.3	421.8	66.1	4.2	26.7	29.4	413.7	63.9	3.9	24.8	31.3	397.5	59.4	3.3
AN CH 50 2 A	35.7	35.0	539.6	85.5	7.1	34.5	36.3	529.5	82.6	6.8	33.3	37.6	519.3	79.7	6.5	30.9	39.9	498.5	74.0	5.9
AN CH 60 2 A	42.8	42.4	649.3	102.5	11.7	41.3	44.0	636.4	98.9	11.2	39.8	45.4	623.1	95.3	10.7	36.8	48.1	596.1	88.1	9.7
AN CH 70 2 A	42.6	54.6	812.0	125.9	16.7	50.7	56.7	797.0	121.4	16.2	48.9	58.8	781.9	117.1	15.7	45.4	62.6	751.6	108.7	15.0
AN CH 80 2 A	59.2	63.4	913.2	141.7	16.1	57.1	65.7	895.2	136.7	15.7	54.9	67.9	876.9	131.4	15.2	50.8	72.1	840.6	121.6	14.2
AN CH 100 2 A	78.6	75.0	1182.0	188.2	14.0	75.7	77.8	1157.0	181.2	13.5	72.8	80.5	1131.0	174.3	13.0	67.2	85.5	1080.0	160.9	12.0
AN CH 120 2 A	89.9	92.1	1375.0	215.2	13.1	86.5	95.4	1345.0	207.1	12.5	82.9	98.5	1311.0	198.5	12.0	75.3	103.4	1236.0	180.3	11.0
AN CH 60 3 A	42.9	40.9	645.4	102.7	11.1	41.5	42.5	633.5	99.4	10.6	40.0	44.1	621.4	95.8	10.0	37.3	47	597.2	89.3	8.9
AN CH 75 3 A	53.1	52.4	805.0	127.1	14.0	51.3	54.4	789.8	122.8	13.7	49.5	56.2	774.4	118.5	13.4	46.0	59.7	743.0	110.1	10.8
AN CH 90 3 A	63.9	63.4	963.1	153.0	11.6	61.6	65.7	943.6	147.5	11.0	59.4	67.8	923.6	142.2	10.4	54.9	71.8	883.0	131.4	9.2
AN CH 105 3 A	79.3	81.7	1206.0	189.9	11.8	76.5	85.2	1183.0	183.2	11.0	73.8	87.8	1160.0	176.7	10.2	68.4	93.5	1113.0	163.8	8.7
AN CH 120 3 A	87.8	94.6	1349.0	210.2	14.8	84.6	98.0	1322.0	202.6	13.8	81.5	101.3	1295.0	195.1	12.8	75.3	107.4	1241.0	180.3	10.9
AN CH 150 3 A	117.9	112.5	1775.0	282.3	15.0	113.5	116.7	1737.0	271.7	14.2	109.2	120.7	1698.0	261.5	13.4	100.8	128.3	1622.0	243.3	11.8
AN CH 180 3 A	135.0	138.2	2064.0	323.2	15.3	129.9	143.2	2019.0	311.0	14.1	124.5	147.8	1969.0	298.1	13.0	112.8	155.2	1854.0	270.1	11.0
AN CH 80 4 A	56.7	54.4	850.0	135.8	13.0	54.8	56.5	834.2	131.2	12.2	52.9	58.5	818.1	126.7	11.4	49.3	62.3	785.8	118.0	9.9
AN CH 100 4 A	71.5	69.9	1075.0	171.2	7.8	69.1	72.5	1055.0	165.4	7.3	66.7	75.0	1034.0	159.7	6.8	62.0	79.7	992.0	148.0	5.9
AN CH 120 4 A	85.2	84.5	1285.0	204.0	8.3	82.2	87.6	1259.0	196.8	7.7	79.2	90.5	1233.0	189.6	7.1	73.3	95.8	1179.0	175.5	5.9
AN CH 140 4 A	105.6	108.9	1607.0	252.8	16.5	102.0	113.1	1577.0	244.2	15.9	98.3	117.1	1546.0	234.4	15.3			1484.0	218.1	14.1
AN CH 160 4 A	117.1	126.1	1801.0	280.4	12.9	112.9	130.7	1765.0	270.3	12.0	108.7	135.1	1729.0	260.3	11.1	100.5	143.3	1657.0	240.6	9.3
AN CH 200 4 A	156.4	149.8	2358.0	374.5	15.7	150.6	155.4	2307.0	360.6	15.2	144.9	160.7	2256.0	346.9	14.7	134.0	170.5	2157.0	320.8	137
AN CH 240 4 A	179.4	184.1	2746.0	429.5	14.1	172.6	190.8	2686.0	413.2	12.8	165.4	196.8	2619.0	396.0	11.5	149.9	206.8	2466.0	358.9	9.0

QE = Actual Evaporator Cooling Capacity. [1 tons of ref. = 12000 BTU/HR] **WC =** Compressor Motor Power Input at 380 V, 3Ø, 50 Hz
PD = Water Pressure Drop [Ft. WG] **QC =** Condenser total heat- rejection {MBH = 1000 BTU/hr} **W.F.D. =** Water Flow Data

PERFORMANCE DATA; FOR Water COOLED CHILLERS

EVAPORATOR LEAVING WATER TEMP. = 45°(F)

Table 6	Condenser Leaving Water Temperature (°F)																	
Model	85						95						105					
	QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]		QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]		QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]	
	Tons	KW	GPM	PD	GPM	PD	Tons	KW	GPM	PD	GPM	PD	Tons	KW	GPM	PD	GPM	PD
AN CH 5 1 W	5.4	4.1	12.9	2.0	15.8	2.8	5.0	4.6	12.0	1.8	15.3	2.8	4.7	5.0	11.2	1.6	14.9	2.7
AN CH 10 1 W	10.1	7.3	24.2	3.0	28.9	6.3	9.5	7.9	22.6	2.7	27.8	5.9	8.9	8.5	21.2	2.4	26.9	5.5
AN CH15 1 W	13.5	9.5	32.3	3.8	38.5	5.4	12.7	10.4	30.4	3.3	37.2	5.1	11.9	11.3	28.5	2.4	36.0	4.7
AN CH 20 1 W	16.3	11.0	39.1	3.6	46.2	6.3	15.4	12.0	36.9	3.1	44.8	5.9	14.5	12.9	34.8	2.6	43.3	5.5
AN CH 25 1 W	20.5	13.9	49.1	4.3	58	9.9	19.3	15.2	46.3	3.9	56.2	9.3	18.2	16.6	43.5	3.4	54.9	8.7
AN CH 30 1 W	24.6	17.2	58.9	6	70.1	7.7	23.2	18.7	55.6	5.4	68.8	7.2	21.8	20.1	52.2	4.8	65.4	6.8
AN CH 35 1 W	30.4	21.5	72.9	10.0	87.0	5.5	28.9	23.5	69.2	8.8	84.9	5.4	27.0	25.8	64.7	7.6	82.0	5.1
AN CH 40 1 W	35.0	25.9	83.8	6.3	100.5	5.4	32.9	27.9	78.7	5.6	96.9	5.0	30.9	30.3	73.9	5.0	93.8	4.7
AN CH 50 1 W	44.3	29.7	106.0	10.5	127.0	7.8	42.4	32.8	101.5	10.0	124.2	6.8	39.5	35.9	94.6	9.5	113.6	6.0
AN CH 60 1 W	53.1	36.2	271.1	9.5	125.6	9.6	50.2	40.0	120.2	8.8	142.5	9.2	46.2	43.7	110.6	7.0	141.3	8.1
AN CH 30 2 W	27.0	19.0	64.6	6.9	77.0	5.4	25.4	10.4	60.8	6.0	74.4	5.1	23.8	22.7	57.7	5.3	71.9	4.7
AN CH 40 2 W	32.6	21.9	78.1	6.8	92.2	6.3	30.8	23.9	73.8	5.8	89.4	5.9	29.0	25.8	69.5	4.9	86.4	5.5
AN CH 50 2 W	40.8	27.8	97.8	9.2	115.6	9.9	38.5	30.4	92.3	8.7	112.0	9.3	36.2	33.	86.7	8.0	108.5	8.7
AN CH 60 2 W	49.1	34.5	117.5	14.2	139.6	7.6	46.3	37.5	110.8	12.8	135.1	7.1	43.5	40.2	104.1	11.6	130.4	6.7
AN CH 70 2 W	60.9	43.2	145.6	18.7	174.1	5.5	57.3	47.0	137.3	18.1	168.4	5.4	53.6	51.6	128.3	17.3	162.7	5.1
AN CH 80 2 W	68.6	51.7	164.3	17.5	197.4	5.2	64.4	55.6	154.3	17.1	190.3	4.8	60.5	60.2	144.8	16.6	184.1	4.5
AN CH 100 2 W	87.7	59.5	210.5	16.0	251.9	7.8	83.5	65.2	200.0	14.7	246.2	6.8	78.0	76.8	186.7	13.2	239.2	6.0
AN CH 120 2 W	105.5	72.8	252.6	15.8	303.9	9.6	99.4	80.0	238.0	14.0	294.7	9.2	91.7	87.9	219.5	12.5	282.2	8.1
AN CH 60 3 W	48.9	32.8	117.0	13.4	138.0	6.3	46.2	35.8	110.6	12.1	133.8	5.9	43.5	38.7	104.1	10.6	129.3	5.5
AN CH 75 3 W	60.9	41.6	145.9	18.0	172.6	9.9	57.6	45.4	138.0	16.2	167.3	9.3	54.1	49.7	129.5	14.5	161.9	8.7
AN CH 90 3 W	73.4	51.5	175.7	15.0	207.3	7.6	69	55.6	165.2	13.4	200.0	7.1	65.0	60.2	155.6	12.0	193.6	6.7
AN CH 105 3 W	91.2	64.4	218.3	15.0	258.7	5.5	85.8	70.4	205.5	13.4	250.4	5.4	80.2	77.3	192.1	12.0	241.8	5.1
AN CH 120 3 W	102.0	76.0	244.2	19.3	290.6	5.2	96.1	82.3	230.0	17.5	281.2	4.8	89.6	89.9	214.6	15.5	271.2	4.5
AN CH 150 3 W	131.0	89.0	313.6	19.5	376.3	7.8	125	98.0	299.2	18.0	368.9	6.8	116.6	108	279.1	16.0	356.3	6.0
AN CH 180 3 W	157.6	108.7	377.3	20.5	453.9	9.6	148.7	120.0	356.0	19.2	441.0	9.2	137.0	131.0	328.0	15.8	421.4	8.1
AN CH 80 4 W	65.2	43.7	156.0	16.8	182.5	5.2	61.4	47.2	147.1	15.0	176.3	4.8	57.9	51.4	138.7	13.5	171.0	4.5
AN CH 100 4 W	82.1	55.5	196.6	9.6	230.5	7.8	77.6	60.5	185.6	8.9	223.5	6.8	72.8	66.3	174.5	7.9	216.2	6.0
AN CH 120 4 W	98.0	68.7	234.5	10.4	276.7	9.6	92.3	74.0	220.9	9.4	267.0	9.2	86.7	80.3	207.7	8.3	258.3	8.1
AN CH 140 4 W	121.6	85.9	291.2	18.9	344.9	7.0	113.8	94.7	272.5	17.9	332.6	6.5	107.0	103.0	256.2	16.8	322.3	6.0
AN CH 160 4 W	136.5	101.6	326.7	17.3	389.1	8.4	128.5	110.1	307.7	15.3	376.5	7.8	120.0	120.0	287.4	13.5	363.3	7.3
AN CH 200 4 W	174.5	119.0	417.8	17.5	501.6	10.4	166.5	130.2	398.6	16.0	491.0	10.2	155.3	144.1	371.8	13.3	474.6	9.6
AN CH 240 4 W	210.2	144.0	503.2	19.2	604.7	11.2	198.0	160.0	474.0	17.0	587.6	10.7	182.7	174.8	437.4	14.0	562.0	9.7

QE = Actual Evaporator Cooling Capacity. [1 tons of ref. = 12000 BTU/HR]
WC = Compressor Motor Power Input at 380 V, 3Ø, 50 Hz **PD =** Water Pressure Drop [Ft. WG] **W.F.D. =** Water Flow Data

Table 7	Condensing Temperature (°F)																			
Model	115					120					125					135				
	QE	WC	QC	Evap. W.F.D. [ΔT=10°F]		QE	WC	QC	Evap. W.F.D. [ΔT=10°F]		QE	WC	QC	Evap. W.F.D. [ΔT=10°F]		QE	WC	QC	Evap. W.F.D. [ΔT=10°F]	
	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD
AN CH 5 1 A	4.5	4.9	63.4	10.7	1.4	4.4	5.1	61.0	10.5	1.3	4.3	5.3	60.0	10.2	1.3	3.8	5.7	55.8	9.1	1.2
AN CH 10 1 A	8.9	9.3	135.2	21.3	2.4	8.5	9.4	131.9	20.4	2.2	8.2	9.6	128.8	19.6	2.1	7.5	10.2	122.6	18.0	1.8
AN CH15 1 A	12.0	12.0	182.3	28.7	2.4	11.6	12.5	178.7	27.8	2.2	11.2	12.9	134.1	26.8	2.0	10.3	13.7	167.8	24.7	1.6
AN CH 20 1 A	14.7	13.7	219.6	35.2	2.7	14.2	14.3	215.5	34.0	2.5	13.7	14.8	211.3	32.8	2.3	12.7	15.8	203.0	30.4	2.0
AN CH 25 1 A	18.3	17.6	275.9	43.8	3.5	17.7	18.3	270.7	42.4	3.2	17.1	19.0	265.4	41.0	2.9	15.9	20.2	254.6	38.1	2.4
AN CH 30 1 A	22.0	21.4	331.2	52.7	5.0	21.2	22.1	324.5	50.8	4.7	20.4	22.9	317.6	48.8	4.4	18.9	24.3	303.7	45.3	3.9
AN CH 35 1 A	27.1	27.5	412.7	64.7	7.7	26.2	28.5	404.8	62.7	7.2	25.2	29.6	396.8	60.3	6.7	23.4	31.5	380.9	56.0	6.0
AN CH 40 1 A	31.0	32.1	474.7	74.2	5.1	29.9	33.3	465.4	71.6	4.8	29.0	34.3	457.6	69.4	4.5	26.7	36.7	437.0	63.9	4.0
AN CH 50 1 A	40.2	32.7	682.2	96.3	9.2	38.7	39.2	589.2	92.7	8.9	37.2	40.6	576.1	89.1	8.6	34.4	43.1	549.8	82.4	8.0
AN CH 60 1 A	46.4	46.4	704.8	111.1	7.1	44.7	48.2	689.8	107.0	6.7	42.6	46.7	673.1	102.7	6.3	39.0	52.3	634.6	93.4	5.5
AN CH 30 2 A	24.0	24.2	364.3	57.5	5.4	23.2	25.0	357.1	55.6	5.1	22.3	25.8	349.9	53.4	4.8	20.7	27.5	335.4	49.6	4.3
AN CH 40 2 A	29.3	27.4	438.1	70.2	5.1	28.3	28.5	429.9	67.8	4.8	27.3	29.6	421.6	65.4	4.5	25.4	31.5	404.9	60.8	3.8
AN CH 50 2 A	36.5	35.2	550.2	87.4	8.1	35.3	36.6	539.9	84.5	7.5	34.1	37.9	529.3	81.6	7.1	31.6	40.3	507.8	75.7	6.2
AN CH 60 2 A	43.7	42.7	660.2	104.6	11.7	42.2	44.2	646.9	101.0	11.2	40.6	45.7	633.3	97.2	10.7	37.6	48.5	605.5	90.0	9.7
AN CH 70 2 A	54.1	54.9	824.4	129.5	17.7	52.2	57.0	808.7	125.0	17.2	50.3	59.1	792.8	120.4	16.7	46.6	63.0	761.1	111.6	15.9
AN CH 80 2 A	60.7	63.8	931.9	145.3	16.7	58.5	66.2	913.4	140.1	16.3	56.3	68.5	894.8	134.8	16.0	52.1	72.8	857.6	124.7	15.2
AN CH 100 2 A	80.3	75.5	1206.0	192.3	14.0	77.4	78.4	1180.0	185.3	13.5	74.5	81.1	1154.0	178.4	13.0	68.8	86.3	1102.0	164.7	12.0
AN CH 120 2 A	92.5	92.8	1408.0	221.5	13.7	89.1	96.3	1378.0	213.3	13.0	85.5	99.4	1345.0	209.7	12.3	77.7	104.6	1268.0	186.0	11.0
AN CH 60 3 A	43.7	41.1	655.9	104.6	10.7	42.3	42.8	643.7	101.3	10.0	40.8	44.3	631.3	97.7	9.3	38.0	47.3	606.4	91.0	8.0
AN CH 75 3 A	54.4	52.8	821.1	130.2	14.7	52.6	54.8	805.7	125.9	14.0	50.7	56.7	790.0	121.4	13.3	47.1	60.3	758.1	112.8	12.0
AN CH 90 3 A	65.2	52.9	979.7	156.1	12.1	62.9	66.1	959.9	150.6	11.3	60.6	68.3	939.7	145.1	10.5	56.1	72.3	898.5	134.3	9.0
AN CH 105 3 A	80.8	82.1	1226.0	193.5	12.2	78.0	85.3	1202.0	168.8	11.4	75.2	88.4	1179.0	180.0	10.6	69.8	94.2	1132.0	167.1	9.0
AN CH 120 3 A	89.6	95.2	1373.0	214.5	15.5	86.4	98.6	1345.0	206.9	14.5	83.2	102.0	1318.0	199.2	13.5	77.0	108.3	1263.0	184.4	11.6
AN CH 150 3 A	120.0	113.2	1804.0	287.3	15.6	115.8	117.5	1765.0	277.3	14.8	111.3	121.6	1726.0	266.5	14.0	102.8	129.2	1648.0	246.1	12.5
AN CH 180 3 A	137.7	139.0	2100.0	329.7	15.9	132.8	144.1	2056.0	318.0	14.7	127.3	148.8	2006.0	304.8	13.4	115.6	156.5	1891.0	276.8	10.0
AN CH 80 4 A	58.1	54.7	867.0	139.1	13.5	56.1	56.8	851.0	134.3	12.7	54.2	58.9	834.6	129.8	12.0	50.4	62.8	801.8	120.7	10.4
AN CH 100 4 A	73.2	70.4	1097.0	175.3	8.0	70.7	73.1	1076.0	196.3	7.5	68.3	75.6	1055.0	163.5	7.0	63.5	80.4	1012.0	152.0	6.0
AN CH 120 4 A	87.0	85.0	1308.0	208.3	8.4	83.9	88.1	1281.0	200.9	7.8	80.9	91.1	1254.0	193.7	7.2	74.9	96.5	1199.0	179.3	6.0
AN CH 140 4 A	107.7	109.5	1633.6	257.9	16.9	104.0	113.7	1603.0	249.0	16.3	100.2	117.9	1571.0	239.9	15.7	92.9	125.6	1509.0	222.4	14.5
AN CH 160 4 A	120.1	127.1	1839.0	287.5	13.5	115.8	131.8	1803.0	277.3	12.6	111.5	136.3	1766.0	267.0	11.7	103.1	144.7	1693.0	246.8	9.9
AN CH 200 4 A	159.8	150.9	2404.0	382.6	16.0	154.2	156.6	2352.0	369.2	15.5	148.2	162.0	2300.0	354.8	15.0	136.9	172.3	2197.0	327.8	14.0
AN CH 240 4 A	183.8	185.4	2804.0	440.1	14.6	177.1	192.2	27450	424.0	13.3	169.9	198.5	2678.0	406.8	11.9	154.4	208.8	2525.0	369.7	8.9

QE = Actual Evaporator Cooling Capacity. [1 tons of ref. = 12000 BTU/HR]
WC = Compressor Motor Power Input at 380 V, 3Ø, 50 Hz
QC = Condenser total heat - rejection {MBH = 1000 BTU/HR}
PD = Water Pressure Drop [Ft. WG]
W.F.D. = Water Flow Data

PERFORMANCE DATA; FOR Water COOLED CHILLERS

EVAPORATOR LEAVING WATER TEMP. = 46°(F)

Table 8	Condenser Leaving Water Temperature (°F)																	
Model	85						95						105					
	QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]		QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]		QE	WC	Evap. W.F.D. [ΔT=10°F]		Cond. W.F.D. [ΔT=10°F]	
	Tons	KW	GPM	PD	GPM	PD	Tons	KW	GPM	PD	GPM	PD	Tons	KW	GPM	PD	GPM	PD
AN CH 5 1 W	5.6	4.2	13.4	2.1	16.4	2.9	5.1	4.5	12.2	2.8	15.4	2.6	4.7	4.8	11.2	1.4	14.7	2.6
AN CH 10 1 W	10.3	7.3	24.6	3.1	29.4	6.6	9.6	8.0	23.1	2.8	28.3	6.1	9.0	8.6	21.7	2.5	27.3	5.6
AN CH15 1 W	18.8	9.6	32.6	3.9	38.7	5.5	12.8	10.4	30.6	3.4	37.5	4.1	12.0	11.4	28.7	2.6	36.1	4.8
AN CH 20 1 W	16.6	11.0	39.8	3.8	46.8	6.5	15.7	12.0	37.5	3.3	45.4	6.2	14.8	12.5	35.4	2.9	43.9	5.8
AN CH 25 1 W	20.9	13.9	49.9	4.5	58.9	10.3	19.7	15.2	47.2	4.0	57.1	9.6	18.5	16.7	44.3	3.6	55.3	9.1
AN CH 30 1 W	25.0	17.3	59.8	9.3	70.9	8.0	23.5	18.8	56.3	5.5	68.6	7.5	22.1	20.3	52.9	4.9	66.2	7.0
AN CH 35 1 W	31.0	21.6	74.4	11.0	86.7	5.7	28.5	23.7	69.0	10.0	84.1	5.4	26.8	25.9	64.1	9.0	81.1	5.0
AN CH 40 1 W	35.6	26.0	85.1	6.5	101.7	6.0	33.4	27.9	80.0	5.3	98.1	5.4	31.3	30.5	75.0	4.3	94.9	5.0
AN CH 50 1 W	46.5	30.5	111.3	11.5	132.8	7.0	43.9	32.8	105.0	10.5	128.4	6.8	40.5	36.5	97.0	9.5	123.0	6.6
AN CH 60 1 W	54.0	36.5	129.2	10.0	155.0	10.2	51.0	40.4	122.1	8.8	150.8	9.4	47.7	44.2	114.2	7.0	145.7	8.7
AN CH 30 2 W	27.5	19.2	65.1	7.2	77.4	5.5	25.7	20.8	61.3	6.0	74.9	4.1	23.9	22.8	57.2	5.0	72.2	4.8
AN CH 40 2 W	33.3	21.9	79.8	7.5	93.7	6.5	31.4	24.0	75.1	6.5	90.8	6.2	29.5	24.9	70.6	5.8	87.7	5.8
AN CH 50 2 W	41.7	27.8	99.9	9.4	117.8	10.3	39.4	30.5	94.3	8.5	114.2	9.6	37.0	33.3	88.6	7.5	110.6	9.1
AN CH 60 2 W	49.9	34.6	119.5	14.6	141.8	8.0	47.0	37.7	112.6	13.4	137.2	7.5	44.2	40.5	105.8	12.4	132.4	7.0
AN CH 70 2 W	62.0	43.2	148.5	19.5	176.6	5.7	58.4	47.2	139.8	19.0	168.2	5.4	54.6	51.9	130.7	18.4	162.2	5.0
AN CH 80 2 W	69.9	51.8	152.2	18.0	200.6	5.9	65.7	55.8	143.0	17.6	193.5	5.3	61.7	61.6	134.2	17.1	187.2	4.9
AN CH 100 2 W	92.0	59.5	220.5	17.5	626.0	7.0	86.7	63.6	207.6	18.5	245.2	6.8	80.1	72.5	191.8	14.5	243.6	6.6
AN CH 120 2 W	106.9	73.2	255.9	16.5	307.5	10.2	100.8	80.0	241.3	14.5	298.7	9.4	94.5	88.6	226.2	11.5	288.6	8.7
AN CH 60 3 W	49.9	39.2	119.4	13.8	140.4	6.5	47.1	35.9	112.8	12.5	136.0	6.2	44.3	38.9	106.1	11.2	131.5	5.8
AN CH 75 3 W	62.4	41.8	149.5	18.6	176.0	10.3	59.0	45.7	141.3	16.9	170.7	9.6	55.5	50.0	132.8	15.1	165.3	9.1
AN CH 90 3 W	74.8	52.5	187.9	15.5	211.0	8.0	70.2	55.8	168.1	13.9	203.6	7.5	66.1	60.5	158.3	12.5	196.5	7.0
AN CH 105 3 W	93.0	64.8	223.2	15.0	261.0	5.7	86.4	71.1	207.0	13.0	252.3	5.4	80.4	77.6	192.3	11.8	243.3	5.0
AN CH 120 3 W	104.1	76.3	249.2	19.9	296.0	5.9	97.6	81.9	233.8	17.9	285.7	5.3	97.4	90.4	219.5	16.2	276.5	4.9
AN CH 150 3 W	137.1	89.4	328.2	20.5	391.3	7.0	126.2	98.8	309.0	18.8	379.5	6.8	119.7	109.0	286.6	16.5	364.4	6.6
AN CH 180 3 W	159.4	110.0	381.6	22.0	459.1	10.2	150.2	121.6	359.6	19.2	445.9	9.4	141.0	139.5	337.6	16.5	432.7	8.7
AN CH 80 4 W	66.5	43.7	159.2	17.6	185.8	5.9	62.7	47.3	150.1	15.8	179.4	5.3	59.1	51.7	141.6	14.3	174.5	4.9
AN CH 100 4 W	83.5	55.6	199.9	9.7	233.8	7.0	78.9	60.7	189.0	9.0	226.7	6.8	74.1	66.6	177.5	8.0	219.4	6.6
AN CH 120 4 W	100.0	68.1	239.4	11.0	281.0	10.0	94.5	74.0	226.2	10.0	272.2	9.4	88.6	80.7	212.2	8.8	263.1	8.7
AN CH 140 4 W	124.0	86.4	297.6	19.0	347.0	7.3	115.2	94.8	276.9	17.9	336.4	6.7	107.2	103.5	256.4	16.6	324.4	6.3
AN CH 160 4 W	138.7	102.0	332.2	18.0	394.9	8.6	130.7	110.6	313.0	16.0	382.1	8.1	122.3	120.6	292.8	14.2	369.0	7.5
AN CH 200 4 W	182.3	119.0	436.5	19.8	520.4	11.2	171.8	130.2	411.3	16.5	503.9	10.4	159.3	145.0	381.4	14.0	485.0	9.8
AN CH 240 4 W	212.4	146.3	508.5	20.0	611.6	11.4	200.3	161.5	479.5	17.5	594.2	10.7	188.1	176.2	450.3	14.8	570.0	10.0

QE = Actual Evaporator Cooling Capacity. [1 tons of ref. = 12000 BTU/HR]
WC = Compressor Motor Power Input at 380 V, 3Ø, 50 Hz **PD =** Water Pressure Drop [Ft. WG] **W.F.D. =** Water Flow Data

Table 9	Condensing Temperature (°F)																			
Model	115					120					125					135				
	QE	WC	QC	Evap. W.F.D. [ΔT=10°F]		QE	WC	QC	Evap. W.F.D. [ΔT=10°F]		QE	WC	QC	Evap. W.F.D. [ΔT=10°F]		QE	WC	QC	Evap. W.F.D. [ΔT=10°F]	
	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD	Tons	KW	MBH	GPM	PD
AN CH 5 1 A	4.7	4.9	65.0	11.2	1.5	4.5	5.1	62.0	10.8	1.3	4.4	5.3	61.1	10.5	1.2	3.8	5.8	56.6	9.1	1.2
AN CH 10 1 A	9.1	9.1	137.4	21.8	2.5	8.7	9.4	134.2	20.8	2.3	8.3	9.7	131.0	19.9	2.1	7.7	10.3	124.7	18.4	1.8
AN CH15 1 A	12.1	12.1	183.2	29.0	2.5	11.7	12.5	179.6	28.0	2.3	11.2	12.9	176.0	26.8	2.0	10.4	13.8	168.7	24.9	1.5
AN CH 20 1 A	14.9	13.8	222.7	35.7	3.0	14.4	14.3	218.6	34.5	2.8	13.9	14.9	214.4	33.3	2.6	13.0	15.9	205.9	31.1	2.3
AN CH 25 1 A	18.7	17.7	280.4	44.8	3.7	18.1	18.4	275.1	43.3	3.4	17.4	19.1	269.8	41.7	3.1	16.2	20.3	258.6	38.8	2.6
AN CH 30 1 A	22.3	21.5	335.4	53.4	5.1	21.5	22.2	328.7	51.5	4.8	20.7	23.0	321.7	49.6	4.5	19.2	24.4	307.6	46.0	4.0
AN CH 35 1 A	27.2	27.5	413.4	65.1	9.2	26.2	28.6	405.5	62.7	8.7	25.3	29.6	397.6	60.6	8.3	23.4	31.6	381.6	56.0	7.6
AN CH 40 1 A	31.4	32.3	480.8	75.4	4.5	30.4	33.5	471.4	72.8	4.2	29.3	34.7	461.9	70.2	3.9	27.1	36.9	442.8	64.9	3.4
AN CH 50 1 A	40.9	38.0	611.6	97.9	9.4	39.4	39.4	598.4	94.3	9.1	37.9	40.8	585.1	90.7	8.8	35.0	43.4	558.8	83.8	8.2
AN CH 60 1 A	47.4	46.7	716.9	113.5	7.6	45.6	48.4	701.9	109.2	7.0	43.8	50.1	685.1	104.9	6.4	39.9	52.7	646.7	95.5	5.2
AN CH 30 2 A	24.5	24.2	370.9	58.7	5.4	23.6	25.1	363.7	56.5	5.0	22.9	25.9	357.7	54.8	4.6	21.1	27.7	341.7	50.5	4.0
AN CH 40 2 A	30.0	27.6	447.2	71.8	6.0	29.0	28.7	438.9	69.4	5.4	28.0	29.8	430.5	67.0	4.8	26.0	31.8	413.5	62.3	4.0
AN CH 50 2 A	37.4	35.4	561.2	89.5	7.6	36.1	36.8	550.6	86.4	7.1	34.9	38.2	539.9	83.6	6.7	32.4	40.6	518.0	77.6	5.8
AN CH 60 2 A	44.5	42.9	671.2	106.5	12.5	43.0	44.5	657.8	103.0	12.0	41.4	46.0	644.0	99.1	11.5	38.3	48.8	615.8	91.7	10.5
AN CH 70 2 A	55.2	55.2	837.7	132.2	18.8	53.2	57.4	821.8	127.4	18.2	51.3	59.5	805.8	122.8	17.9	47.6	63.5	773.7	114.0	16.7
AN CH 80 2 A	61.9	64.2	948.0	148.2	17.2	59.7	66.7	929.3	142.9	16.8	57.5	69.0	910.4	137.3	16.4	53.2	73.4	872.8	127.4	15.6
AN CH 100 2 A	80.6	75.6	1210.0	193.0	14.3	77.7	78.5	1184.0	186.6	13.8	74.8	81.2	1158.0	179.1	12.3	69.1	86.4	1106.0	165.4	11.2
AN CH 120 2 A	94.1	93.3	1441.0	225.3	14.2	90.7	96.7	1411.0	217.2	13.5	87.0	99.9	1378.0	208.3	12.7	79.2	105.7	1301.0	189.6	12.1
AN CH 60 3 A	44.6	36.2	550.0	106.8	11.3	43.1	43.0	655.1	103.2	10.7	41.7	44.6	642.5	99.8	10.1	8.38	47.6	617.3	92.9	8.8
AN CH 75 3 A	55.7	53.1	838.3	133.4	15.2	53.8	55.2	822.6	128.8	14.3	52.0	57.1	806.6	124.6	13.4	48.3	60.8	774.1	115.6	11.8
AN CH 90 3 A	66.3	64.1	904.5	158.7	12.6	64.0	66.5	974.5	153.2	11.8	61.7	68.7	954.0	147.7	11.0	57.1	72.8	912.3	136.7	4.9
AN CH 105 3 A	80.4	82.0	1220.0	192.5	10.8	77.6	85.2	1197.0	185.8	10.0	74.9	88.2	1174.0	179.3	9.2	69.4	94.0	1127.0	166.2	7.2
AN CH 120 3 A	91.7	95.8	1400.0	219.6	16.2	88.5	99.4	1373.0	211.9	15.2	85.2	102.8	1345.0	204.0	14.2	78.9	109.3	1290.0	188.9	12.3
AN CH 150 3 A	120.6	113.3	1810.0	288.7	16.4	116.1	117.6	1771.0	278.0	15.6	111.8	121.7	1731.0	267.7	14.8	103.2	129.4	1654.0	247.1	13.2
AN CH 180 3 A	139.6	134.5	2122.0	334.2	16.5	134.4	144.6	2078.0	321.5	15.2	129.0	149.4	2028.0	308.9	13.9	117.3	157.3	1863.0	280.8	10.9
AN CH 80 4 A	59.3	55.0	882.7	142.0	14.3	57.3	57.2	866.4	137.2	13.5	55.7	58.9	852.8	133.4	12.7	51.6	63.3	816.5	123.5	11.0
AN CH 100 4 A	74.4	70.7	1113.0	178.1	8.1	72.0	73.4	1092.0	172.4	7.6	69.5	76.1	1071.0	166.4	7.1	64.6	80.9	1028.0	154.7	6.1
AN CH 120 4 A	88.8	85.6	1332.0	212.6	8.9	85.7	88.7	1350.0	205.2	8.3	82.6	91.8	1278.0	197.8	7.7	76.5	97.3	1222.0	183.2	6.5
AN CH 140 4 A	107.3	109.3	1629.0	256.9	16.6	103.6	113.6	1598.0	248.0	16.0	99.9	117.7	1567.0	239.2	15.4	92.6	125.4	1505.0	221.7	14.2
AN CH 160 4 A	122.3	127.8	1864.0	288.0	14.2	118.0	132.6	1832.0	282.5	13.3	113.6	137.2	1795.0	272.0	12.4	105.2	145.7	1721.0	251.9	10.6
AN CH 200 4 A	161.1	151.2	2420.0	385.7	16.2	155.3	127.0	2368.0	371.8	15.7	149.4	162.5	2365.0	357.7	15.2	138.1	172.8	2214.0	330.6	14.2
AN CH 240 4 A	185.5	185.8	2824.0	445.2	15.2	178.7	192.7	2765.0	427.8	13.9	171.4	199.0	2698.0	410.4	12.5	155.9	209.5	2545.0	373.3	9.5

QE = Actual Evaporator Cooling Capacity. [1 tons of ref. = 12000 BTU/HR]
WC = Compressor Motor Power Input at 380 V, 3Ø, 50 Hz
QC = Condenser total heat - rejection {MBH = 1000 BTU/hr}
PD = Water Pressure Drop [Ft. WG]
W.F.D. = Water Flow Data

Table 10			Single Compressor Models																			
Model			AN CH 5 1		AN CH 10 1		AN CH 15 1		AN CH 20 1		AN CH 25 1		AN CH 30 1		AN CH 35 1		AN CH 40 1		AN CH 50 1		AN CH 60 1	
			Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled
Electrical Data	Compressor Motor (Per Unit)	HP	5		10		15		20		25		30		35		40		50		60	
		RLA	6.5	7.5	14.3	17.1	19	22.9	22.2	25.7	27.8	32.2	31.8	37.1	43.7	50.8	48.3	55.8	65.9	75.7	79.1	90.4
		FLA	7.2	8.4	16.3	19.6	21.8	26.4	25.3	29.2	31.5	36.6	36.6	42.6	49.8	58.2	54.9	63.7	73.5	85.7	88.6	103.2
		MOC	9		21.3		28.8		30.5		40.1		47.7		62.4		71.8		91.6		107	
		LRA	55		121		129		160		192		218		284		347		444		544	
	System	Max KW Input	3.8	4.6	8.8	10.9	11.9	14.8	13.9	16.8	18	21.6	21.9	26	27.9	33.4	33.1	39.7	38.5	46.5	46.7	56.1
		FLA	7.2	8.4	16·3	19·6	21·8	26·4	25.3	29.2	31.5	36.6	36.6	42.6	49.8	58.2	54.9	63.7	73.5	85.7	88.6	103.2
		Wire* Size	4*4	4*4	4*4	4*4	4*6	4*6	4*10	4*10	4*10	4*10	4*16	4*16	4*16	4*16	3*25/16	3*25/16	3*25/16	3*25/16	3*35/16	3*50/16
Physical Data	Oil Charge (U.S Gals)		0.5		1		1		1		1.1		1.1		1.1		2		2		2	
	Ref. Charge**(Kg)		2.5	1.5	5	3	7.5	4.5	10	6	12.5	7.5	15	9	17.5	10.5	20	12	25	15	30	18
	Oper. Weight (Kg)		360	310	460	410	670	570	770	660	820	700	970	810	1050	840	1220	1110	1380	1180	1585	1350

Table 11			TwoCompressor Models																			
Model			AN CH 30 2		AN CH 40 2		AN CH 50 2		AN CH 60 2		AN CH 70 2		AN CH 80 2		AN CH 100 2		AN CH 120 2					
			Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled				
Electrical Data	Compressor Motor (Per Unit)	HP	15		20		25		30		35		40		50		60					
		RLA	19	22.9	22.2	25.7	27.8	32.2	31.8	37.1	43.7	50.8	48.3	55.8	65.9	75.7	79.1	90.4				
		FLA	21.8	26.4	25.3	29.2	31.5	36.6	36.6	42.6	49.8	58.2	54.9	63.7	73.5	85.7	88.6	103.2				
		MOC	28.8		30.5		40.1		47.7		62.4		71.8		91.6		107					
		LRA	129		160		192		218		284		347		444		544					
	System	Max KW Input	23.8	29.6	27.8	33.6	36	43.2	43.8	52	55.8	66.8	66.2	79.4	77	93	93.4	112.2				
		FLA	43.6	52.8	50.6	58.4	63	73.2	73.2	85.2	99.6	116.4	109.8	127.4	147	171.4	177.2	206.4				
		Wire* Size	4*16	4*16	4*16	3*25/16	3*25/16	3*25/16	3*25/16	3*35/16	3*50/25	3*50/25	3*50/25	3*70/35	3*70/35	3*95/50	3*95/50	3*120/70				
Physical Data	Oil Charge (U.S Gals)		2		2		2.2		2.2		2.2		4		4		4					
	Ref. Charge**(Kg)		15	9	20	12	25	15	30	18	35	21	40	24	50	30	60	36				
	Oper. Weight (Kg)		1210	1010	1370	1150	1450	1200	1690	1380	1910	1500	2140	1690	2200	1750	2350	1810				

Note:
LRA : Locked Rotor Amps **MOC :** Maximum Operating Current **FLA :** Full Load Amps **RLA :** Rated Load Amps
* Suggested cabel size based on copper conductor under full load conditions (FLA) at maximum ambient temperature of 50 C and maximum distance of 70m.
** Excluding the amount of refrigerant for an air cooled condenser & relevant pipings.

Table 12			Three Compressor Models													
Model			AN CH 60 3		AN CH 75 3		AN CH 90 3		AN CH 105 3		AN CH 120 3		AN CH 150 3		AN CH 180 3	
			Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled
Electrical Data	Compressor Motor (Per Unit)	HP	20		25		30		35		40		50		60	
		RLA	22.2	25.7	27.8	32.2	31.8	37.1	43.7	50.8	48.3	55.8	65.9	75.7	79.1	90.4
		FLA	25.3	29.2	31.5	36.6	36.6	42.6	49.8	58.2	54.9	63.7	73.5	85.7	88.6	103.2
		MOC	30.5		40.1		47.7		62.4		71.8		91.6		107	
		LRA	160		192		218		284		347		444		544	
	System	Max KW Input	41.7	50.4	54	64.8	65.7	78	83.7	100.2	99.3	119.1	115.5	139.5	140.1	168.3
		FLA	75.9	87.6	94.5	109.8	109.8	127.8	149.4	174.6	164.7	191.1	220.5	257.1	265.8	309.6
		Wire* Size	3*25/16	3*35/16	3*35/16	3*50/25	3*50/25	3*70/35	3*95/50	3.90/50	3*95/50	3*120/70	3*150/70	3*185/95	3*185/95	3*240/120
Physical Data	Oil Charge (U.S Gals)		3		3.3		3.3		3.3		6		6		6	
	Ref. Charge**(Kg)		30	18	37.5	22.5	45	27	52.5	31.5	60	36	75	45	90	54
	Oper. Weight (Kg)		1890	1550	2160	1750	2500	2000	2880	2250	2980	2350	3100	2470	3280	2630

Table 13			Four Compressor Models													
Model			AN CH 80 4		AN CH 100 4		AN CH 120 4		AN CH 140 4		AN CH 160 4		AN CH 200 4		AN CH 240 4	
			Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled
Electrical Data	Compressor Motor (Per Unit)	HP	20		25		30		35		40		50		60	
		RLA	22.2	25.7	27.8	32.2	31.8	37.1	43.7	50.8	48.3	55.8	65.9	75.7	79.1	90.4
		FLA	25.3	29.2	31.5	36.6	36.6	42.6	49.8	58.2	54.9	63.7	73.5	85.7	88.6	103.2
		MOC	30.5		40.1		47.7		62.4		71.8		91.6		107	
		LRA	160		192		218		284		347		444		544	
	System	Max KW Input	55.6	67.2	72	86.4	87.6	104	111.6	133.6	132.4	158.8	154	186	186.8	224.4
		FLA	101.2	116.8	126	146.4	146.4	170.4	199.2	232.8	219.6	254.8	252	292.8	292.8	340.8
		Wire* Size	3*50/25	3*50/25	3*70/35	3*70/35	3*70/35	3*95/50	3*120/70	3*185/95	3*150/70	3*185/95	3*185/95	3*240/120	3*240/120	3*300/150
Physical Data	Oil Charge (U.S Gals)		4		4.4		4.4		4.4		8		8		8	
	Ref. Charge**(Kg)		40	24	50	30	60	36	70	42	80	48	100	60	120	72
	Oper. Weight (Kg)		2570	2150	3000	2450	3200	2600	3680	2900	3880	3100	4100	3300	4350	3550

Note:
LRA: Locked Rotor Amps **MOC:** Maximum Operating Current **FLA:** Full Load Amps **RLA:** Rated Load Amps
* Suggested cabel size based on copper conductor under full load conditions (FLA) at maximum ambient temperature of 50˚C and maximum distance of 70m.
** Excluding the amount of refrigerant for an air cooled condenser & relevant pipings.

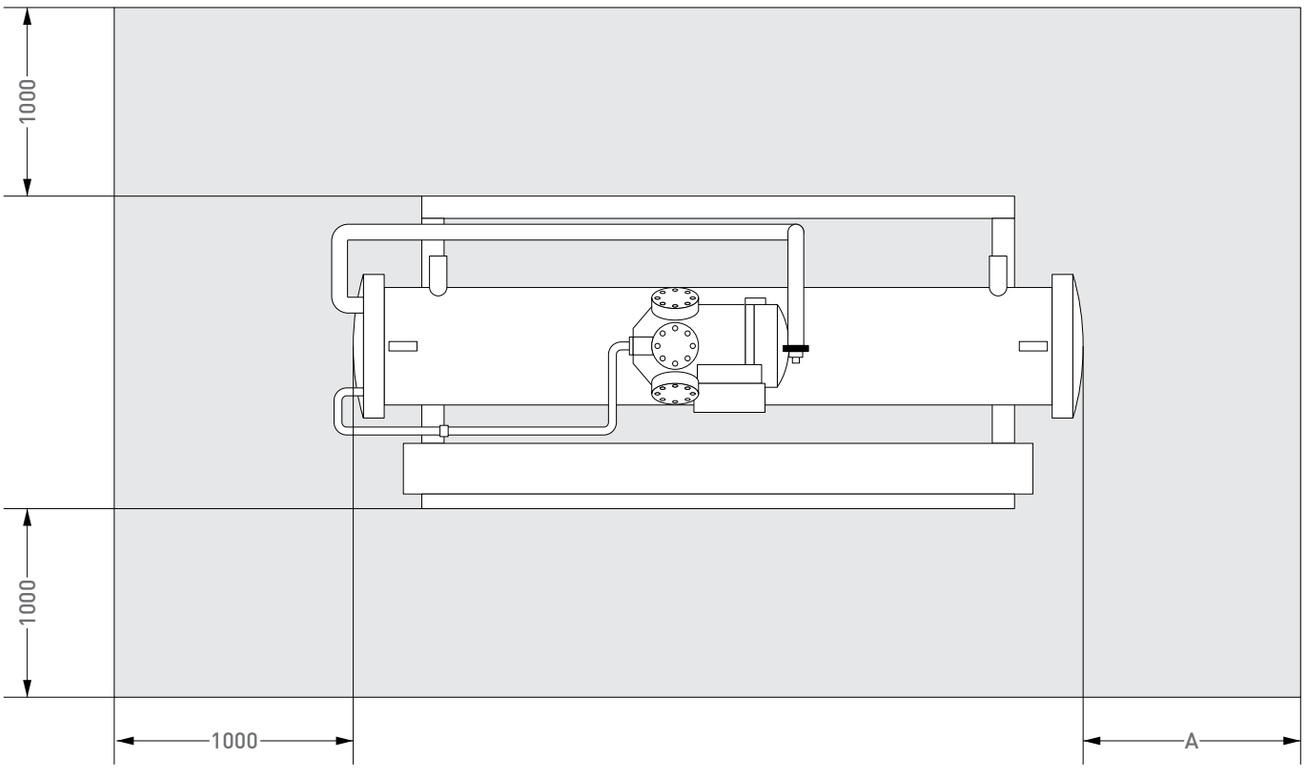


Table 14										
Model	5-1	10-1	15-1	20-1	25-1	30-1	35-1	40-1	50-1	60-1
A	1500	1500	1800	1800	2300	2300	2300	2300	2300	2300

Table 14								
Model	30-2	40-2	50-2	60-2	70-2	80-2	100-2	120-2
A	2300	2300	2300	2700	2700	2700	2700	2700

Table 14								
Model	60-3	75-3	90-3	105-3	70-2	120-3	150-3	180-3
A	2800	2800	3300	3000	3300	3300	3300	3800

Table 14							
Model	80-4	100-4	120-4	140-4	160-4	200-4	240-4
A	3300	3300	3300	3300	3300	3800	4300

Note: All Dimensions in mm

Note:

Note:

Note:

FRP COOLING TOWER
GALVANIZED COOLING TOWER

AzarNasim
HVAC SYSTEMS

1. **Definition**:
Cooling towers are heat removal devices used to transfer process waste heat to the atmosphere. Cooling towers may either use the evaporation of water to remove process heat and cool the working fluid to near the wet-bulb air temperature or in the case of "Close Circuit Dry Cooling Towers" rely solely on air to cool the working fluid to near the dry-bulb air temperature. Common applications include cooling the circulating water used in oil refineries, chemical plants, power stations and building cooling. The towers vary in size from small roof-top units to very large hyperboloid structures that can be up to 200 meters tall and 100 meters in diameter or rectangular structures that can be over 40 meters tall and 80 meters long. Smaller towers are normally factory-built, while larger ones are constructed on site. They are often associated with nuclear power plants in popular culture, although cooling towers are constructed on many types of buildings.

2. **Classification by use:**

HVAC
An HVAC (Heating, Ventilating, and Air Conditioning) cooling tower is a subcategory rejecting heat from a chiller. Watercooled chillers are normally more energy efficient than air-cooled chillers due to heat rejection to tower water at or near wet-bulb temperatures. Air-cooled chillers must reject heat at the dry-bulb temperature, and thus have lower average reverse-Carnot cycle effectiveness. Large office buildings, hospitals, and schools typically use one or more cooling towers as part of their air conditioning systems. Generally, industrial cooling towers are much larger than HVAC towers.

Industrial cooling towers
Industrial cooling towers can be used to remove heat from various sources such as machinery or heated process material. The primary use of large, industrial cooling towers is to remove the heat absorbed in the circulating cooling water systems used in power plants, petroleum refineries, petrochemical plants, natural gas processing plants, food processing plants, semiconductor plants, and for other industrial facilities such as in condensers of distillation columns, for cooling liquid in crystallization, etc. The world's tallest cooling tower is the 200 meter tall cooling tower of Niederaussem Power Station.

3. **Heat transfer methods**
With regard to the heat transfer mechanism employed, the main types are:
Wet cooling towers or simply open circuit cooling towers operate on the principle of evaporation. The working fluid and the evaporated fluid (usually H2O) are one and the same. Dry Cooling Towers operate by heat transfer through a surface that separates the working fluid from ambient air, such as in a tube to air heat exchanger, utilizing convective heat transfer. They do not use evaporation.

4. **Air flow generation methods**
With regard to drawing air through the tower, there are three types of cooling towers:
Natural draft, which utilizes buoyancy via a tall chimney. Warm, moist air naturally rises due to the density difference to the dry, cooler outside air. Warm moist air is less dense than drier air at the same pressure. This moist air buoyancy produces a current air through the tower. Mechanical draft, which uses power driven fan motors to force or draw air through the tower. Induced draft: A mechanical draft tower with a fan at the discharge which pulls air through tower. The fan induces hot moist air out the discharge. This produces low entering and high exiting air velocities, reducing the possibility of recirculation in which discharged air flows back into the air intake. This fan/fin arrangement is also known as draw-through. Forced draft: A mechanical draft tower with a

blower type fan at the intake. The fan forces air into the tower, creating high entering and low exiting air velocities. The low exiting velocity is much more susceptible to recirculation. With the fan on the air intake, the fan is more susceptible to complications due to freezing conditions. Another disadvantage is that a forced draft design typically requires more motor horsepower than an equivalent induced draft design. The forced draft benefit is its ability to work with high static pressure. They can be installed in more confined spaces and even in some indoor situations. This fan/fill geometry is also known as blow-through.

5. Air-to-water flow Categorization

Cross flow

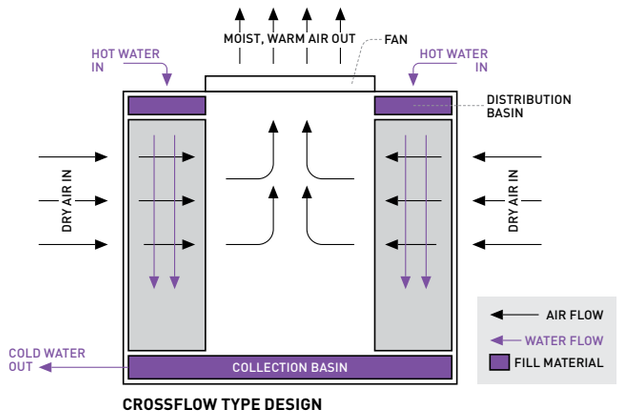
Cross flow is a design in which the air flow is directed perpendicular to the water flow (see diagram below). Air flow enters one or more vertical faces of the cooling tower to meet the fill material. Water flows (perpendicular to the air) through the fill by gravity.
The air continues through the fill and thus past the water flow into an open plenum area. A distribution or hot water basin consisting of a deep pan with holes or nozzles in the bottom is utilized in a cross flow tower. Gravity distributes the water through the nozzles uniformly across the fill material.

6. Factors which effects the capacity of cooling tower

- Environment wet bulb temperature: lowering wet bulb temperature.
- increasing fill area.
- increasing the period of air and water contact.

7. Terminology

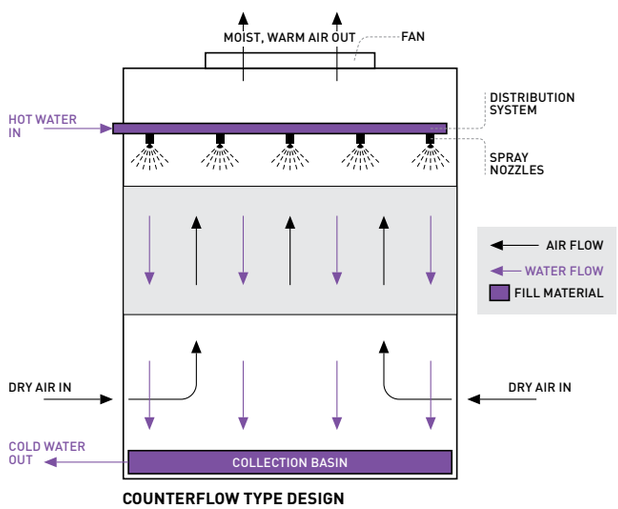
Range - The range is the temperature difference between the water inlet and water outlet. The capacity of a cooling tower can be calculated by measuring the water flow rate



CROSSFLOW TYPE DESIGN

Counter flow

In a counter flow design the air flow is directly opposite of the water flow (see diagram below) Air flow first enters an open area beneath the fill media and is then drawn up vertically. The water is sprayed through pressurized nozzles and flows downward through the fill, opposite to the air flow.



COUNTERFLOW TYPE DESIGN

Common to both designs

The interaction of the air and water flow allows a partial equalization and evaporation of water. The air, now saturated with water vapor, is discharged from the cooling tower. A collection or cold water basin is used to contain the water after its interaction with the air flow. Both cross flow and counter flow designs can be used in natural draft and mechanical draft cooling towers.

and the range from below equation:

Cooling tower load (KW) =
flow rate (L/S) ×4.19 (Kj/Kg°K)×Range(°K)

Approach - The approach is the difference in temperature between the cooled-water temperature and the entering-air wet bulb temperature (twb). Since the cooling towers are based on the principles of evaporative cooling, the maximum cooling tower efficiency depends on the wet bulb temperature of the air. The wet-bulb temperature is a type of temperature measurement that reflects the physical properties of a system with a mixture of a gas and a vapor, usually air and water vapor.

8. Principal of operations of "Tahvieh Azar Nasim" conical Type Cooling Towers

The automatic rotating sprinkler system distributes the hot water evenly over the entire fill section. Dry air is simultaneously drafted upward causing evaporation and so, the heat is removed. The cooled water falls into the basin and is pumped to the heat source for recirculation.

9. Thermal Design

The "Tahvieh Azar Nasim" cooling towers operate on the counter flow principle which gives the best performances. The air flow through the tower fill is opposed the water flow. The cold air meets the closed water at the bottom of the fill providing maximum evaporation and heat transfer in the fill. The PVC fill is corrugated with clear channels between flutes to prevent any blockage and giving a large surface area per unit volume. Water flows through the fill in a thin film exposed the maximum area to the cooling air flow. The flutes of the fill area at an angle and each layer of fill section are reversed, turning the film or water and air over for maximum cooling.

10. Better Air Flow

The rotating water sprinkler head distributes the hot water which forming a fine spray, and hence does not need the conventional type of moisture eliminator. This is because the water header has large number of holes giving a 'steam' type flow direct into the fill. Tower with fixed nozzles cannot obtain the coverage, which is needed for optimum cooling. We should not overlook that in rectangular type towers, eliminators provide a pressure drop which evens out the flow particularity into the corner.
The "Tahvieh Azar Nasim" cooling tower being round, plus its conical fan inlet can better provide an even air flow through the fill, with a lower pressure drop, and without the additional pressure drop caused by the eliminator needed on other towers. Fan KW depends on the mass of air delivered, the pressure generated and the blade efficiency, from the available data on other manufacturers' tower. "Tahvieh Azar Nasim" air volumes are similar to competitor's size. The influence factors for lower power are 'pressure' and 'efficiency'.
Tower has large air inlet area, with low air velocity; low pressure drop tower is of the induced draft type. The fan is in the ideal position, to discharge the air at a high velocity upwards and allow natural convection to prevent recirculation, as can happen with the forced draft tower arrangement, where air leaves the eliminator at low velocity.

11. Pumping head

As seen already, the water distribution by a rotating header is a significant part of the "Tahvieh Azar Nasim" tower design. The large diameter holes in the rotating header give a gentle stream of water at negligible pressure lose. Also, there is no risk of 'clogging', as can easily happen with spray nozzles in other types of towers. The "Tahvieh Azar Nasim" cooling towers pumping head, is the static height of the spray or header pipe above the water level in basin, plus the pressure loss the rotating header, sprays of balancing valves, according to the type of tower being considered. It should be noted

that pumping heads quoted for "Tahvieh Azar Nasim" towers include both of these as well as piping inside the pressure loss of sprays is usually quoted. To this must be added the static lift to the spray header from the basic required for a "Tahvieh Azar Nasim" cooling tower 50% less than for some other cooling towers.

12. Lift factor

Although we generally refer to the towers as being constructed of fiberglass, we should actually refer to them as being FRP (Fiberglass Reinforced Plastic) should not be confused with the translucent fiberglass roofing panels, and in particular with the cheaper grades which have given poor results even only in a few years.
Without an adequate protective layer, the sun's ultra violet rays draw the fibers upwards so that 'hairs' appear to be growing on the panels as with fiberglass hulls, the "Tahvieh Azar Nasim" towers do not need painting. However, if a client wishes to have color scheme changed, painting is possible.
Compared with timber towers which will ultimately rot, or steel towers which will rust despite increased maintenance, the fiberglass tower has tremendous financial advantages for the wise investor.
Unfortunately, many buyers appear to be only concerned to maintenance, running costs or rate of deterioration.

13. Smaller Fan Motors

Smaller electric motor in "Tahvieh Azar Nasim "cooling towers, causes lower consumption power and save money.

14. Advantages of "Tahvieh Azar Nasim" Cooling Towers:

- Strong FRP layers used isophetalic resin, no vibration and increase the life of cooling tower.
- Neopentyl glycol (NPG) anti-UV causes long lasting color, decorative and long life.
- FRP sump
- Fill are made of Virgin antibacterial PVC films.
- Fans are dynamically balanced for smooth operation, longer bearing life including that of the supporting structure.
- The fan drive motor is in IP-55, "F" class.
- 5years warranty insures you a right purchase.

15. Components

The various components of FRP conical type cooling tower are as below:

Casing

The bolt together FRP casing is completely non-corrosive. The casing enclosed the PVC fills services to isolate the air stream, which passes over the fills. The casing is conical shaped to reduce frictional resistance of air and aids flow pattern. It is designed to withstand wind loads up to 75km/hr., and vibrations emanating from the motor and other equipment. FRP casing has a high impact resistance when laminated with Isophetalic Resin and even if damaged is easily repaired at site. The neopentyl glycol gel coat is U.V. inhibited to provide a long lasting finished appearance and service life and imported wax release agents helps retain colors for long periods even if exposed to direct sunlight. The casing is in sections of easy to handle sizes and is assembled at site using bolting joints. The conical shape of casing is ideal with regard to cooling efficiency and space economy.

Basin

The basin serves the purposes of collecting the water descending from the fills and channeling it to the suction point. Further the basin also acts as a reservoir of water. The basin is also made of FRP and has similar characteristic the same as casing.

Sump

The sump is located below and in the center of the basin and has all connections for inlet/

outlet, drain, filling and overflow. The unit is at the lowest point and is always flooded and thus ensuring no capitations on the pump suction. The suction tank is fully molded in FRP to prevent corrosion and subsequent leakages. A drain is provided to the tank which makes it quite simple to remove the accumulated dirt and to drain out the water, simplifies the cleaning and maintenance of the tower.

Tower Structure
The structure of the tower supports the casing, basin and motor mounting loads to the foundations. These are of MS and are hot dipped galvanized so as to resist corrosion.

Fills
The fills section is designed to bring about intimate contact of water and air so as to facilitate heat and mass transfer at the same time aiding in proper and even distribution of air and water over the cross section, while maintaining minimum pressure drop. The fills are of honeycomb section and are vacuum formed from anti-bacterial Virgin PVC for excellent resistance to corrosion and give maximum area for intake.

Sprinkler
The gravity die cast aluminum alloy / S.S sprinkler is used to distribute the water evenly over the cross section of the tower. An aluminum alloy / S.S rotary head with radial PVC / PP pipes having drilled holes serves this purpose. The rotation of assembly is accomplished due to reaction of water jet being sprayed from PVC / PP pipes. The sprinkler head is mounted on top of the central water supply. To ensure free rotation even at low flows the sprinkler has 2 sealed pre lubricated ball bearing mounted on the central shaft. This sprinkler system is preferred over the fixed nozzle system forVarious reasons.

Fan / Fan Blades
The light weight fan has good corrosion-resistant quality is an axial flow, multi blade version with adjustable blade pitch. The fan is designed to deliver large volumes of air at low power consumption and low noise generation. The fans are dynamically balanced for smooth operation, longer bearing life including that of the supporting structure. FRP fan blades may also be provided on demand and these have in addition to excellent corrosion-resistance, good noise reduction properties.

Fan Drive Motor
The fan drive motor is in IP-55 'F' class design. The fan is directly driven by the special extended shaft motor made from steel mounted facing downward on a mounting frame on the top of the Cooling Tower.

Louvers
FRP louvers are installed at the air inlet (space between the Tower casing and water Basin) to prevent water splash and contaminants like leaves, bird etc. entering the Cooling Tower.

Grills
Since Cooling Tower are generally installed on windswept rooftop or higher altitude, galvanized MS grill are installed at the air outlet to prevent contaminants like leaves, bird etc. entering the cooling tower.

16. Water loss

Water losses are very important especially in dry zones. Water losses in cooling towers are based on four items;

- Evaporation
- Drift
- Bleed off
- Pipe line and valves leakages

Evaporation

The evaporation rate can be estimated from the below equation:

$$E=0.0008(T_i-T_o) \times F$$

E=evaporation rate (gpm)
T_i &T_o= inlet and outlet temperatures °F
F= water flow rate (gpm)

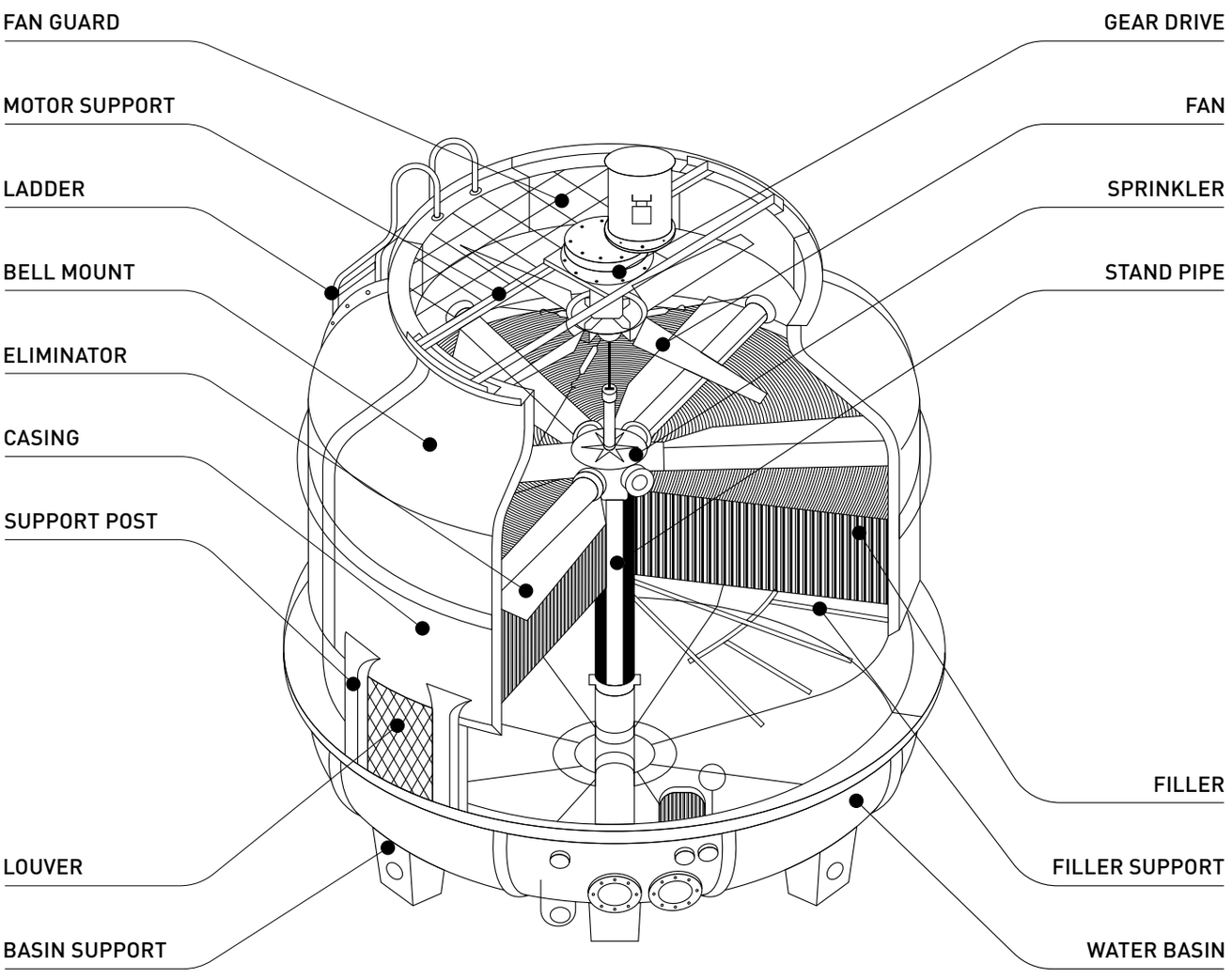
Drift

Water droplets that are carried out of the cooling tower with the exhaust air. Drift droplets have the same concentration of impurities as the water entering the tower. The drift rate is typically reduced by employing baffle-like devices, called drift eliminators, through which the air must travel after leaving the fill and spray zones of the tower. Drift can also be reduced by using warmer entering cooling tower temperatures. The drift loss in "Tahvieh Azar Nasim" cooling towers is less than 0/002% of water flow rate, so the maximum drift loss can be calculated from below equation:

$$D=0.002 \times F$$

Bleed Off

The portion of the circulating water flow that is removed in order to maintain the amount of dissolved solids and other impurities at an acceptable level. It may be noted that higher TDS (total dissolved solids) concentration in solution results in greater potential cooling tower efficiency. However the higher the TDS concentration, the greater the risk of scale,



Drift Eliminators

Units with rotary sprinklers are designed to minimum carry over by judicious choice of air flow velocities. The air distribution is aided by using a centrally located rotating eliminator section to avoid high velocity area. Further the pipes are covered by aero foil section eliminators which prevent small droplets escaping and facilitate uniformly distributing the sprinkler water. For the towers using stationary sprinkler nozzles a full width eliminator covering the full cross section is used. The shape of the eliminator is chosen to minimize pressure loss of air and to trap the maximum amount of droplets.

biological growth and corrosion.
"Tahvieh Azar Nasim" suggested the flowing rates for bleed off as given in below table: Bleed off can be calculated by multiplying water flow rate into the coefficient given above. Bleed off pipe should be installed on return pipe from condenser to cooling tower and near the tower so that when the pump is running bleed off takes place.

Pipe line and valves leakage
Water losses from pipe lines and valves are depends on the quality and connections.

17. Preparation for Installation

1. Declare all components, open all packages, and confirm nothing is damaged.
2. Check all components received as per packing slip (including fiberglass mat and resin)
3. Collect all tools and tackles as needed:
   - Spanners / - drill & drill bit / - pipe wrench / - screw driver / - plier / - hammer
   - files / - spirit level , pipe level / - slitting knife / - brush / - roller

Cooling Range °F	Percent Bleed off
5	0.1
6.5	0.16
7.5	0.21
10	0.33
15	0.55
20	0.75

4. Check concrete foundation, is as per drawing.
5. Check level of foundation legs and correct if required.
6. Install suction tank on central foundation, with correct orientation as decided by client.
7. Install cylindrical legs on circumference foundation.
8. Level top side with pipe level.
9. Install basin supporting ring and bolt together, with supporting legs.
10. Bolt basin FRP section and place on top of Basin Ring.
11. Install Grill which supports upper Ring support legs on top of Basin on edges.
12. Install upper ring and bolt to legs.
13. Install casing sections piece by piece and bolt together to next piece to form complete cylindrical shape.
14. Install motor supporting ring / bracket.
15. Install ladder.
16. Install motor and fan set.
17. Connect inlet stand pipe.
18. Connect sprinkler mounting pipe.
19. Connect P.V.C pipes to sprinkler.
20. Screw in pipes and end caps and lock with locknut (for large towers turn buckles are to be used for maintaining PVC pipes horizontally.)
21. Install clamp on central pipe.
22. Install cross containers of cooling surfaces.
23. Flatten plastic cooling support on the containers.
24. Install cooling surfaces on grid vertically, stating with diametrically placed packs fill up the rest of grid.
25. Install next fill pack layer at right angles to 1st layer
26. Seal Basin flanges and suction tank with fiberglass mat and resin, and allow drying before using.
27. Install motor / fan protection grid.
28. Install grill and louvers.
29. Brush coat bolt heads with resin for additional protection.
30. Provide bottom support for ladder.
31. Sprinkler assembly

31-1- sprinkler pipes

The sprinkler pipes must be clean to prevent any blockage in their holes. When cleaning the sprinkler pipes, loosen the lock nut to unscrew and remove the sprinkler pipes. On reassembling, be sure the alignment screws (round head) are positioned at the top center 30-2 sprinkler hand Scale or sludge attached to the narrow space impedes revolution.

If the sprinkler rotation slows down or even stops despite normal water flow the sprinkler pipes or, at the beginning of the season, if the head does not rotate even though the water is flowing at the same rate as last season, dismantle the rotary head for cleaning and checking.
When reassembling, do not wet the bearing portion with water and apply ample anticorrosion lubricant (water proof, lithium soap- radical grease) on bearings and oil seals position.
Also pay particular attention when passing the oil seal over the center poll to not to damage the lips of the oil seal. Since oil seal is effective for a limited period, it is desirable to dismantle and replace it every two or three years.

18. Normal conditions

Water quality and environmental conditions on the vast majority of HVAC cooling tower applications permit acceptable service life from standard cooling tower construction using the materials previously described. Significant deviation from these normal conditions often demands alternate materials choices.
For most proposes the following criteria define “normal” conditions:
Standard tower design assumes a maximum of 120°F hot water to the tower, including system upset conditions. Temperatures over 120°F, even for short duration, may impose damaging effects on PVC fill, many thermoplastic components, galvanizing and play woods. Those rare applications demanding hot water in excess of 120°F usually benefit from careful review with the tower manufacturer to assure that appropriate materials changes from standard configuration are included in the initial purchase specification.
“Normal” circulating water chemistry falls within the following limits (note the distinction between circulating water and make-up water):
--ph. between 6.5 and 8.0, although ph. down to 5.0 is acceptable if no galvanized steel is present. Low ph. attacks galvanized steel, concrete and cement products, fiberglass and aluminum. High ph. wood, fiberglass and aluminum.
--chlorides (express as NaCl) below 750 ppm.
--Calcium (as CaCO3) below 1200 ppm- except in arid climates where the critical level for scale formation may be much lower.
--sulfates below 5000 ppm if calcium exceeds 1200 ppm sulfates should be limited to 800 ppm, (less in arid climates) to prevent scale formation.
--sulfides below 1ppm
--Silica (as SiO2) below 150 ppm
--iron below 3ppm
Manganese below 0.1ppm
-- saturation index between -0.5 and +0.5 negative LSI indicates corrosion likely; positive indicates CaCo3 scaling likely.
--suspended solids below 150ppm if slides are abrasive avoid film-type fills, is solids are fibrous, greasy, fatty or tarry wood, PVC, Polypropylene or ABS fills can be used, but PVC usually is the material of choice.
--oil and grease below 10ppm or loss of thermal performance will occur.
--no organic solvents
--no organic nutrient, which could promote growth of algae or sludge.
--chlorine (from water treatment below 1ppm free residual for intermittent treatment below 0.4ppm free residual for continuous chlorination These conditions define normal circulating water, including the chemical concentrating effects caused by recalculating the water to some predetermined number of concentration.

19. Water quality control

Cooling towers not only are very effective but also sensitive air washers. Atmospheric dust able to pass through the air inlet will enter the circulating water or air pollution, such cases as corrosion, scale and algae growth which impeded the performance of air conditioning equipment are surprisingly increasing. To prevent such trouble, it is not

enough to depend entirely upon chemical or equipment. Check the water quality and also on environment factors as well.

1. Make quality analysis of circulating water and supplementing water and take appropriate action to control the quality.
2. If when the trouble is anticipated owing to the condensed circulation water, we recommended the use of chemical, periodic below sown to keep the operation within the regulate water quality.
3. For nitrate and sediment, clean with chemicals.
4. Use strainer or filter depending on the water quality.

WARNING
Water treatment must be supplied and / or applied by a professional in the field in order to avoid fill damage. It is the user's / owner's responsibility to treat water in order to stop biological contaminants and avoid among other bacterium, the Legionella bacteria, which is known to cause legionnaire disease.

20. Post assembly Checks/Pre-commissioning Checks

1. Check level of sump, and fan ensure they are parallel to ground.
2. Check center pipe is vertical and sprinkler arms are all leveled, at right angles to center pipe.
3. Ensure no dirt/other foreign particles are present in sump, suction tank etc. sweep clean/wash clean.
4. Rotate sprinkler with hand and ensure it is free.
5. Ensure fill top is even.
6. Ensure sprinkler arms are at a constant level above the fills and that the arms do not rub against/ uneven fills, casing etc.
7. Ensure fan and motor assembly is free.
8. Check all bolts are tight and no loose part noticed.
9. Fill water in sump and check and eliminate water leaks.
10. Connect correct power (i.e. 380V, 50Hz 3PH.AC) supply to fan and check

    a. Direction of rotation of fan is correct and air is being sucked through screen above sump and discharged vertically upwards.
    b. Vibrations are negligible.
    c. Fan cable connections are made with lugs & terminal cover gasket is tight.

11. Establish water flow and check sprinkler rotates and check any unregulated bypass from sprinkler pipes.

Check after commissioning

1. Check motor speed to be as specified in technical data for particular model.
2. Check air flow rate is as per specification.
3. Check water flow rate is as per specification.
4. Check power / current drawn by fan motor are within limits and as specified.
5. Check for abnormal noise / vibration during operation.
6. Check sprinkler rotates freely at 5 to 8 rpm or adjust holes to angle so as to achieve correct rpm.
7. Ensure water is being distributed evenly over the FRP eliminator plates and there is no carry over from below the eliminator plate water must fall down below evenly and not pass out.
8. Eliminator plate adjustment to be checked to ensure equal distance between fill top and plat bottom.
9. Measure temperature at following locations:

I. Water inlet
II. Water outlet / sump
III. Make up water inlet
IV. Wet bulb / dry bulb temperature at outlet

of tower above fan

10. Adjust drain valve to give adequate blow down.
11. Set float to ensure proper operation and to avoid over flow when plant stops.

Maintenance Schedule

Every Day
Check if--
1. Vibrations are normal / noise normal.
2. Proper Water distribution.
3. Measuring every three phases of fan.
4. Normal Inlet / outlet temperature of water

Every week:
1. Clean inlet grill to remove entrained matter.
2. Clean inlet water filter.
3. Clean sprinklers / nozzles if chocked.
4. Check growth of Algae etc. and remove from sump.
5. Check belts stiffness.

Every month:
1. Drain tank, flush out and remove any sediment.
2. Check fills if clogged due to Allege, sediment / salt, etc.
3. Check structural / FRP casing and Basin damages.
4. Clean outside of the tower with detergents like soap and water.
5. Check and tighten all bolts.
6. Grease bolts to facilitate easy opening in future.

Every two months:
1. Grease all bearings of motor.
2. Grease all bearings of sprinklers.
3. Check run out on fan motor Shafer.
4. Clean blades from foreign materials.
5. Check conditioner plates if damaged and replace it.

Replace bearings of sprinkler ssembly after 2 years and grease it.

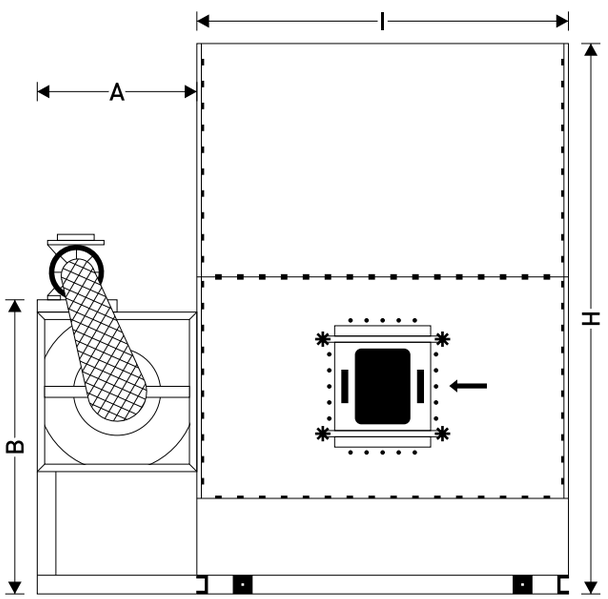
Table 1	TROUBLESHOOTING	
Trouble	Cause	Remedy
Lowering of cooling capacity 1- Motor	Electric blackout 1	Electric blackout 1
	Fuse burned due to damage contacts	Fuse burned due to damage contacts
	Insufficient switch capacity	Insufficient switch capacity
	Bad switch contact	Bad switch contact
2- Sudden lowering of motor speed (rotation per minute)	Electric blackout 1	Electric blackout 1
	Fuse burned due to damage contacts	Fuse burned due to damage contacts
	Insufficient switch capacity	Insufficient switch capacity
3- Con not rev up motor speed (rotation per minute)	Defective starter / starter connection	a. Correct connection according to name plate b. Check supply voltage across 3 phases c. Check current in all 3 phases
	Fuse burned due to damage contacts	Fuse burned due to damage contacts
	Insufficient switch capacity	Insufficient switch capacity
4- Fan stoppage	Jammed Bearing	Replace bearing
Temperature rise 1- Motor getting over heated	Too heavy load	Lighten load proper level
	a. lowering of voltage supply	a. consult power company
	b. unbalanced voltage supply	b. consult power company
	High surrounding temp	Consult Azar Nasim
	Contact between rotary and fixed section	Change bearing or supplement grease
Oil leaking , others 1- In case of gear speed reducer oil leakage	Too much oil	Lower the oil face to proper level
	Loose bolt	Tighten properly
Raise in discharging water temperature	Water flow above specified	Regulate to correct flow rate
	Water flow below specified	Adjust blade angle check and clean jail
	Load higher than design	Adjust load to correct level
	Fill checked or coated	Clean/replace fills. Use proper water (make up) quality
	Fresh air intake not sufficient or area sufficient or area around tower not as specified	Improve ventilation and ensure exhaust air does not get recycled
	WBT high	Check design condition and ensure no recycling of exhaust air
	Water bypassing fills	Check sprinkler and distribution system
	Sprinkler jammed/water not being sprinkler and distributed	Repair sprinkler and distribution system
Water flow reduction	Filter chocked	Clean water filter
	Sprinkler pipes chocked	Clean pipes and holes
	Level of water low in pump	Adjust float / inlet flow ensure proper make up
	Pump small	Replace for correct flow volume
Air flow reduction	Fan speed low	Check bearings / motor
	Fan blade angle in correct	Correct blade angle required setting
	Inlet grill chocked	Clean air path
Water splash	Sprinkler is rapid	Adjust it
	Filter chocked	Clean or replace it
	Eliminator is defective	Replace or repair it
Noise and vibration	Fan mounting loose	Tighten mounting bolt and correct/replace if needed
	Fan block loose	Tighten blade in hub
	Fan unbalanced	Rebalance and adjust
	Motor bearing faulty	Check and grease or replace bearing on motor
	Hub mounting on motor shaft loose	Tighten and use end plate and shims if needed
	Many parts rubbing against tower components	Give proper clearances and adjust/align components

After the inspection and troubleshooting process, contact the after sale services of Azar nasim co. otherwise, the problem shall be fixed by authorized personel.

Table 2

Model	Nominal water flow (GPM)	Motor power (Kw)	Fan		Pump Head (m)	Dimensions (cm)		Weight (Kg)			
			Dia (cm)	Nominal Air flow (CFM)		Standard and Low Noise type		Standard type		Low Noise type	
						Height	Dia.	Dry	Full	Dry	Full
5-085	28	0.18	50	2800	1.3	135	85	50	118	52	120
10-093	35	0.18	60	3180	1.3	163	93	56	138	58	142
15-117	53	0.37	80	6360	1.6	168	117	83	218	85	220
20-138	71	0.37	80	7000	1.6	178	138	110	264	113	268
25-138	88	0.37	80	7770	1.8	202	138	115	329	118	332
30-163	105	0.75	90	8480	2	189	163	160	363	164	367
40-178	141	0.75	90	9410	2	200	178	171	410	175	414
50-187	176	1.1	90	11300	2.2	234	187	215	515	219	519
60-199	212	1.5	120	14500	2.5	237	199	399	708	405	714
70-215	247	1.5	120	16000	2.5	215	215	420	777	426	783
80-215	282	1.5	120	17100	2.5	248	215	431	792	437	798
90-259	318	1.5	120	21800	3.1	235	259	459	854	471	864
100-259	352	1.5	120	24100	3.1	257	259	519	943	529	953
125-295	442	2.2	150	27500	3.5	238	295	629	1053	644	1068
150-295	528	4	150	29700	3.5	262	295	789	1468	804	1483
175-333	618	4	180	32900	3.8	262	333	874	1553	890	1569
200-371	705	4	180	47100	4.4	292	371	1342	3043	1360	3060
225-371	795	5.5	180	57100	4.4	315	371	1462	3162	1480	3180
250-439	880	5.5	240	66500	4.7	328	439	1657	3357	1678	3379
300-439	1050	5.5	240	76900	4.7	366	439	1766	3473	1788	3494
350-485	1230	7.5	240	83500	5	345	485	1861	3861	1885	3885
400-485	1410	11	240	90700	5	368	485	2305	4305	2329	4329
450-551	1580	11	300	106500	5.3	404	551	2535	5818	2565	5848
500-551	1770	11	300	119500	5.3	427	551	2590	7155	2619	7185
600-653	2120	11	330	139500	5.6	460	653	3493	10588	3524	10619
700-653	2460	15	330	171000	5.6	483	653	3652	10747	3684	10779
800-759	2830	18.5	360	197100	6.2	500	759	5229	12808	5264	12843
1000-759	3520	22	360	217700	6.2	523	759	5449	13247	5483	13282
1250-879	4400	22	420	270700	6.5	556	879	6476	15458	6516	15497

Table 3						
Model	Inlet	Outlet	Over Flow	Drain	Quick	Float Valve
5-085	1.5	1.5	1	1	1/2	-
10-093	1.5	1.5	1	1	1/2	-
15-117	2	2	1	1	1/2	-
20-138	2	2	1	1	1/2	-
25-138	2	2	1	1	1/2	-
30-163	3	3	1	1	1/2	-
40-178	3	3	1	1	1/2	-
50-187	3	3	1	1	1/2	-
60-199	4	4	1.5	1.5	3/4	-
70-215	4	4	1.5	1.5	3/4	-
80-215	4	4	1.5	1.5	3/4	-
90-259	4	4	1.5	1.5	3/4	-
100-259	4	4	1.5	1.5	3/4	-
125-295	4	4	1.5	1.5	3/4	3/4
150-295	4	4	1.5	1.5	3/4	3/4
175-333	6	6	1.5	1.5	3/4	3/4
200-371	6	6	3	1.5	1	1
225-371	6	6	3	1.5	1	1
250-439	6	6	3	1.5	1	1
300-439	8	8	3	1.5	1	1
350-485	8	8	3	1.5	1	1
400-485	8	8	3	1.5	1	1
450-551	10	10	4	3	2	2
500-551	10	10	4	3	2	2
600-653	10	10	4	3	2	2
700-653	10	10	4	3	2	2
800-759	12	12	4	3	3	3
1000-759	12	12	4	3	3	3
1250-879	12	12	4	3	3	3



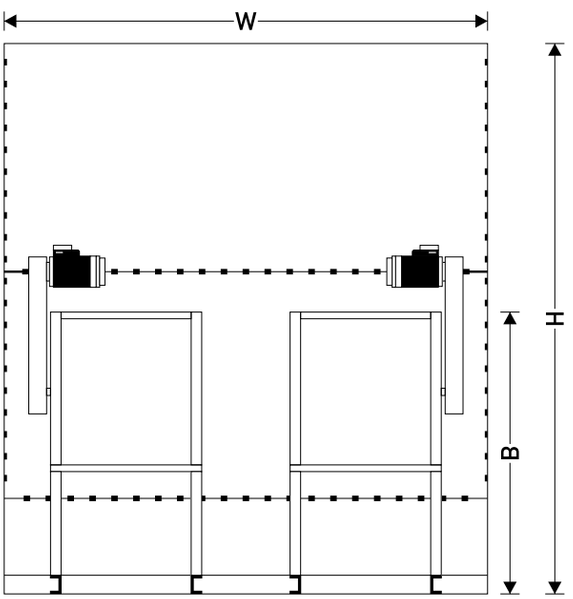


Table 4

Model	Dimensions (mm)					Outlet Water		Inlet Water		Weight (Kg)
	L	W	H	A	B	No.	Size (Inch)	No.	Size (Inch)	
10	560	945	2150	533	460	1	1 ½	1	1 ½	285
15	740	945	2150	620	540	1	1 ½	1	1 ½	345
20	945	945	2200	750	655	1	2	1	2	410
25	945	1300	2200	750	655	1	2	1	2	500
30	945	1450	2250	1060	847	1	3	1	3	620
35	945	1450	2250	1060	847	1	3	1	3	695
40	1000	1940	2250	1060	847	1	3	1	3	755
50	1210	1940	2250	1060	847	1	3	1	3	880
60	1460	1940	2900	1060	847	1	4	1	4	1080
80	1940	1800	2900	1060	847	1	4	2	3	1500
90	1940	1940	2900	1060	847	1	4	2	3	1590
110	1940	2560	2900	1060	847	1	5	3	3	1790
120	1940	2890	3000	1060	847	1	5	3	3	2250
140	1940	3400	3000	1060	847	1	5	4	3	2500
160	1940	3860	3000	1060	847	2	4	4	3	3150

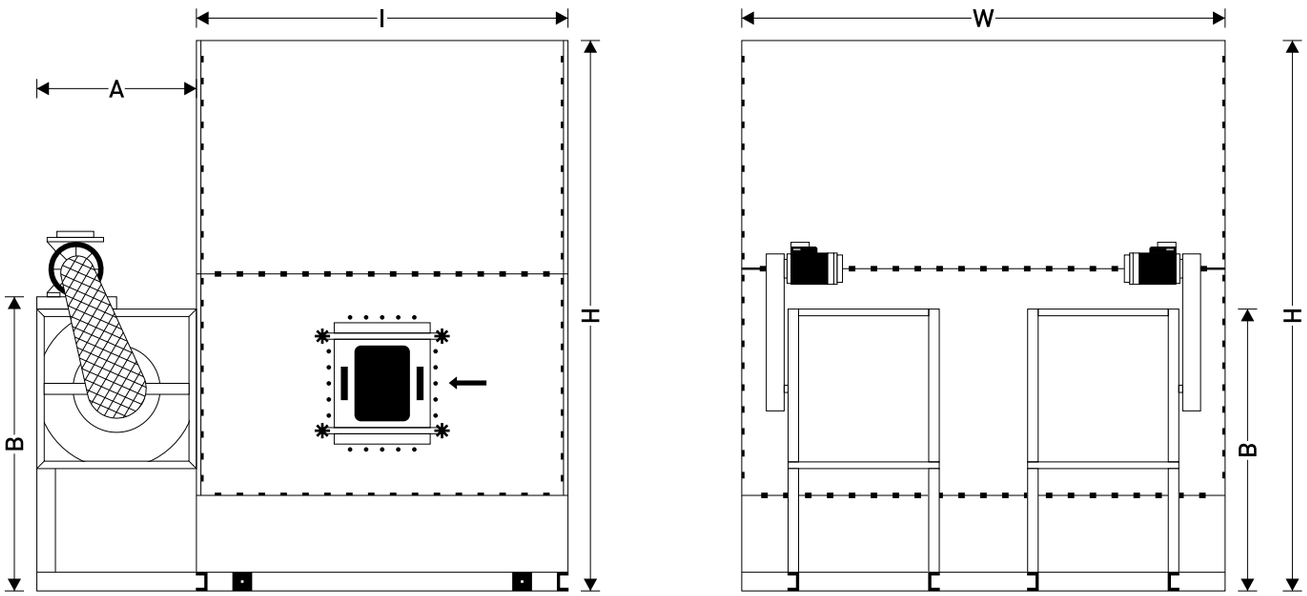


Table 4

Model	Dimensions (mm)					Outlet Water		Inlet Water		Weight (Kg)
	L	W	H	A	B	No.	Size (Inch)	No.	Size (Inch)	
180	1940	4400	3000	1060	847	2	4	5	3	3300
220	1940	5170	3000	1060	847	3	4	5	3	3850
260	1940	5670	3000	1060	847	3	4	6	3	4500
300	1940	6600	3000	1060	847	3	5	7	3	5200
340	1940	8000	3000	1060	847	3	5	8	3	5900
400	3780	5260	3100	1060	847	3	5	10	3	6900
450	3780	5730	3100	1060	847	3	5	12	3	8500
500	3780	6200	3100	1060	847	3	5	12	3	8800
590	3780	7120	3100	1060	847	3	5	14	3	9500
660	3780	8060	3100	1060	847	3	5	16	3	1140
750	3780	9000	3100	1060	847	3	5	18	3	12700
820	3780	9950	3200	1060	847	3	5	20	3	14400
900	3780	10840	3200	1060	847	3	5	22	3	15500
980	3780	11840	3200	1060	847	3	5	24	3	16700
1060	3780	12790	3200	1060	847	3	5	26	3	18150
1150	3780	13740	3200	1060	847	3	5	28	3	19400

Table 5

Model	GPM	Air Flow CFM	Fan		Motor power		Pump Head (meter)
			No.	Size (Inch)	No.	Size (Hp)	
10	30	2850	1	12	1	3/4	23
15	45	4200	1	16	1	1 ½	23
20	60	5700	1	18	1	2	23
25	75	7000	1	18	1	3	24
30	90	8500	1	22	1	3	24
35	105	9950	1	22	1	4	24
40	120	11400	1	22	1	5.5	24
50	150	14000	1	22	1	7.5	24
60	180	17000	1	22	1	7.5	24
80	225	24000	2	22	2	5.5	24
90	270	25000	2	22	2	5.5	24
110	330	29000	2	22	2	5.5	24
120	360	33000	3	22	3	5.5	24
140	420	40000	3	22	3	5.5	25
160	480	46000	4	22	4	5.5	25
180	540	49500	4	22	4	5.5	25
220	660	57000	5	22	5	5.5	25
260	780	68000	6	22	6	5.5	25
300	900	79500	7	22	7	5.5	25
340	1020	90000	8	22	8	5.5	25
400	1200	106000	10	22	10	5.5	25
450	1350	126000	12	22	12	5.5	25
500	1500	140000	12	22	12	5.5	25
590	1770	165000	14	22	14	5.5	25
660	1980	184000	16	22	16	5.5	25
750	2250	210000	18	22	18	5.5	25
820	2460	229000	20	22	20	5.5	25
900	2700	252000	22	22	22	5.5	25
980	2940	274000	24	22	24	5.5	25
1060	3180	296000	26	22	26	5.5	25
1150	3450	322000	28	22	28	5.5	25

FRP Cubic Cooling Tower

Principals of FRP Cubic Cooling Tower operation "Tahvieh Azar Nasim" Fiberglass Cooling towers are inspired from the well-known "Sulzer" cooling tower design, and are designed and manufactured considering local Iranian facilities and requirements. The most important change in this design is considering service hatches which unfortunately are not considered in original design.

Casing
Different parts of fiberglass body would be connected to each other by galvanized bolts and nuts and make the strong integrated body of the tower. The tower body can bear the wind pressure up to 21 m/s. and it thwart the vibrations caused by electro motor and fan.

Basin
The integrated rigid and reinforced basin is designed so that the amount of water reserves in basin should be as when the pump starts , air does not trap and when the pump is turn off water does not overflow the basin.

Fan Deck and Fan Stack
The integrated rigid fan deck and fan stack, reinforced by fiberglass is designed to assist the air flow path.

Fills
Fiberglass cubic cooling towers suit two types of fills, film type and splash type. Cooling tower fills are designed to have the maximum contact of air with the water and cause the minimum pressure downfall.

Fan
The light weight fan has good corrosion-resistant quality is an axial flow, multi blade version with adjustable blade pitch. The fan is designed to deliver large volumes of air at low power consumption and low noise generation.

The fans are dynamically balanced for smooth operation, longer bearing life including that of the supporting structure. FRP fan blades may also be provided on demand and these have in addition to excellent corrosion-resistance, good noise reduction properties.

Electromotor
Single speed electromotor, Standard TEFC with IP55, “F” class are used in "Tahvieh Azar Nasim" cooling towers.
Water Distribution system
Large orifice polymeric nozzles (Non-clogging) are one of the significant benefits of cubic towers comparing the sprinklers of FRP conical type cooling towers.

Drift Eliminator
PVC drift eliminator with three changes in air path gives us less than 0.002% drift loss. Considering the conditions of the area (height from the sea level) there is the option of changing the capacity of electromotor.

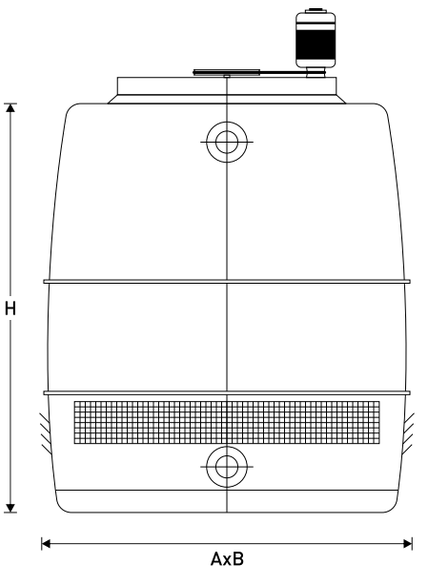


Table 6

Model	GPM	Dimensions (mm)			Motor power Kw	Inlet (inch)	Outlet (inch)	Weight (Kg)	
		Length	Width	Height				Dry	Full
49.1	20	700	700	1300	0.37	1	1	45	105
49.2	30	700	700	1450	0.37	1	1	56	128
49.3	40	700	700	1600	0.55	1	1	65	140
72.1	50	850	850	1740	0.55	2	2	115	240
72.2	60	850	850	1740	0.55	2	2	121	250
72.3	80	850	850	2040	0.75	2	2	127	260
169.1	90	1300	1300	2320	0.75	3	3	270	587
169.2	135	1300	1300	2320	1.1	3	3	290	660
169.3	150	1300	1300	2320	1.5	3	3	310	695
272.1	186	1650	1650	2360	1.5	4	4	390	1220
272.2	218	1650	1650	2360	2.2	4	4	410	1330
272.3	235	1650	1650	2660	2.2	4	4	430	1450
361.1	265	1900	1900	2590	2.2	4	4	645	1510
361.2	290	1900	1900	2590	3	4	4	680	1620
361.3	320	1900	1900	2890	3	4	4	720	1740
528.1	400	2400	2200	2650	3	2 x 3	6	895	2950
528.2	460	2400	2200	2650	4	2 x 3	6	950	3075
528.3	500	2400	2200	2950	5.5	2 x 3	6	1000	3270
748.2	570	3400	2200	3620	5.5	2 x 4	6	1300	4100
748.3	720	3400	2200	3920	7.5	2 x 4	6	1380	4490
967.2	815	4300	2200	3690	7.5	2 x 4	6	1450	5150
967.3	890	4300	2200	3690	11	2 x 4	6	1550	5550
1333.1	1150	4300	3100	4100	11	3 x 3	2 x 4	2230	8300
1333.2	1300	4300	3100	4100	11	3 x 3	2 x 4	2385	8500
1333.3	1430	4300	3100	4100	15	3 x 3	2 x 4	2510	8700
1849.1	1600	4300	4300	4000	15	3 x 4	2 x 6	3050	11050
1849.2	1770	4300	4300	4000	18.5	3 x 4	2 x 6	3240	11250
1849.3	1840	4300	4300	4000	22	3 x 4	2 x 6	3410	11850

Principals of operation

FRP Closed Circuit Cooling Towers act quite like open circuit cooling towers, the only deference is that in FRP Closed Circuit Cooling Towers the fluid to be cooled (usually water) flows through the tubes of the coil without coming into direct contact with external air, preventing dirt or pollution entering the primary water circuit.
The heat is transmitted from the fluid through the tube walls to the water, which is being continuously sprayed over the coil.
The fan situated at the top of the tower intakes air in counter flow to water, thereby evaporating a small part of the re-circulating water, drawing off the necessary heat for evaporation and releasing it into the atmosphere.

The rest of water is re-circulated with a spray water pump from the basin to the spray nozzles. (Secondary Circuit).
A small quantity of heat is transmitted by convention to the external air, just as for an air cooler.

In closed circuit cooling towers there are two separated circuits.

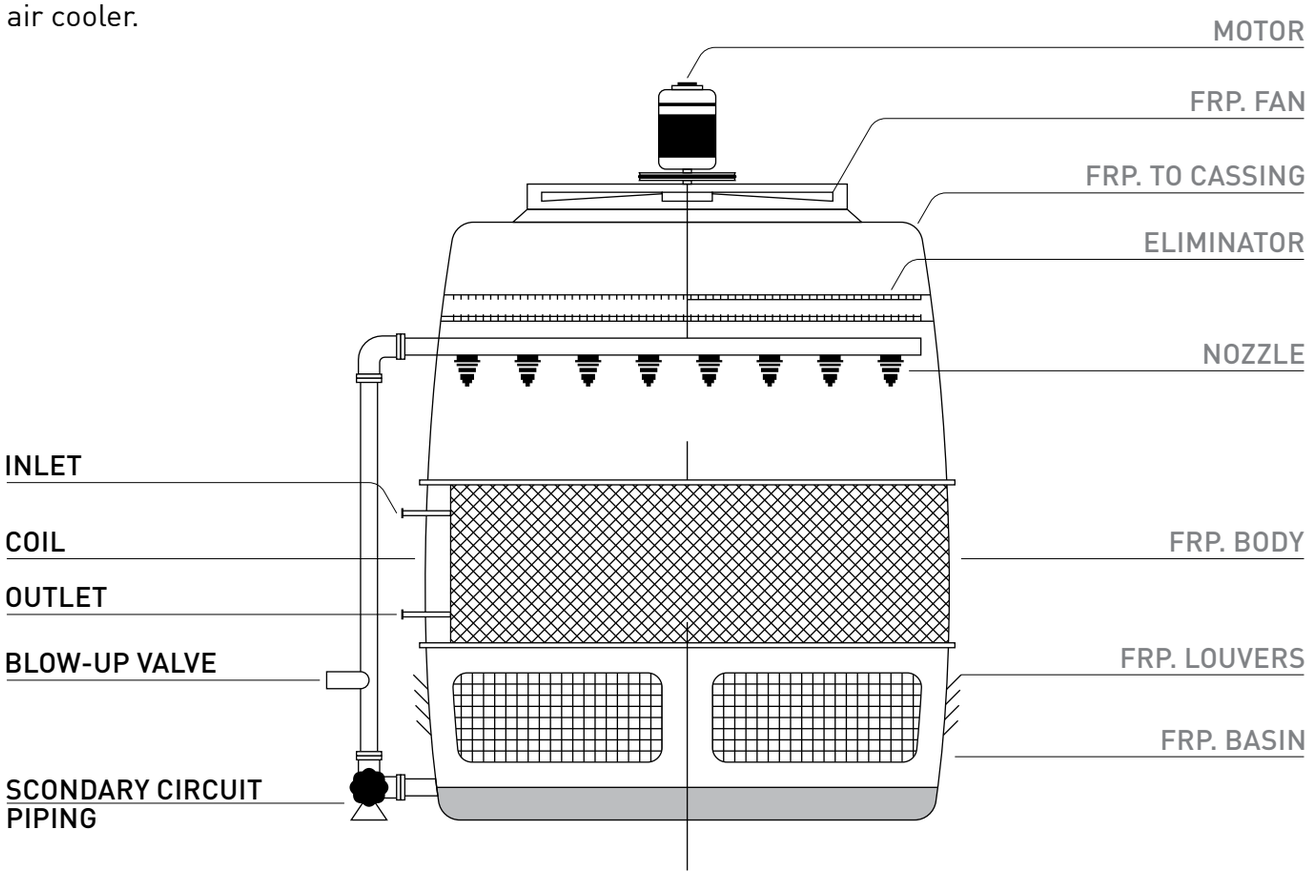
1. Initial circuit which process fluid is circulating
2. Secondary circuit which sprays the water on the coil.

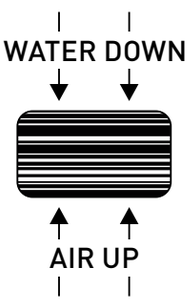
Fan

The light weight fan has good corrosion-resistant quality is an axial flow, multi blade version with
adjustable blade pitch. The fan is designed to deliver large volumes of air at low power consumption and low noise generation.

Driving system

Movement transfer from the electromotor to fan would be delivered through a series of belt, pulley and fly wheel. (Belt Drive)





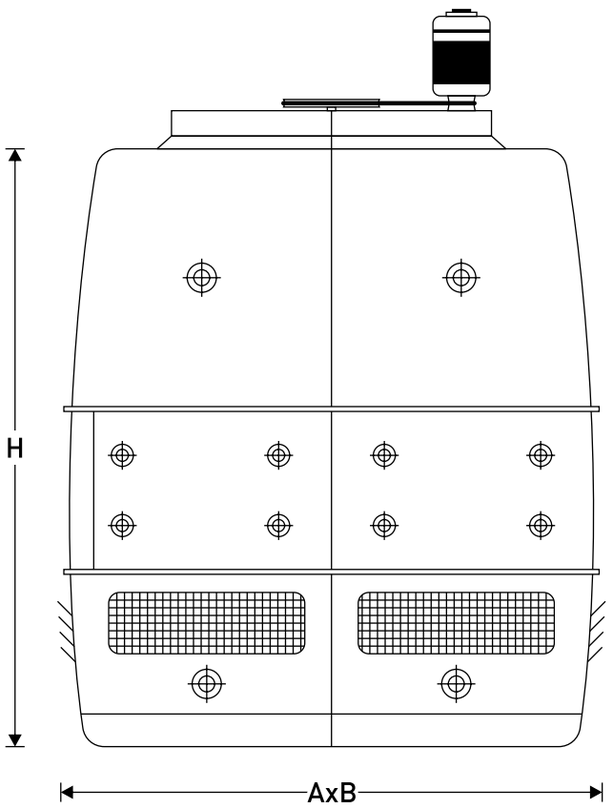


Table 7

Model	GPM	Dimensions (mm)			Motor power Kw	Inlet (inch)	Outlet (inch)	Weight (Kg)	
		Length	Width	Height				Dry	Full
169.2	1300	1300	2320	1.5	0.75	2 ½	2 ½	700	1300
169.3	1300	1300	2620	1.5	0.75	2 ½	2 ½	800	1400
169.4	1300	1300	2620	1.5	0.75	2 ½	2 ½	950	1550
272.3	1650	1650	2660	2.2	0.75	3	3	1250	2250
272.4	1650	1650	2660	2.2	0.75	3	3	1450	2400
272.5	1650	1650	2960	3	1.1	3	3	1700	2700
361.4	1900	1900	2890	3	1.1	2 x 2 ½	2 x 2 ½	1826	3300
361.5	1900	1900	3190	4	1.5	2 x 2 ½	2 x 2 ½	2190	3540
484.4	2200	2200	2950	4	1.5	2 x 3	2 x 3	2090	4250
484.5	2200	2200	3250	5.5	2.2	2 x 3	2 x 3	2440	4600
484.6	2200	2200	3550	7.5	2.2	2 x 3	2 x 3	2850	5010
575.5	2400	2400	3550	7.5	2.2	2 x 4	2 x 4	2960	5460
575.6	2400	2400	3850	7.5	2.2	2 x 4	2 x 4	3430	5930
967.5	4300	2250	3980	11	3	3 x 3	3 x 3	4858	10885
967.6	4300	2250	4280	11	3	3 x 3	3 x 3	5720	11950
1333.5	4300	3100	4360	15	2 x 2.2	4 x 3	4 x 3	7895	15000
1333.6	4300	3100	4660	15	2 x 3	4 x 3	4 x 3	9000	16900
1849.5	4300	4300	4300	22	2 x 3	6 x 3	6 x 3	9800	24000
1849.6	4300	4300	4600	22	2 x 3	6 x 3	6 x 3	11100	26000

Electromotor
Single speed electromotor, Standard TEFC with IP55, “F” class are used in "Tahvieh Azar Nasim" cooling Towers.

Drift Eliminator
PVC drift eliminator with three changes in air path gives less than 0.002% drift loss.

Circulating water pump
Circulating water pump is a piece of closed circuit cooling tower which is designed to spray water on the Heat exchange coil and its electromotor would be cooled by fan (TEFC). Exit valve for Bleed off is Considered in pump circuit.

Industrial Cooling Towers
Principals of "Tahvieh Azar Nasim" Industrial Cooling Towers is using finest raw materials and the highest Quality parts from well-known industries are used in "Tahvieh Azar Nasim" cooling towers in order to Ensure the high quality of tower in worst working conditions. All pieces can easily be carried, and makes fast installation at site results an integrated rigid cooling tower. "Tahvieh Azar Nasim" Cooling Towers are designed such as to use the modern polymeric substances as Much as possible. Fan deck, fan stack and casing are manufactured from fiberglass reinforced polymer, packing and drift Eliminators from PVC sheets or other polymer substances. The water distribution system would be through The PVC high pressure pipes and large orifice nozzles (non-clogging) made of polymers.
The main structure would be made of fabric steel profiles which after manufacturing processes hot dipped Galvanized and then covered by a fiberglass layer. Fast and rigid Installation All the pieces would be easily installed by a couple of bolts and there is no need To any extra operation.

Rigid structure
The Structure of "Tahvieh Azar Nasim" cooling towers are made of galvanized steel fabric profiles which has provided the resistant structure and long lasting towers at peak industrial conditions.

Fills
The fills section is designed to bring about intimate contact of water and air so as to facilitate heat and mass Transfer at the same time aiding in proper and even distribution of air and water over the cross section, while maintaining minimum pressure downfall. The fills are of honeycomb section and are vacuum formed From anti- Bacterial Virgin PVC for excellent resistance to corrosion and give maximum area for Wattage.

Fans
Multi wings powerful axial Fan with high efficiency and low power consumption is one of the Best options for industrial cooling towers. FRP fan blades may also be provided on demand and these have In addition to excellent corrosion-resistance, good noise reduction properties.

Moving System
Movement transfer from The electromotor to fan would occurred by means of shaft (greaducer drive) or by pulley ,flywheel and a series of belts. (Belt drives)

Electromotor
Single speed electromotor, Standard TEFC with IP55, “F” class are used in "Tahvieh Azar Nasim" cooling Towers.

Casing, Fan Stack, Fan Deck
"Tahvieh Azar Nasim" Cooling Towers packing are enclosed by fiberglass casings. Fan Stack and Fan Deck Are also made of fiberglass and designed as if the air suction occurs based on air path model.

Water distribution system
The water distribution system is designed in such a way that provides the easy service and low pressure. Large orifice polymeric nozzles (Non-clogging) are one of the significant, benefits of industrial towers.

Drift Eliminator
"Tahvieh Azar Nasim" Industrial cooling towers drift eliminators are made of PVC with three changes in air Path and high efficiency. The drift Loss would be less than 0.002% by using these drifts eliminators.

Louvers
FRP louvers are installed at the air inlet (space between the Tower casing and water Basin) to prevent water Splash and prevents leaves, bird etc., entering the Cooling Tower. They could be easily detached to Access the tower's basin.

Technical Specifications
"Tahvieh Azar Nasim" Industrial Cooling Towers are made and designed based on assumptions of client's requirements (suitable to be installed on a concrete basin).
The concrete basin plan would be delivered to the client after the agreement, so that the civil contractor of client can construct the concrete basin as the "Tahvieh Azar Nasim" is manufacturing the pieces of Tower.

PACKAGED AIR CONDITIONING UNITS

AzarNasim
HVAC SYSTEMS

INTRODUCTION

BENEFITS AND FEATURES
AzarNasim packaged air conditioning units are compact systems intended for applications in new or existing stores, restaurants, offices, schools, computer rooms, airports, and industrial plants.
Available in cooling capacities from 5 to 80 tons in a single unit, these units provide significant installation versatility and economy in that they can be used to supply the total cooling requirements in a variety of commercial, institutional, and industrial applications.

Units can be selected with air or water-cooled condensers in rooftop, indoor, and in case f aircooled versions in split or packaged arrangements. Furthermore, the units can be used for free delivery or ducted applications. For ease of installation, the units can be in vertical or horizontal configuration.

AzarNasim packaged units can provide year round air conditioning with hot water, steam or electric heating coil during the cold season. They can also be used to supplement central systems, permitting zone control at low load conditions without the expense of central systems.

Each unit is factory assembled, wired and shipped as a package. This greatly reduces installation time and assures the optimum positioning of the components.

In the areas where water supply is either unavailable or scarce, the air cooled units can be used. The aircooled split unit requires only the addition of the remotely located AzarNasim Air Cooled Condenser for complete air conditioning.

All components in AzarNasim packaged units are designed for maximum performance and reliability.

The basic component of the AzarNasim packaged unit is a semi-hermetic type multi-cylinder compressor designed to run on 380 volt, 3 phase, 50 cycle power input. Motor protection on these units is comprised of three sensors mounted internally in the motor windings which in case of charges in motor temperature shuts off the compressor. An oil safety switch provides protection against loss of oil pressure. All controls and factory wiring are protected within galvanized steel enclosures.
The DX cooling coil is designed and rated accord-ing to ARI-410 Standard. To maximize perfor- mance, a venturi flow distributor assures even distribution of flow into the cooling coil tubes. Suction line piping is insulated with closed cell insulation to prevent moisture condensation. The DX coil section is insulated with 19mm rock wool panel with aluminum foil cover.

The water cooled condenser is a shell and tube type heat exchanger, sized sufficiently to hold the total refrigerant charge on pump down operations. An integrated sub-cooling section allows system capacity increase without an increase in power.
The condenser shell design meets the ASME- Section VIII, DiV.1, Boiler & Pressure Vessel Code requirements in addition to TEMA Standards.

The air-cooled condenser is configured so that air discharge is directed upward thus carrying heat away from the unit and minimizing directional sound. The fan is statically and dynamically balanced therefore assuring smooth and quiet operation.

For industrial process cooling and year round air conditioning, custom built units can also be designed and constructed.

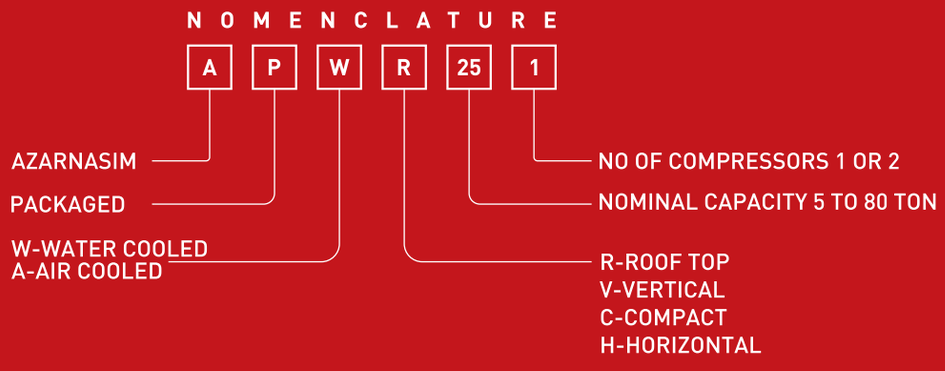


Table 1	PHYSICAL DATA																	
UNIT SP	W	A	W	A	W	A	W	A	W	A	W	A	W	A	W	A	W	A
	5-1		8-1		10-1		15-1		20-1		25-1		30-1		35-1		40-1	
COMPRESSOR CAPACITY (Tons)	5		8		10		15		20		25		30		35		40	
NO OF COMPRESSORS	1		1		1		1		1		1		1		1		1	
REFRIGERANT R-22 Operating charge (kg)	6.0	2.5	5.5	2.2	6.5	2.8	11.7	4.8	11.7	4.9	11.8	6.7	17.0	7.0	27.6	11.0	27.6	11.5
EVAPORATOR COIL																		
Number of rows	4		4		4		4		4		4		4		4		4	
Fins per inch	8		8		8		8		8		8		8		8		8	
Tube O.D (in)	5/8		5/8		5/8		5/8		5/8		5/8		5/8		5/8		5/8	
Total face area (sq.ft)	4		6.4		8.0		12		16		20		23.4		28.0		32.0	
EVAPORATOR FAN																		
Number	1		1		1		1		1		1		2		2		2	
Size (in)	13		14		14		16		17		19		17		17		17	
Nominal CFM	2000		3200		4000		6000		8000		10000		12000		14000		16000	
STANDARD MOTOR																		
Horsepower @ 1450 RPM	0.75		2.0		2.0		4.0		5.5		5.5		7.5		7.5		10.0	
RETURN-AIR FILTER																		
Total face area (sq.ft)	5.2		7.6		8.3		12.5		17.7		23.6		26.6		29.2		38.2	
Thickness (in)	2		2		2		2		2		2		2		2		2	
CONDENSER (watercooled)																		
No x shell diam. (in)	1 x 6		1 x 6		1 x 6		1 x 6		1 x 8		1 x 8		1 x 10		1 x 10		1 x 10	
Integrally finned tube O.D. (in)	3/4		3/4		3/4		3/4		3/4		3/4		3/4		3/4		3/4	
OPERATING WEIGHT (Kg)	441	341	523	420	615	492	700	559	780	631	846	686	931	745	1100	872	1200	969

Table 2	PHYSICAL DATA																	
UNIT SP	W	A	W	A	W	A	W	A	W	A	W	A	W	A	W	A	W	A
	10-2		15-2		20.2		30-2		40-2		50-2		60-2		70-2		80-2	
COMPRESSOR CAPACITY (Tons)	5		8		10		15		20		25		30		35		40	
NO OF COMPRESSORS	2		2		2		2		2		2		2		2		2	
REFRIGERANT R-22 Operating charge (kg)	11.5	4.5	11.0	4.0	12.7	5.5	24.4	10.5	24.4	10.8	27.6	11.2	33.9	14.0	56.2	23.1	55.1	23.1
EVAPORATOR COIL																		
Number of rows	4		4		4		4		4		4		4		4		4	
Fins per inch	8		8		8		8		8		8		8		8		8	
Tube O.D (in)	5/8		5/8		5/8		5/8		5/8		5/8		5/8		5/8		5/8	
Total face area (sq.ft)	8.0		12.0		16.0		24.0		32.0		40.0		48.0		57.6		62.0	
EVAPORATOR FAN																		
Number	1		1		1		1		1		1		2		2		2	
Size (in)	14		16		17		17		17		17		19		22		22	
Nominal CFM	4000		6000		8000		12000		16000		20000		24000		28000		32000	
STANDARD MOTOR																		
Horsepower @ 1450 RPM	2.0		4.0		5.5		7.5		10.0		15.0		15.0		15.0		20.0	
RETURN-AIR FILTER																		
Total face area (sq.ft)	10.4		13.0		17.7		25.0		36.5		43.9		55.9		63.9		67.9	
Thickness (in)	2		2		2		2		2		2		2		2		2	
CONDENSER (watercooled)																		
No x shell diam. (in)	2 x 6		2 x 6		2 x 6		2 x 6		2 x 8		2 x 8		2 x 10		2 x 10		2 x 10	
Integrally finned tube O.D. (in)	3/4		3/4		3/4		3/4		3/4		3/4		3/4		3/4		3/4	
OPERATING WEIGHT (Kg)	670	473	920	706	1100	831	1230	952	1400	1087	1550	1233	1780	1407	2100	1664	2300	1815

Note:

1. All units are shipped with a holding charge. However, operating charge dose not include charge for remote air-cooled condenser or refrigerant connection piping. Operating charge values are approximate.
2. Fan size in TABLES 1& 2 is selected for nominal conditions. Addition of special filters and other accessories will vary the fan size requirement.

EXAMPLE 1: Air Cooled Model

Given:

SUMMER CONDITISION:

Total Cooling Load (TC).....720 MBH
Sensible Heat Capacity (SHC).....530 MBH
Air Flow Rate.....24000 CFM
Entering Dry Bulb Temp. (EDB).....80 °F
Entering Wet Bulb Temp. (EWB).....67 °F
Air Entering Condenser Temp. (AEC).....90°F
Condensing Temp. (CT).....125 °F

WINTER CONDITION

Total Heating Load.....800 MBH
Entering Air Temp. EDB.....50 °F
Entering Hot Water Temp. EHT.....160 °F
Temperature Drop.....10 °F
Air Flow Rate.....24000 CFM
External Static Pressure.....0.5" w.g.
Altitude.....Sea Level

Find:

A. Unit size and capacity.
B. Total heat rejection.
C. Leaving dry/wet bulb temperatures.
D. Heating capacity.
E. Fan speed and HP.

A. Consider Model Anpu-70-A-2 from TABLE 38, Interpolating between 23040 and 25920 CFM at 67 °F EWB, results in the following quantities:

Total Cooling Capacity (TC) = 725.9 MBH
Sensible Heat Capacity (SHC) = 539.3 MBH
Compressor Power Consumption = 62.6 KW

B. To determine the Total Heat Rejection, THR, enter TABLE 38 with CT = 125 °F and interpolate between 23040 and 25920 CFM. The THR is then found to be:

THR = 939.6 MBH

Next, to select an air cooled condenser, refer to the Total Heat Rejection Chart in the AzarNasim Air Cooled Condenser Catalog with:

TD = 125 - 90 = 35 °F
Model Anpu-550-R can be selected to appropriately reject the total heat.

C. The Leaving Dry Bulb temperature can be calculated using the following relation:

$$LDB = EDB - \frac{SHC}{1.087 \times CFM}$$

$$LDB = 80\ °F - \frac{539300}{1.087 \times 24000} = 59.3\ °F$$

The Leaving Wet Bulb temperature can be calculated according to the following method:

$$H_2 = H_1 - \frac{TC \times 1000}{4.5 \times CFM}$$

$$= 31.62 - \frac{735.9 \times 1000}{4.5 \times 24000} = 24.9\ BTU/lb$$

From TABEL 64, at 0 altitude interpolate between 24.48 and 25.12 BTU/lb to read
LWB = 57.7 °F

D. From the Heating Coil Ratings in TABLE 45, for Model Anpu-70-A-2,a 1 row heating coil (Full Circuit-8 FPI) with the following specifications can be selected:

Heating Capacity = 1,001,800 BTU/hr
Air Flow Rate = 28000 CFM

Since the CFM listed in the table is not equal to the design CFM, a correction factor must be applied.

$$\frac{CFM}{NOMINAL\ CFM} = \frac{24000}{28000} = 85.7\ \%$$

From TABLE 42, interpolating between 80% and 90%, a correction factor of 0.92 is obtained. Next, a hot water coil correction factor must be determined.
Enter Figure 1 at 50 °F EDB and moving vertically upward to 160 °F EHT, the correction factor can be found to be 0.93 The actual heating capacity is then:

Actual Heating Capacity =
1,001, 800 x 0.92 x 0.93 = 857,200 BTU/hr

E. From TABLE 43, for a 1 row coil, the internal static pressure is found by interpolation to be 0.07" w.g. Similarily for a 4-row cooling coil, the static pressure drop is found to be 0.4" w.g. The

total system pressure drop is:

$\Delta P_{Total} = \Delta P_{internal} + \Delta P_{external}$

= (0.07" + 0.4") + 0.5" = 0.97" w.g.

From the Fan Performance Chart on TABLE 49, for Model AnpuA-70-2 with a static pressure of 0.97" w.g., 24000 CFM, and interpolating between 0.75" and 1" static pressure the following quantities can be selected for the fan:

RPM = 512 HP = 10

EXAMPLE 2: Water Cooled Model

Given:

SUMMER CONDITION

Total Cooling Load (TC).....206 MBH
Sensible Heat Capacity (SHC).....103 MBH
Air Flow Rate.....5500 CFM
Entering Dry Bulb Temp. (EDB).....80 °F
Entering Wet Bulb Temp. (EWB).....72 °F
Condenser Entering Water Temp. (EWT).85 °F

WINTER CONDITION

Total Heating Load.....270 MBH
Entering Dry Bulb Temp. (EDB).....60 °F
Entering Hot Water Temp. (EWT).....160 °F
Temperature Drop.....20 °F
Air Flow Rate.....5500 °F
External Static Pressure.....0.5" w.g.
Altitude.....Sea Level

Find:

A. Unit size and capacity.
B. Condenser water flow rate.
C. Condenser pressure drop.
D. Leaving dry/wet bulb temperatures.
E. Heating capacity.
F. Fan speed and HP.

A. Consider Model AnpuW-15-1 from TABLE 7 , interpolating between 5400 and 6000 CFM at 72 °F EWB, Permits the determination of the following quantities:

Total Capacity (TC) = 207.6 MBH
Sensible Heat Capacity (SHC) = 105.7 MBH
Compressor Power Consumption = 10.2 KW

B. From TABLE 7, the condenser water flow rate is:

GPM = 45.1

C. From TABLE 7, the condenser pressure drop is

PD = 16.2 ft. water

D. The Leaving Dry Bulb temperature is calculated according to the following relation:

$$LDB = EDB - \frac{SHC}{1.087 \times CFM}$$

$$LDB = 80\ °F - \frac{105700}{1.087 \times 5500} = 62.3\ °F$$

The Leaving Wet Bulb temperature can be calculated according to the following method:

$$H_2 = H_1 - \frac{TC \times 1000}{4.5 \times CFM}$$

$$= 35.83 - \frac{207.6 \times 1000}{4.5 \times 5500} = 27.4\ BTU/lb$$

From TABLE 64, interpolating between 27.85 and 28.57 BTU/lb result in LWB = 61.4 °F.

E. The Heating Coil Capacity for Model AnpuW-15-1 configured with a 2-row coil (Full Circuit-8 FPI) and EDB = 60 °F , from TABLE 45, is:

Heating Capacity = 338.7 MBH

Next, the hot water coil correction factor of 0.85 can be read from Figure 1 at the intersection of a vertically projected line from 60 °F entering air temperature up to the 160 °F entering water temperature line and projection horizontally to the left to correction factor axis.
Since the CFM in the table is not equal to the design CFM, a correction factor must be applied.

$$\frac{CFM}{NOMINAL\ CFM} = \frac{5500}{6000} = 91.7\ \%$$

Interpolating between 90% and 100% in TABLE 42, a correction factor 0.96 is obtained. Applying the hot water and CFM correction factors to obtain the actual heating capacity as:

Actual Heating Capacity = 338700 x 0.85 x 0.96
= 276.4 MBH

F. The total static pressure, fan speed, and horse power are calculated similar to the procedure outlined in part e) of EXAMPLE 1 as:

ΔP_{Total} = 1.1" w.g.

RPM = 780 HP = 3

Notes:
Air cooled condensers must operate under different ambient conditions is order to provide sufficient heat rejection from the air conditioning cycle. All manufacturers therefore publish condenser ratings under a standard condition. For any condition other than the standard condition stated by the manufacturer, correction factors must be applied to the total heat rejection in the packaged rating tables. One such correction factor is altitude correction factor given in the table below which must be applied to the total heat rejected from the air cooled packaged unit in order to select the appropriate air cooled condenser.

Table 3 -ALTIYUDE CORRECTION FACTOR

ALTITUTE (m)	CF	ALTITUDE (m)	CF
0	1.000	1400	1.107
310	1.023	1550	1.119
625	1.047	1720	1.132
940	1.070	1880	1.145
1250	1.095	2000	1.158

EXAMPLE 3: Altitude Correction Factor

Suppose the air cooled condenser of EXAMPLE 1 is to operate under the same summer and winter condition except at the location stated below:

Geographic Location: Tehran
Altitude: 1190 meters
The unit selection and the calculation of the Total Heat Rejection (THR) is identical to the steps a) and B) in EXAMPLE 1. Hence:

Model **Anpu-70-A-2**
THR = 939.6 MBH

From TABLE 3, the Correction Factor CF = 1.0902 by interpolation. Applying CF to the Total Heat Rejection leads to the new value for THR:

THRNew = THR x 1.0902 = 939.6 X 1.0902 = 1024 MBH

From AzarNasim Air Cooled Condenser Catalog for TD = 35 °F and THR New = 1024 MBH, air cooled condenser Model Anpu-700-R can be selected.

EXAMPLE 4: Non Standard Condition
Water Cooled Model

Given:
SUMMER CONDITION
Total Cooling Load (TC).....260 MBH
Sensible Heat Capacity (SHC).....140 MBH
Air Flow Rate.....8800 MBH
Entering Dry Bulb Temp. (EDB).....83 °F
Entering Wet Bulb Temp. (EWB).....67 °F
Condenser Entering Water Temp. (EWT).....85 °F
Design Leaving Dry Bulb Temp. (DLDB).....66 °F
Coil Face Area (FA).....16.0 FT^2
Altitude.....0 FT

Select **Anpu-20-W-1** from TABLE 8, with TC=240.8 MBH and SHC=186 MBH at 80 °F EDB. The face velocity, FV, is calculated according to the following relation:

$$FV = \frac{CFM}{FA} = \frac{8800}{16.0} = 550 \text{ FPM}$$

Where the face area, FA, for packaged units is listed in TABLE 1. With the calculated face velocity enter TABLE 40, under the 4-row coil the Bypass Factor, BF, is given as 0.26. Next, enter TABLE 41, at 83 °F EDB and interpolate between 0.25 and 0.30 BF. The CF is then calculated as 2.42. The corrected TC and SHC for EDB=83 °F can be determined according to:

TC = 240800 + 8800 x 2.42 = 262000 BTUH
SHC = 186000 + 8800 x 2.42 = 207000 BTUH

Since the calculated TC and SHC can atisfactorily meet the given load, the leaving dry bulb temperature can be calculated as:

$$LDB = 83\ ^\circ F - \frac{207000}{1.087 \times 8800} = 61.4\ ^\circ F$$

It can thus be seen that the design leaving dry bulb temperature of 66 °F can be attained.

The leaving Wet Bulb temperature can be calculated according to the following method:

$$H_2 = H_1 - \frac{TC}{4.5 \times CFM} = 35.83 - \frac{262000}{4.5 \times 8800} = 24.9 \text{ BTU/lb}$$

From TABLE 64 at 0 altitude interpolate between 29.31 and 28.57 BTU/lb to read LWB =63.8 °F.

TABLE 4			Anpu-5-W-1 RATINGS												
EWT (°F)	CONDENSER		CFM	1600			1800			2000			2200		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	15.7	8.2	TC (MBH)	73.5	66.4	59.9	75.3	68.1	61.4	76.8	69.4	62.5	78.0	70.5	63.5
			SHC (MBH)	35.8	43.5	51.2	37.3	45.8	53.9	38.6	48.0	57.0	40.0	49.9	59.6
			Input Power (KW)	2.5	2.6	2.7	2.5	2.6	2.7	2.5	2.6	2.6	2.5	2.6	2.6
			Current(AMP.)	5.7	5.8	5.8	5.6	5.7	5.8	5.6	5.7	5.8	5.6	5.7	5.8
85	15.3	7.8	TC (MBH)	70.7	63.8	57.3	72.3	65.3	58.8	73.7	66.5	59.8	74.8	67.6	60.8
			SHC (MBH)	34.7	42.4	50.1	36.1	44.5	52.9	37.6	46.8	55.7	38.8	48.7	58.5
			Input Power (KW)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
			Current(AMP.)	6.2	6.3	6.3	6.2	2.6	6.3	6.2	6.2	6.3	6.2	6.2	6.3
95	15.0	7.5	TC (MBH)	67.7	61.1	54.8	69.2	62.5	56.1	70.4	63.6	57.1	71.5	64.6	58.1
			SHC (MBH)	33.6	41.1	48.8	35.0	43.5	51.7	36.4	45.5	54.6	37.6	47.6	57.6
			Input Power (KW)	3.4	3.4	3.40	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
			Current(AMP.)	6.8	6.8	6.7	6.8	6.8	6.7	6.8	6.8	6.7	6.8	6.8	6.7

TABLE 5			Anpu-8-W-1 RATINGS												
EWT (°F)	CONDENSER		CFM	2560			2880			3200			3520		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	24.4	13.4	TC (MBH)	110.5	99.9	90.6	112.4	102.1	92.5	113.9	103.8	94.5	115.7	105.8	95.4
			SHC (MBH)	54.4	66.8	78.9	56.6	70.3	83.6	58.5	73.6	87.5	60.2	76.5	92.3
			Input Power (KW)	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.	5.4	5.4
			Current(AMP.)	10.4	10.5	10.5	10.4	10.5	10.5	10.4	10.5	10.5	10.4	10.5	10.5
85	24.0	13.0	TC (MBH)	106.8	96.7	87.4	109.0	98.8	89.2	111.1	100.6	113.6	113.6	102.8	92.0
			SHC (MBH)	53.2	65.6	77.3	55.3	68.8	82.1	57.6	72.4	59.5	59.5	75.3	91.4
			Input Power (KW)	5.8	5.7	5.6	5.8	5.7	5.6	5.8	5.7	5.8	5.8	5.7	5.6
			Current(AMP.)	11.2	11.1	10.9	11.2	11.1	10.9	11.3	11.1	11.3	11.3	11.1	11.0
95	23.5	12.4	TC (MBH)	102.4	92.9	83.9	105.0	94.8	85.6	106.3	96.2	107.3	107.3	98.1	88.7
			SHC (MBH)	51.8	63.9	75.9	54.0	67.3	80.5	55.9	71.0	57.5	57.5	73.4	88.7
			Input Power (KW)	6.4	6.3	6.1	6.4	6.3	6.2	6.5	6.3	6.5	6.5	6.4	6.2
			Current(AMP.)	12.2	12.0	11.8	12.3	12.0	11.8	12.3	12.1	12.3	12.3	12.1	11.9

TABLE 6			Anpu-10-W-1 RATINGS												
EWT (°F)	CONDENSER		CFM	3200			3600			4000			4400		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	33.3	16.5	TC (MBH)	152.0	137.4	124.3	155.7	140.9	124.3	158.7	143.7	129.8	161.5	146.2	131.8
			SHC (MBH)	73.6	89.0	104.0	76.5	93.4	104.0	79.4	97.7	115.6	81.9	101.7	121.2
			Input Power (KW)	6.7	6.7	6.6	6.7	6.7	6.6	6.6	6.7	6.7	6.6	6.7	6.7
			Current(AMP.)	13.0	13.0	12.9	12.9	13.0	12.9	12.9	13.0	13.0	12.9	13.0	13.0
85	32.5	15.7	TC (MBH)	144.9	130.8	118.2	148.3	133.9	118.2	150.9	136.6	123.0	153.5	138.9	124.9
			SHC (MBH)	70.7	86.1	101.1	73.7	90.5	101.1	76.4	94.6	112.9	78.9	98.6	118.0
			Input Power (KW)	7.6	7.6	7.5	7.6	7.6	7.5	7.6	7.6	7.5	7.6	7.6	7.5
			Current(AMP.)	14.4	14.3	14.1	14.4	14.3	14.1	14.4	14.3	14.2	14.4	14.3	14.2
95	31.8	15.1	TC (MBH)	138.1	124.7	112.5	141.3	127.5	112.5	143.7	130	117.0	146.0	132.1	118.9
			SHC (MBH)	68.1	83.6	98.4	71.0	88.0	98.4	73.7	92.0	110.1	76.1	96.0	115.3
			Input Power (KW)	8.5	8.4	8.2	8.6	8.5	8.2	8.6	8.5	8.3	8.6	8.5	8.3
			Current(AMP.)	15.8	15.6	15.3	15.8	15.6	15.3	15.8	15.7	15.4	15.8	15.7	15.5

Note: All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86.

TABLE 7			Anpu-15-W-1 RATINGS												
EWT (°F)	CONDENSER		CFM	4800			5400			6000			6600		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	45.8	16.7	TC (MBH)	210.7	190.6	172.3	215.4	195.5	176.2	219.3	198.8	179.4	222.7	201.8	181.3
			SHC (MBH)	103.9	127.1	149.8	107.8	133.6	158.8	112.0	139.8	167.0	115.9	146.1	176.0
			Input Power (KW)	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
			Current(AMP.)	17.6	17.6	17.5	17.6	17.6	17.5	17.5	17.6	17.6	17.5	17.6	17.6
85	45.1	16.2	TC (MBH)	202.7	183.2	165.5	207.0	187.2	169.1	210.6	190.9	171.4	213.7	193.6	174.7
			SHC (MBH)	100.6	124.1	146.5	105.0	130.6	155.6	108.9	136.5	164.7	113.1	142.4	172.7
			Input Power (KW)	10.2	10.1	10.0	10.2	10.2	10.0	10.3	10.2	10.0	10.3	10.2	10.1
			Current(AMP.)	19.6	19.4	19.2	19.6	19.5	19.3	19.6	19.5	19.3	19.6	19.5	19.3
95	44.3	15.7	TC (MBH)	194.3	175.7	158.5	198.4	179.2	153.8	201.6	182.7	164.4	204.5	185.2	167.8
			SHC (MBH)	97.5	120.6	143.5	101.7	127.4	152.6	105.7	133.2	160.7	109.5	139.4	167.7
			Input Power (KW)	11.5	11.3	11.1	11.6	11.4	11.1	11.6	11.4	11.2	11.6	11.5	11.2
			Current(AMP.)	21.7	21.3	20.9	21.7	21.0	21.0	21.8	21.5	21.1	21.8	21.5	21.2

TABLE 8			Anpu-20-W-1 RATINGS												
EWT (°F)	CONDENSER		CFM	6400			7200			8000			8800		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	57.1	17.0	TC (MBH)	260.9	237.7	216.0	265.9	242.5	220.2	270.3	246.3	223.5	273.7	249.7	227.4
			SHC (MBH)	133.1	164.7	196.1	138.8	173.5	207.9	143.8	181.9	219.5	149.1	189.9	227.4
			Input Power (KW)	9.8	10.0	10.1	9.8	10.0	10.0	9.8	9.9	10.0	9.8	9.9	10.0
			Current(AMP.)	19.5	19.7	19.8	19.4	19.7	19.8	19.4	19.6	19.8	19.4	19.6	19.7
85	56.4	16.6	TC (MBH)	252.4	229.2	207.6	257.3	233.9	211.3	261.5	237.6	215.1	264.6	240.8	219.7
			SHC (MBH)	130.0	161.2	191.9	135.5	169.4	204.6	140.4	178.1	215.1	146.0	186.0	219.7
			Input Power (KW)	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3
			Current(AMP.)	21.4	21.4	21.4	21.4	21.4	21.4	21.4	21.4	21.4	21.4	21.4	21.4
95	55.3	15.9	TC (MBH)	241.6	219.4	198.3	246.1	223.7	201.9	249.9	227.1	252.5	252.5	230.0	211.7
			SHC (MBH)	125.7	157.0	188.2	131.4	165.3	200.1	136.7	173.9	142.4	142.4	181.7	211.7
			Input Power (KW)	12.9	12.8	12.6	12.9	12.8	12.6	12.9	12.8	12.9	12.9	12.8	12.7
			Current(AMP.)	23.5	23.4	23.2	23.5	23.4	23.2	23.5	23.3	23.5	23.5	23.5	23.3

TABLE 9			Anpu-25-W-1 RATINGS												
EWT (°F)	CONDENSER		CFM	8000			9000			10000			11000		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	71.1	23.8	TC (MBH)	260.9	237.7	216.0	336.4	305.8	277.1	341.8	311.3	280.4	346.3	315.5	285.7
			SHC (MBH)	133.1	164.7	196.1	171.7	214.8	257.2	178.0	224.7	272.0	184.5	234.5	285.2
			Input Power (KW)	9.8	10.0	10.1	12.9	13.0	13.1	12.9	13.0	13.1	12.9	13.0	13.1
			Current(AMP.)	19.5	19.7	19.8	24.3	24.5	24.6	24.3	24.5	24.6	24.3	24.5	24.6
85	70.3	23.4	TC (MBH)	252.4	229.2	207.6	326.5	295.9	266.8	331.8	301.2	270.9	335.9	305.4	227.1
			SHC (MBH)	130.0	161.2	191.9	168.4	210.4	252.8	174.4	220.9	267.3	161.7	229.8	227.1
			Input Power (KW)	11.3	11.3	11.3	14.8	14.7	14.7	14.8	14.8	14.7	14.8	14.8	14.7
			Current(AMP.)	21.4	21.4	21.4	26.9	26.9	26.8	26.9	26.9	26.8	26.9	26.9	26.8
95	69.0	22.5	TC (MBH)	241.6	219.4	198.3	312.3	283.1	225.5	317.4	287.9	260.6	320.4	291.9	267.2
			SHC (MBH)	125.7	157.0	188.2	162.8	205.9	247.6	169.2	215.9	260.1	176.6	225.0	267.2
			Input Power (KW)	12.9	12.8	12.6	16.8	16.6	16.4	16.8	16.7	16.4	16.8	16.7	16.5
			Current(AMP.)	23.5	23.4	23.2	29.8	29.5	29.2	29.8	29.6	29.3	29.8	29.6	29.4

Note: ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86.

TABLE 10			Anpu-30-W-1 RATINGS												
EWT (°F)	CONDENSER		CFM	9360			10530			11700			12870		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	84.7	21.5	TC (MBH)	390.9	190.6	172.3	215.4	362.3	328.6	405.5	368.6	332.1	411.0	373.9	337.7
			SHC (MBH)	193.9	127.1	149.8	107.8	253.2	301.4	210.1	264.5	320.0	217.3	276.3	335.8
			Input Power (KW)	16.0	8.9	8.9	8.9	16.1	16.0	16.0	16.1	16.0	16.0	16.0	16.0
			Current(AMP.)	27.8	17.6	17.5	17.6	27.9	27.8	27.8	27.9	27.9	27.7	27.9	27.9
85	83.6	20.8	TC (MBH)	379.1	183.2	165.5	207.0	350.2	315.5	393.0	356.3	319.9	398.7	361.3	326.8
			SHC (MBH)	190.2	124.1	146.5	105.0	247.6	297.1	205.1	259.6	314.0	213.2	271.1	326.8
			Input Power (KW)	18.2	10.1	10.0	10.2	18.1	17.9	18.2	18.1	17.9	18.2	18.1	18.0
			Current(AMP.)	31.0	19.4	19.2	19.6	30.9	30.6	31.0	30.9	30.6	31.0	31.0	30.7
95	82.0	20.2	TC (MBH)	362.8	175.7	158.5	198.4	334.7	301.5	375.8	340.3	307.1	380.6	344.9	314.7
			SHC (MBH)	183.8	120.6	143.5	101.7	241.0	290.7	199.5	253.4	307.1	206.8	262.0	314.7
			Input Power (KW)	20.5	11.3	11.1	11.6	20.3	19.9	20.6	20.4	20.0	20.6	20.4	20.1
			Current(AMP.)	34.5	21.3	20.9	21.7	34.1	33.6	34.5	34.2	33.7	34.5	34.3	33.8

TABLE 11			Anpu-35-W-1 RATINGS												
EWT (°F)	CONDENSER		CFM	11200			12600			14000			15400		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	103.1	19.9	TC (MBH)	471.9	429.3	390.6	481.5	439.4	398.3	489.8	446.2	403.9	497.2	452.1	407.9
			SHC (MBH)	234.3	289.2	342.7	243.8	304.2	362.8	253.0	317.6	383.0	260.8	331.9	403.0
			Input Power (KW)	20.2	20.3	20.3	20.2	20.3	20.3	20.2	20.3	20.3	20.2	20.3	20.3
			Current(AMP.)	38.4	38.6	38.5	38.3	38.5	38.5	38.3	38.5	38.6	38.3	38.5	38.6
85	101.8	19.5	TC (MBH)	457.1	414.7	375.9	466.5	424.6	382.5	474.1	430.9	389.1	481.7	436.7	394.4
			SHC (MBH)	228.8	283.6	336.0	238.4	297.2	356.8	247.3	311.7	376.0	254.0	326.3	394.4
			Input Power (KW)	23.0	22.9	22.7	23.0	22.9	22.7	23.0	22.9	22.7	23.0	23.0	22.8
			Current(AMP.)	42.5	42.3	42.0	42.5	42.4	42.1	42.5	42.4	42.1	42.5	42.4	42.2
95	99.7	18.7	TC (MBH)	436.7	396.1	358.3	445.4	404.6	365.1	451.8	410.6	372.2	459.7	416.3	379.6
			SHC (MBH)	221.8	275.3	328.3	230.6	290.1	348.7	240.2	304.2	372.2	246.2	317.3	379.6
			Input Power (KW)	26.0	25.7	25.2	26.0	25.3	25.3	26.0	25.8	25.4	26.0	25.9	25.5
			Current(AMP.)	47.0	46.5	45.8	47.0	46.0	46.0	47.0	46.7	46.1	47.0	46.8	46.2

TABLE 12			Anpu-40-W-1 RATINGS												
EWT (°F)	CONDENSER		CFM	12800			14400			16000			17600		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	123.1	22.7	TC (MBH)	563.8	512.0	465.0	575.9	523.2	475.1	586.2	533.4	482.6	595.6	540.8	486.4
			SHC (MBH)	279.4	339.7	400.2	291.1	357.0	423.9	301.9	372.6	446.6	311.0	389.2	476.2
			Input Power (KW)	24.1	24.1	24.1	24.0	24.1	24.1	24.0	24.1	24.1	23.9	24.1	24.1
			Current(AMP.)	43.0	43.1	43.1	42.9	43.1	43.1	42.9	43.1	43.1	42.8	43.1	43.1
85	121.1	22.1	TC (MBH)	545.3	493.6	446.7	557.1	504.3	456.0	567.0	514.3	462.9	576.3	521.5	467.7
			SHC (MBH)	270.6	331.3	391.4	281.4	349.3	414.9	294.0	364.8	441.0	303.0	381.4	765.6
			Input Power (KW)	27.3	24.2	26.8	27.3	27.2	26.9	27.3	27.2	27.0	27.3	27.2	27.0
			Current(AMP.)	47.2	47.0	46.6	47.2	47.0	46.7	47.2	47.1	46.8	47.2	47.1	46.8
95	118.8	21.1	TC (MBH)	520.9	471.3	425.8	531.8	481.0	433.7	540.8	489.8	441.4	549.7	496.9	448.1
			SHC (MBH)	260.8	322.1	382.3	271.9	340.1	409.0	285.0	355.9	427.8	293.0	371.8	448.1
			Input Power (KW)	30.9	30.4	29.9	30.9	30.5	30.0	30.9	30.6	30.1	30.9	30.7	30.2
			Current(AMP.)	51.8	51.3	50.5	51.9	51.4	50.7	52.0	51.5	50.8	52.0	51.6	50.9

Note: All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86.

TABLE 13			Anpu-10-W-2 RATINGS											
EWT (°F)	CONDENSER		CFM	3200			3600			4000			4400		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	31.7	8.2	TC (MBH)	148.8	134.4	121.2	152.4	137.6	124.1	155.5	140.6	126.6	158.2	143.0	128.6
			SHC (MBH)	72.4	87.8	103.0	75.4	92.4	109.0	78.1	96.8	114.4	80.6	100.8	120.0
			Input Power (KW)	5.1	5.2	5.3	5.0	5.2	5.3	5.0	5.2	5.3	5.0	5.1	5.3
			Current(AMP.)	11.3	11.5	11.6	11.3	11.5	11.6	11.2	11.4	11.6	11.2	11.4	11.5
85	31.1	7.8	TC (MBH)	143.0	129.0	116.2	146.4	132.2	119.0	149.2	134.8	121.2	151.8	137.0	123.2
			SHC (MBH)	70.0	85.4	100.6	73.2	90.0	106.4	75.6	94.2	112.0	78.2	98.0	117.4
			Input Power (KW)	6.0	6.1	6.1	6.0	6.0	6.1	6.0	6.0	6.1	5.9	6.0	6.1
			Current(AMP.)	12.4	12.5	12.5	12.4	12.5	12.5	12.4	12.5	12.5	12.3	12.5	12.5
95	30.5	7.5	TC (MBH)	137.0	123.6	111.0	140.2	126.4	113.6	142.8	128.8	115.8	145.0	131.0	117.6
			SHC (MBH)	68.0	83.0	98.2	70.8	87.6	104.2	73.4	92.0	109.6	76.0	95.8	116.0
			Input Power (KW)	6.9	6.9	6.1	6.9	6.9	6.8	6.9	6.9	6.8	6.8	6.9	6.8
			Current(AMP.)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5

TABLE 14			Anpu-15-W-2 RATINGS											
EWT (°F)	CONDENSER		CFM	4800			5400			6000			6400		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	47.9	13.4	TC (MBH)	215.1	193.9	176.2	219.9	198.6	180.1	223.2	202.2	183.2	225.8	205.4	186.0
			SHC (MBH)	105.5	129.1	151.7	109.5	135.5	160.6	113.4	141.6	169.2	114.6	144.5	173.6
			Input Power (KW)	10.8	10.9	10.9	10.8	10.9	10.9	10.8	10.9	10.8	10.7	10.9	10.9
			Current(AMP.)	20.9	21.0	21.0	20.9	21.0	21.0	20.9	21.0	21.0	20.8	21.0	21.0
85	46.9	13.0	TC (MBH)	207.7	188.2	170.0	212.3	192.1	173.6	215.9	195.7	176.8	219.2	179.7	179.7
			SHC (MBH)	102.7	125.9	148.9	106.8	132.7	157.7	110.8	138.9	166.1	112.5	170.5	170.5
			Input Power (KW)	11.5	11.3	11.1	11.5	11.3	11.1	11.6	11.4	11.2	11.6	11.2	11.2
			Current(AMP.)	22.3	22.0	21.7	22.4	22.1	21.8	22.5	22.2	21.8	22.5	21.9	21.9
95	46.2	12.4	TC (MBH)	199.7	180.9	163.2	204.0	184.5	166.6	208.1	187.8	169.7	210.8	172.7	172.7
			SHC (MBH)	99.5	122.9	145.8	103.6	129.6	154.6	108.0	136.0	163.0	109.8	172.7	172.7
			Input Power (KW)	12.8	12.5	12.2	12.8	12.6	12.3	12.9	12.6	12.3	12.9	12.4	12.4
			Current(AMP.)	24.3	23.9	23.4	24.4	24.0	23.5	24.5	24.1	23.6	24.6	23.7	23.7

TABLE 15			Anpu-20-W-2 RATINGS											
EWT (°F)	CONDENSER		CFM	6400			7200			8000			8800		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	66.6	16.5	TC (MBH)	304.1	274.7	248.6	311.4	281.7	254.7	317.5	287.5	259.5	323.0	292.4	263.6
			SHC (MBH)	147.2	178.2	208.2	152.9	186.9	214.5	158.8	195.3	231.2	163.8	203.4	242.4
			Input Power (KW)	13.3	13.4	13.3	13.3	13.4	13.3	13.3	13.4	13.3	13.3	13.4	13.3
			Current(AMP.)	25.9	26.0	25.8	25.9	26.0	25.9	25.9	26.0	25.9	25.8	26.0	25.9
85	65.0	15.7	TC (MBH)	289.7	261.7	236.3	296.5	267.8	241.8	301.9	273.2	246.1	307.0	227.8	249.9
			SHC (MBH)	141.5	172.2	202.2	147.0	181.0	214.0	152.8	189.2	225.8	157.9	197.3	36.1
			Input Power (KW)	15.3	15.1	14.9	15.3	15.2	15.0	15.3	15.2	15.0	15.3	15.2	15.1
			Current(AMP.)	28.8	28.6	28.3	28.8	28.6	28.4	28.8	28.7	28.4	28.8	28.7	28.5
95	63.6	15.1	TC (MBH)	276.3	249.4	225.0	282.5	255.1	230.0	287.4	260.0	234.0	292.0	264.2	237.7
			SHC (MBH)	137.6	167.1	196.9	142.0	176.0	208.5	147.5	184.1	220.1	152.3	192.0	230.6
			Input Power (KW)	17.1	16.8	16.5	17.1	16.9	16.6	17.2	17.0	16.6	17.2	17.0	16.7
			Current(AMP.)	31.6	31.2	30.7	31.6	31.3	30.8	31.7	31.4	30.9	31.7	31.4	30.9

Note: ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86.

TABLE 16			Anpu-30-W-2 RATINGS												
EWT (°F)	CONDENSER		CFM	9600			10800			12000			13200		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	89.4	16.7	TC (MBH)	409.9	371.2	335.6	419.0	379.1	342.7	426.5	386.3	348.4	432.6	392.3	353.9
			SHC (MBH)	202.2	247.9	292.8	210.7	261.3	310.0	218.3	272.8	326.5	226.0	284.8	341.5
			Input Power (KW)	17.8	17.8	17.7	17.8	17.8	17.7	17.8	17.8	17.8	17.8	17.8	17.8
			Current(AMP.)	35.2	35.2	35.0	35.2	35.2	35.0	35.1	35.2	35.2	35.1	35.2	35.1
85	88.1	16.2	TC (MBH)	394.4	351.7	322.3	402.8	364.4	328.9	409.7	371.2	334.3	415.3	376.7	339.7
			SHC (MBH)	196.2	241.7	286.3	204.4	254.7	303.8	212.0	267.0	320.2	219.8	277.9	336.3
			Input Power (KW)	20.4	20.2	19.9	20.4	20.3	20.0	20.5	20.3	20.0	20.5	20.3	20.1
			Current(AMP.)	39.1	38.8	38.3	39.2	38.9	38.4	39.2	39.0	38.5	39.3	39.0	38.6
95	86.5	15.7	TC (MBH)	378.5	342.4	308.6	385.7	349.4	314.6	392.4	355.2	319.9	397.4	360.4	326.5
			SHC (MBH)	190.1	235.6	280.7	198.8	248.2	297.7	205.7	260.5	316.3	213.6	271.1	326.5
			Input Power (KW)	23.0	22.6	22.0	23.1	22.7	22.1	23.1	22.7	22.2	23.2	22.8	22.3
			Current(AMP.)	43.2	42.5	41.6	43.3	42.7	41.8	43.4	42.8	41.9	43.5	42.9	42.1

TABLE 17			Anpu-40-W-2 RATINGS												
EWT (°F)	CONDENSER		CFM	4800			5400			6000			6400		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	111.0	17.0	TC (MBH)	516.6	470.0	427.0	529.5	479.3	435.4	534.5	487.3	442.3	541.6	493.6	448.9
			SHC (MBH)	258.7	322.0	383.1	269.5	338.9	405.6	279.2	354.2	427.5	289.1	370.0	448.8
			Input Power (KW)	19.7	20.0	20.1	19.7	20.0	20.1	19.6	19.9	20.1	19.6	19.9	20.1
			Current(AMP.)	39.1	39.4	39.6	39.0	39.4	39.5	38.9	39.3	39.5	38.8	39.3	39.5
85	109.4	16.6	TC (MBH)	499.5	453.1	410.2	509.1	462.2	425.9	516.9	469.9	425.9	523.5	475.8	434.7
			SHC (MBH)	252.0	314.7	375.3	263.3	331.0	421.6	273.1	347.0	421.6	283.1	362.9	434.6
			Input Power (KW)	22.6	22.6	22.5	22.6	22.6	22.6	22.6	22.6	22.6	22.5	22.6	22.6
			Current(AMP.)	42.8	42.9	42.8	42.8	42.9	42.8	42.8	42.9	42.8	42.7	42.9	42.9
95	107.3	15.9	TC (MBH)	478.0	433.6	392.5	487.0	442.1	409.2	494.0	449.1	409.2	499.9	454.3	418.8
			SHC (MBH)	244.2	306.9	367.4	255.1	323.2	408.6	265.1	338.7	408.6	275.5	354.8	418.8
			Input Power (KW)	25.7	25.5	25.2	25.7	25.6	25.3	25.8	25.6	25.3	25.8	25.6	25.4
			Current(AMP.)	47.1	46.8	46.3	47.1	46.8	46.5	47.1	46.9	46.5	47.1	46.9	46.6

TABLE 18			Anpu-50-W-2 RATINGS												
EWT (°F)	CONDENSER		CFM	16000			18000			20000			22000		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	140.4	23.8	TC (MBH)	649.8	590.5	535.8	662.6	602.6	546.6	673.0	612.8	555.5	682.0	620.9	565.0
			SHC (MBH)	325.2	403.7	479.6	339.6	424.8	509.1	353.0	445.0	536.4	364.2	464.8	565.0
			Input Power (KW)	25.9	26.1	26.1	25.8	26.1	26.2	25.8	26.1	26.2	25.7	26.0	26.1
			Current(AMP.)	48.8	49.1	49.2	48.7	49.1	49.2	48.6	49.0	49.2	48.5	49.0	49.2
85	138.7	23.4	TC (MBH)	630.3	571.2	516.5	642.7	582.9	526.8	652.8	592.8	533.9	661.3	600.5	547.3
			SHC (MBH)	318.2	396.2	472.1	331.9	416.9	499.7	344.8	437.0	533.9	357.0	457.0	547.3
			Input Power (KW)	29.5	29.5	29.2	29.5	29.5	29.3	29.5	29.5	29.3	29.5	29.5	29.4
			Current(AMP.)	53.9	53.8	53.4	53.9	53.8	53.5	53.8	53.8	53.6	53.8	53.8	53.7
95	136.1	22.5	TC (MBH)	603.6	547.2	495.1	615.1	557.8	500.5	624.2	566.9	514.9	631.8	573.9	527.2
			SHC (MBH)	308.4	386.0	460.5	322.6	407.2	494.4	334.7	425.7	514.9	347.0	449.5	527.2
			Input Power (KW)	33.5	33.3	32.6	33.6	33.2	32.7	33.6	33.3	32.8	33.6	33.3	32.9
			Current(AMP.)	59.4	59.1	58.1	59.5	59.0	58.2	59.5	59.1	58.5	59.5	59.2	58.6

Note: All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86.

TABLE 19			Anpu-60-W-2 RATINGS											
EWT (°F)	CONDENSER		CFM	19200			21600			24000			26400		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	172.2	21.5	TC (MBH)	795.5	723.8	655.7	813.3	738.6	669.2	826.9	751.6	680.0	837.1	762.3	691.9
			SHC (MBH)	398.0	490.4	582.7	413.5	516.9	618.0	430.4	540.6	651.4	444.0	565.2	691.9
			Input Power (KW)	32.0	32.1	32.0	31.9	32.1	32.1	31.9	32.1	32.1	31.9	32.1	32.1
			Current(AMP.)	55.6	55.8	55.7	55.5	55.8	55.7	55.5	55.8	55.8	55.5	55.7	55.8
85	170.2	20.8	TC (MBH)	771.7	700.2	631.4	788.4	714.2	647.0	802.2	726.9	656.5	811.3	737.3	669.4
			SHC (MBH)	389.6	479.7	572.6	404.7	506.7	607.0	420.4	531.3	637.9	436.3	555.8	665.7
			Input Power (KW)	36.4	36.2	36.2	36.4	36.3	35.9	36.4	36.3	36.0	36.4	36.3	36.0
			Current(AMP.)	62.1	61.8	61.8	62.1	61.9	61.3	62.1	61.9	61.6	62.1	62.0	61.6
95	166.7	20.2	TC (MBH)	738.7	669.8	603.5	753.4	682.6	616.8	766.4	694.2	642.3	774.0	703.7	642.3
			SHC (MBH)	375.9	460.3	559.8	392.1	495.3	592.6	408.3	518.1	642.3	428.0	541.1	642.3
			Input Power (KW)	41.2	40.6	39.8	41.2	40.7	40.0	41.2	40.8	40.3	41.2	40.9	40.3
			Current(AMP.)	69.1	68.3	67.2	69.1	68.5	67.4	69.1	68.6	67.9	69.1	68.7	67.9

TABLE 20			Anpu-70-W-2 RATINGS											
EWT (°F)	CONDENSER		CFM	23040			25920			28800			31680		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	208.2	19.9	TC (MBH)	954.5	869.5	790.0	975.4	887.8	805.0	991.1	902.6	818.7	1003.0	915.5	831.8
			SHC (MBH)	476.2	589.4	700.0	494.2	619.9	743.2	514.0	649.5	781.9	534.0	675.9	818.7
			Input Power (KW)	40.5	40.7	40.7	40.4	40.7	40.7	40.4	40.6	40.7	40.4	40.6	40.7
			Current(AMP.)	76.7	77.1	77.1	76.6	77.0	77.1	76.6	77.0	77.1	76.6	76.9	77.1
85	205.7	19.5	TC (MBH)	924.6	840.2	760.2	854.6	857.6	774.6	960.0	871.7	789.3	972.2	884.3	803.7
			SHC (MBH)	466.4	576.4	685.6	484.8	606.6	728.9	503.4	635.7	765.9	524.0	663.8	798.6
			Input Power (KW)	46.0	45.8	45.9	46.0	45.9	45.5	46.0	45.9	45.6	46.0	45.9	45.7
			Current(AMP.)	85.0	84.7	84.9	85.0	84.8	84.2	85.0	84.9	84.4	85.0	84.9	84.5
95	201.5	18.7	TC (MBH)	883.2	802.3	727.2	900.4	818.1	739.7	915.9	831.1	754.9	924.0	842.9	770.5
			SHC (MBH)	450.2	562.3	672.1	469.6	591.1	711.3	487.0	621.0	748.2	508.0	647.4	770.5
			Input Power (KW)	52.1	51.5	50.6	52.1	51.6	50.8	52.1	51.7	50.9	52.1	51.8	51.1
			Current(AMP.)	94.1	93.3	91.8	94.1	93.4	92.1	49.1	93.5	92.4	94.1	93.7	92.6

Note: ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86.

TABLE 21			Anpu-80-W-2 RATINGS												
EWT (°F)	CONDENSER		CFM	24800			27900			31000			341		
			FACE VELOCITY(FPM)	400			450			500			550		
	GPM	PD(ft)	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
75	245.5	22.7	TC (MBH)	1121.9	1018.6	925.4	1149.0	1042.9	947.1	1169.2	1062.7	964.2	1187.9	1080.1	976.0
			SHC (MBH)	548.0	671.6	788.0	568.5	704.6	833.8	589.2	737.1	877.2	609.6	766.6	923.1
			Input Power (KW)	48.1	48.3	48.1	48.1	48.3	48.2	48.0	48.3	48.2	47.9	48.2	48.3
			Current(AMP.)	86.0	86.3	86.1	85.9	86.2	86.2	85.8	86.2	86.2	85.7	86.2	86.2
85	242.1	22.1	TC (MBH)	1085.2	982.6	889.2	1111.8	1006.1	909.5	1131.2	1024.8	924.4	1148.7	1041.5	938.1
			SHC (MBH)	535.9	654.0	772.8	555.7	687.9	815.7	577.8	720.2	861.8	596.8	751.1	902.9
			Input Power (KW)	54.6	54.3	53.6	54.6	54.4	53.8	54.6	54.4	53.9	54.6	54.5	54.0
			Current(AMP.)	94.4	93.9	93.2	94.4	94.1	93.4	94.4	94.2	93.5	94.4	94.2	93.6
95	237.1	21.1	TC (MBH)	1037.0	939.1	848.0	1061.4	960.2	865.0	1079.4	976.8	880.7	1094.4	992.1	895.7
			SHC (MBH)	516.4	636.2	752.1	535.7	669.6	799.4	558.2	702.4	840.2	578.3	731.9	881.7
			Input Power (KW)	61.7	60.8	59.7	61.9	61.0	59.9	61.9	61.2	60.1	61.9	61.3	60.3
			Current(AMP.)	103.6	102.5	101.0	103.9	102.8	101.3	103.9	138.0	101.6	103.9	103.2	101.8

Rating Table Notes:

1. Direct interpolation is permissible but do not extrapolate.
2. In calculating the cooling load and power input (KW), the heat generated by the evaporator fan has not been taken into account.
3. Ratings are based on 10 °F subcooling.
4. All ratings are based on 80 °F EDB according to ARI standards 310-90 and 360-86.

Formulas, (At sea level):

$$GPM = \frac{THR(BTU/hr}{500x\ \Delta T}$$ (Water Flow Rate)

$$LDB = EDB - \frac{SHC(BTU/hr)}{1.087\ xCFM}$$ (For cooling and heating coils)

$$H_2 = H_1 - \frac{TC\ (BTU/hr)}{4.45\ x\ CFM}$$ (For cooling coil)

THR (MBH) = Gross Total Capacity (MBH) + 3.413 x Compressor Power Input (KW)
(For suction cooled compressors)

TABLE 22	Anpu-5-A-1 RATINGS											
CT (°F)	CFM	1600			1800			2000			2200		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	67.7	61.1	54.8	69.2	62.5	56.1	70.4	63.6	57.1	71.5	64.6	58.1
	SHC (MBH)	33.6	41.1	48.8	35.0	43.5	51.7	36.4	45.5	54.6	37.6	47.6	57.6
	Input Power (KW)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
	Current(AMP.)	6.8	6.8	6.7	6.8	6.8	6.7	6.8	6.8	6.7	6.8	6.8	6.7
	THR (MBH)	79.4	72.8	58.2	80.9	74.2	67.7	82.2	75.3	68.8	83.2	76.3	69.7
115	TC (MBH)	64.6	58.3	52.3	66.0	59.5	53.5	67.1	60.6	54.3	68.1	61.5	55.6
	SHC (MBH)	32.5	40.0	47.5	33.9	42.4	50.5	35.2	44.3	53.4	36.5	46.3	55.6
	Input Power (KW)	3.9	3.8	3.7	3.9	3.8	3.8	3.9	3.8	3.8	3.9	3.8	3.8
	Current(AMP.)	7.37	7.3	7.2	7.3	7.3	7.2	7.3	7.3	7.2	7.3	7.3	7.2
	THR (MBH)	77.8	71.3	65.1	79.2	72.6	66.3	80.3	73.7	67.2	81.4	74.6	68.5
125	TC (MBH)	61.5	55.4	49.7	62.7	56.5	50.6	63.7	57.5	51.9	64.6	58.3	53.2
	SHC (MBH)	31.3	38.8	46.3	32.7	41.1	49.2	34.0	43.2	51.9	33.	45.2	53.2
	Input Power (KW)	4.3	4.2	4.1	4.3	4.2	4.1	4.3	4.2	4.1	4.3	4.2	4.2
	Current(AMP.)	7.97	7.8	7.6	7.9	7.8	7.7	7.9	7.8	7.7	7.9	7.8	7.7
	THR (MBH)	76.1	69.7	63.7	77.4	70.9	64.6	78.5	71.9	66.0	79.3	72.8	67.4
135	TC (MBH)	58.3	52.4	46.9	59.3	53.4	48.2	60.3	54.3	49.6	61.0	55	50.8
	SHC (MBH)	30.0	37.7	45.2	31.5	39.8	48.0	32.8	41.9	49.5	34.0	43.9	50.8
	Input Power (KW)	4.7	4.6	4.4	4.7	4.6	4.5	4.7	4.6	4.5	4.7	4.6	4.5
	Current(AMP.)	8.4	8.3	8.1	8.5	8.3	8.1	8.5	8.3	8.2	8.5	8.4	8.2
	THR (MBH)	74.3	68.0	62.0	75.4	69.1	63.4	76.4	70.0	64.9	77.2	70.8	66.3

TABLE 23	Anpu-8-A-1 RATINGS											
CT (°F)	CFM	2560			2880			3200			3520		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	102.4	92.9	83.9	105.3	94.8	85.6	106.3	96.2	87.3	107.3	98.1	88.7
	SHC (MBH)	51.8	63.9	75.9	54.0	67.3	80.5	55.9	71.0	85.3	57.5	73.4	88.7
	Input Power (KW)	6.4	6.3	6.1	6.4	6.3	6.2	6.5	6.3	6.2	6.5	6.4	6.2
	Current(AMP.)	12.2	12.0	11.8	12.3	12.0	11.8	12.3	12.1	11.9	12.3	12.1	11.9
	THR (MBH)	124.3	114.4	104.9	127.0	116.4	106.7	128.4	117.8	108.4	129.5	119.8	109.9
115	TC (MBH)	98.0	88.8	80.1	99.9	90.5	81.7	101.4	91.6	84.0	102.9	93.5	85.3
	SHC (MBH)	50.1	62.1	74.1	52.2	65.6	78.6	54.2	69.3	82.1	55.9	71.6	85.3
	Input Power (KW)	7.1	6.9	6.7	7.1	6.9	6.7	7.1	6.9	6.8	7.1	7.0	6.8
	Current(AMP.)	13.3	14.2	12.6	13.3	13.0	12.7	13.4	13.0	12.8	13.4	13.1	12.8
	THR (MBH)	122.1	112.3	102.9	124.1	114.2	104.7	125.8	115.3	107.2	127.3	117.3	105.6
125	TC (MBH)	92.9	84.2	75.9	94.7	85.7	77.6	96.1	86.7	80.4	97.3	88.3	81.5
	SHC (MBH)	48.1	60.3	72.4	50.3	63.6	77.0	52.1	67.3	78.4	54.2	69.9	81.5
	Input Power (KW)	7.7	7.5	7.2	7.8	7.5	7.3	8.8	7.6	8.4	8.8	7.6	7.4
	Current(AMP.)	14.3	13.9	13.5	14.4	14.0	13.6	15.9	14.0	15.3	15.9	14.1	13.8
	THR (MBH)	119.3	109.7	100.6	121.1	111.5	102.5	126.1	112.5	109.0	127.3	114.2	106.9
135	TC (MBH)	87.1	78.9	71.3	88.4	80.3	73.4	89.6	81.4	76.2	90.2	82.4	77.2
	SHC (MBH)	46.1	58.2	70.8	48.1	61.5	73.4	49.7	65.0	74.3	51.6	68.0	77.2
	Input Power (KW)	8.4	8.1	7.8	8.4	8.1	7.9	8.4	8.2	8.0	8.4	8.2	8.0
	Current(AMP.)	15.4	14.9	14.4	15.4	15.0	14.6	15.4	15.0	14.7	15.4	15.1	14.8
	THR (MBH)	115.7	106.5	98	117.1	108.1	100.4	118.3	109.3	103.5	118.9	110.5	104.7

Rating Table Notes:

1. Direct interpolation is permissible but do not extrapolate.
2. In calculating the cooling load and power input (kw), the heat generated by the evaporator fan has not been taken into account.
3. Ratings are based on 10 °F subcooling.
4. All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86
5. Standard air cooled condenser rating are based on 125 °F condensing temperature according to ARI Standard 460-(87).

TABLE 24	Anpu-10-A-1 RATINGS											
CT (°F)	CFM	3200			3600			4000			4400		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	138.1	124.7	112.5	141.3	127.5	115.0	143.7	130	117	146.0	132.1	118.9
	SHC (MBH)	68.1	83.6	98.4	71.0	88.0	104.2	73.7	92.0	110.1	76.1	96.0	115.3
	Input Power (KW)	8.5	8.4	8.3	8.6	8.5	8.3	8.6	8.5	8.3	8.6	8.5	8.3
	Current(AMP.)	15.8	15.6	15.3	15.8	15.6	15.4	15.8	15.7	15.4	15.8	15.7	15.5
	THR (MBH)	167.3	153.4	140.7	170.5	170.1	143.3	173.0	158.9	145.4	175.3	161.1	147.4
115	TC (MBH)	131.2	118.5	106.8	134.1	121.1	109.0	136.4	123.3	110.9	138.3	125.2	112.8
	SHC (MBH)	65.6	81.0	95.8	68.2	85.3	101.6	70.9	89.4	107.2	73.5	93.1	112.7
	Input Power (KW)	9.4	9.2	9.0	9.5	9.3	9.0	9.5	9.3	9.0	9.5	9.3	9.1
	Current(AMP.)	17.2	16.9	16.5	17.2	16.9	16.6	17.2	17	16.6	17.3	17.0	16.7
	THR (MBH)	163.4	150.0	137.5	166.4	152.7	139.9	168.8	155.0	141.9	170.8	157.0	144
125	TC (MBH)	124.2	112.2	101.0	126.8	114.5	102.9	128.9	116.4	104.8	130.5	118.1	107.7
	SHC (MBH)	62.9	78.3	93.1	65.6	82.6	99.2	68.3	86.6	104.8	70.9	90.6	107.7
	Input Power (KW)	10.3	10.0	9.7	10.3	10.1	9.8	10.3	10.1	9.8	10.4	10.1	9.9
	Current(AMP.)	18.5	18.1	17.6	18.6	18.2	17.7	18.6	18.2	17.8	18.7	18.3	17.9
	THR (MBH)	152.3	146.4	134.2	162.0	148.9	136.3	164.2	150.9	138.4	165.9	152.7	141.4
135	TC (MBH)	117.2	105.8	95.2	119.4	107.8	97.2	121.3	109.4	100	122.7	110.9	102.5
	SHC (MBH)	60.5	75.6	90.7	63.0	80.1	97.2	65.6	84	100	68.1	87.8	102.5
	Input Power (KW)	11.1	10.7	10.4	11.1	10.8	10.5	11.2	10.9	10.6	11.2	10.9	10.6
	Current(AMP.)	19.8	19.3	18.7	19.9	19.4	18.8	20	19.5	19.6	20.0	19.55	19.1
	THR (MBH)	154.9	142.5	130.8	157.4	144.7	132.9	159.4	146.5	136.1	160.9	148.1	138.8

TABLE 25	Anpu-15-A-1 RATINGS											
CT (°F)	CFM	4800			5400			6000			6600		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	194.3	175.7	158.5	198.4	179.2	153.8	201.6	182.7	164.4	204.5	185.2	167.8
	SHC (MBH)	97.5	120.6	143.5	101.7	127.4	152.6	105.7	133.2	160.7	109.5	139.4	167.7
	Input Power (KW)	11.5	11.3	11.1	11.6	11.4	11.1	11.6	11.4	11.2	11.6	11.5	11.2
	Current(AMP.)	21.7	21.3	20.9	21.7	21.4	21.0	21.8	21.5	21.1	21.8	21.5	21.2
	THR (MBH)	233.8	214.4	196.4	237.9	218.1	191.8	241.3	221.7	202.5	244.2	224.3	206.1
115	TC (MBH)	185.8	167.9	151.3	189.5	171.1	153.8	192.5	174.2	157.4	195.6	176.6	161.3
	SHC (MBH)	94.4	117.6	140.1	98.6	124.2	149.6	102.3	129.9	157.3	105.6	137.0	161.6
	Input Power (KW)	12.8	12.5	12.2	12.9	12.6	12.2	12.9	12.6	12.3	12.9	12.7	12.4
	Current(AMP.)	23.8	23.3	22.7	23.9	23.4	22.8	23.9	23.5	22.9	23.9	23.5	23.0
	THR (MBH)	229.6	210.7	192.8	233.5	214.1	195.6	236.0	217.3	199.4	239.7	219.9	203.5
125	TC (MBH)	176.9	159.9	143.1	180.3	162.8	146.8	183.6	165.5	150.9	186.5	167.7	154.8
	SHC (MBH)	91.5	114.3	137.8	95.1	120.7	146.7	98.6	126.9	151.3	101.4	132.6	154.8
	Input Power (KW)	14.1	13.7	13.2	14.2	13.8	13.3	14.2	13.8	13.4	14.2	13.9	13.5
	Current(AMP.)	25.9	25.2	24.4	26.0	25.3	24.6	26.0	25.5	24.8	26.0	25.5	25.0
	THR (MBH)	225.1	206.6	188.2	228.7	209.8	192.3	232.1	212.7	196.8	235.0	215.1	201.1
135	TC (MBH)	167.8	151.6	136.0	170.9	154.4	140.3	174.5	156.5	144.5	177.1	158.4	148.0
	SHC (MBH)	87.9	110.9	133.9	91.8	117.1	140.7	94.0	123.5	144.5	96.9	129.6	148.0
	Input Power (KW)	15.4	14.8	14.2	15.4	14.9	14.4	15.4	15.0	14.6	15.4	16.1	14.7
	Current(AMP.)	28.1	27.2	26.2	28.1	27.3	26.5	28.1	27.5	26.7	28.1	27.6	26.9
	THR (MBH)	220.2	202.2	184.7	223.4	205.3	189.6	227.0	207.7	194.8	229.5	209.8	198.2

Rating Table Notes:

1. Direct interpolation is permissible but do not extrapolate.
2. In calculating the cooling load and power input (KW), the heat generated by the evaporator fan has been taken into account.
3. Ratings are based on 10 °F subcooling.
4. All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86
5. Standard air cooled condenser ratings are based on 125 °F condensing temperature according to ARI Standard 460-(87).

TABLE 26	Anpu-20-A-1 RATINGS											
CT (°F)	CFM	6400			7200			8000			8800		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	241.6	219.4	198.3	246.1	223.7	201.9	249.9	227.1	206.7	252.5	230.0	211.7
	SHC (MBH)	125.8	157.0	188.2	131.4	165.3	200.1	136.7	173.9	206.7	142.4	181.7	211.7
	Input Power (KW)	12.9	12.8	12.6	12.9	12.8	12.6	12.9	12.8	12.7	12.9	12.8	12.7
	Current(AMP.)	23.5	23.4	23.2	23.5	23.4	23.2	23.5	23.5	23.3	23.5	23.5	23.3
	THR (MBH)	285.5	263.0	241.4	290.1	267.4	245.1	293.9	270.8	250.0	296.5	273.8	255.1
115	TC (MBH)	230.6	209.4	188.5	234.7	213.1	193.3	238.1	216.2	198.6	240.2	218.7	203.1
	SHC (MBH)	121.6	152.6	188.5	126.9	161.1	193.3	132.2	169.4	198.6	138.2	177.6	203.1
	Input Power (KW)	14.4	14.2	13.9	14.4	14.2	14.0	14.4	14.3	14.1	14.4	14.3	14.1
	Current(AMP.)	25.7	25.4	24.9	25.7	25.4	25.1	25.7	25.5	25.2	25.7	25.5	25.3
	THR (MBH)	279.8	257.9	235.9	283.9	261.7	241.1	287.4	265.0	246.6	289.4	267.6	251.3
125	TC (MBH)	219.1	198.7	179.6	222.8	202.2	185.2	225.7	205.0	190.4	227.1	207.2	194.7
	SHC (MBH)	117.4	148.6	179.6	122.5	156.9	185.2	128.3	164.7	190.4	135.0	173.4	194.7
	Input Power (KW)	15.9	15.6	15.2	15.9	15.7	15.3	15.9	15.7	15.4	15.9	15.7	15.5
	Current(AMP.)	27.8	27.4	26.8	27.8	27.4	27.0	27.8	27.5	27.1	27.8	27.6	27.3
	THR (MBH)	273.4	251.9	231.5	277.0	255.6	237.5	280.0	258.6	243.1	281.3	260.9	247.7
135	TC (MBH)	207.4	187.8	171.4	210.7	190.9	177.0	213.2	193.3	181.6	214.0	195.3	185.7
	SHC (MBH)	112.6	144.2	171.4	118.2	152.5	177.0	123.7	160.8	181.6	130.9	168.7	185.7
	Input Power (KW)	17.3	16.9	16.5	17.3	17.0	16.7	17.3	17.1	16.8	17.3	17.1	16.9
	Current(AMP.)	29.8	29.3	28.7	29.8	29.5	28.9	29.8	29.6	29.1	29.8	29.6	29.3
	THR (MBH)	266.4	245.6	227.7	269.7	249.0	233.9	272.2	251.7	238.9	273.0	253.8	243.4

TABLE 27	Anpu-25-A-1 RATINGS											
CT (°F)	CFM	8000			9000			10000			11000		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	306.6	277.7	250.7	312.3	283.1	255.5	317.4	287.9	260.6	320.4	291.9	267.2
	SHC (MBH)	155.8	195.0	233.0	162.8	205.9	247.6	169.2	215.9	260.6	176.6	225.0	267.2
	Input Power (KW)	16.8	16.6	16.3	16.8	16.6	16.4	16.8	16.7	16.4	16.8	16.7	16.5
	Current(AMP.)	29.7	29.5	29.1	29.8	29.5	29.2	29.8	29.6	29.3	29.8	29.6	29.4
	THR (MBH)	363.8	334.4	306.5	369.6	339.9	311.5	374.7	344.8	316.7	377.7	348.9	323.6
115	TC (MBH)	292.4	264.9	239.1	297.4	269.7	244.5	302.3	274.1	250.6	304.2	277.6	256.8
	SHC (MBH)	151.3	189.4	227.7	157.7	200.3	242.7	163.4	209.8	250.6	172.1	219.9	256.8
	Input Power (KW)	18.7	18.4	18.0	18.7	18.5	18.1	18.7	18.5	18.2	18.7	18.6	18.3
	Current(AMP.)	32.5	32.0	31.4	32.5	32.1	31.6	32.5	32.2	31.4	32.5	32.3	31.9
	THR (MBH)	356.2	327.7	300.5	361.4	332.7	306.3	366.2	337.4	312.7	368.1	340.9	319.2
125	TC (MBH)	277.5	251.3	227.7	282.1	255.9	233.7	286.7	259.7	240.0	287.2	262.6	245.7
	SHC (MBH)	145.6	184.4	221.4	152.5	194.8	233.5	157.4	205.0	240.0	167.6	214.6	245.7
	Input Power (KW)	20.5	20.1	19.6	20.5	20.2	19.8	20.5	20.3	19.9	20.5	20.4	20.4
	Current(AMP.)	35.1	34.5	33.8	35.1	34.7	34.0	35.1	34.8	34.2	35.1	34.8	34.4
	THR (MBH)	347.6	320.1	294.6	352.2	325.0	301.2	356.8	329.0	308.0	357.3	322.2	314.1
135	TC (MBH)	261.6	237.1	215.9	265.6	241.3	222.8	270.5	244.5	228.8	269.4	247.0	233.9
	SHC (MBH)	140.6	178.6	215.9	147.6	189.2	22.8	151.4	199.2	228.8	164.1	208.6	233.9
	Input Power (KW)	22.2	21.8	21.2	22.2	22.0	21.4	22.2	22.0	21.6	22.2	22.1	21.8
	Current(AMP.)	37.5	37.0	36.0	37.5	37.1	36.4	37.5	37.3	36.6	37.5	37.3	36.8
	THR (MBH)	337.6	311.7	288.3	341.5	316.2	295.9	346.5	319.7	302.5	345.3	322.4	308.2

Rating Table Notes:

1. Direct interpolation is permissible but do not extrapolate.
2. In calculating the cooling load and power input (KW), the heat generated by the evaporator fan has been taken into account.
3. Ratings are based on 10 °F subcooling.
4. All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86.
5. Standard air cooled condenser ratings are based on 125 °F condensing temperature according to ARI Standard 460-(87) .

TABLE 28	Anpu-30-A-1 RATINGS											
CT (°F)	CFM	9360			10530			11700			12870		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	362.8	328.1	296.0	369.6	334.7	301.5	375.8	340.3	307.1	380.6	344.9	314.7
	SHC (MBH)	183.8	229.0	273.2	192.1	241.0	290.7	199.5	253.4	307.1	206.8	262.0	314.7
	Input Power (KW)	20.5	20.2	19.9	20.6	20.3	19.9	20.6	20.4	20.0	20.6	20.4	20.1
	Current(AMP.)	34.5	34.0	33.5	34.5	34.1	33.6	34.5	34.2	33.7	34.5	34.3	33.8
	THR (MBH)	432.9	397.1	363.9	439.9	404.0	369.5	446.0	409.8	375.3	450.8	414.5	383.3
115	TC (MBH)	345.6	312.5	281.7	351.9	318.5	287.9	357.4	323.7	294.8	362.1	327.8	302.3
	SHC (MBH)	177.8	222.8	266.8	185.3	235.5	285.0	192.5	246.8	294.8	199.9	258.1	302.3
	Input Power (KW)	22.8	22.3	21.8	22.8	22.4	21.9	22.8	22.5	22.0	22.8	22.6	22.2
	Current(AMP.)	37.9	37.1	36.3	37.9	37.3	36.5	37.9	37.4	36.7	37.9	37.5	36.9
	THR (MBH)	423.5	388.8	356.0	429.8	395.0	362.6	435.3	400.5	370.0	439.9	404.9	377.9
125	TC (MBH)	327.7	296.3	267.6	333.4	301.4	274.4	338.1	306.1	282.2	342.3	309.9	288.9
	SHC (MBH)	171.3	216.4	259.6	179.5	228.8	274.4	186.5	240.1	282.2	193.1	251.8	288.9
	Input Power (KW)	24.9	24.4	23.6	24.9	24.5	23.8	24.9	24.6	24.0	24.9	24.7	24.2
	Current(AMP.)	41.0	40.1	39.1	41.0	40.3	39.4	41.0	40.5	39.6	41.0	40.6	39.9
	THR (MBH)	412.7	379.4	348.4	418.4	385.0	355.8	423.1	390.1	364.2	427.3	394.1	371.5
135	TC (MBH)	308.5	279.1	253.2	313.5	283.6	261.3	317.9	287.7	268.5	321.8	291.0	274.7
	SHC (MBH)	164.8	209.4	253.2	172.4	222.0	261.4	179.4	233.0	268.5	186.3	243.7	274.7
	Input Power (KW)	26.8	26.3	25.5	26.8	26.4	25.7	26.8	26.6	26.0	26.8	26.7	26.2
	Current(AMP.)	43.8	43.0	41.8	43.8	43.3	42.2	43.8	43.4	42.6	43.8	43.6	42.9
	THR (MBH)	400.1	368.9	340.1	405.2	379.9	349.2	409.6	378.4	357.1	413.4	382.0	364.0

TABLE 29	Anpu-35-A-1 RATINGS											
CT (°F)	CFM	11200			12600			14000			15400		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	436.7	396.1	358.3	445.4	404.6	365.1	451.8	410.6	372.2	459.7	416.3	379.6
	SHC (MBH)	221.8	275.3	328.3	230.6	290.1	348.7	240.2	304.2	372.2	246.2	317.3	379.6
	Input Power (KW)	26.0	25.7	25.2	26.0	25.8	25.3	26.0	25.8	25.4	26.0	25.9	25.5
	Current(AMP.)	47.0	46.5	45.8	47.0	46.6	46.0	47.0	46.7	46.1	47.0	46.8	46.2
	THR (MBH)	525.5	483.8	444.4	534.4	492.5	451.5	540.7	498.8	458.9	458.6	504.6	466.6
115	TC (MBH)	415.6	376.9	340.8	423.7	384.4	347.9	428.7	390.1	355.6	437.3	395.3	364.0
	SHC (MBH)	213.5	266.9	320.1	223.3	282.0	341.7	232.0	296.0	354.9	237.0	309.7	364.0
	Input Power (KW)	29.0	28.4	27.8	29.0	28.6	27.9	29.0	28.6	28.1	29.0	28.7	28.2
	Current(AMP.)	51.4	50.6	49.6	51.4	50.8	49.8	51.4	50.9	50.1	51.4	51.1	50.3
	THR (MBH)	514.5	474.0	435.6	522.2	481.9	443.2	527.6	487.9	451.4	536.2	493.3	460.2
125	TC (MBH)	393.9	357.1	323.3	401.2	363.8	330.8	404.6	368.9	339.6	443.7	373.5	347.7
	SHC (MBH)	205.4	259.7	311.4	213.9	273.9	329.8	225.0	287.6	339.6	228.0	300.9	347.7
	Input Power (KW)	31.8	31.1	30.3	31.8	31.3	30.5	31.8	31.4	30.7	31.8	31.5	30.9
	Current(AMP.)	55.7	54.7	53.4	55.7	55.0	53.7	55.7	55.1	54.1	55.7	55.3	54.4
	THR (MBH)	502.4	463.4	426.6	509.6	470.7	434.8	513.0	476.2	444.5	522.1	481.1	453.2
135	TC (MBH)	371.3	336.4	305.7	378.1	342.3	314.8	379.8	347.0	323.3	390.0	350.9	330.6
	SHC (MBH)	197.4	251.4	303.9	205.0	265.9	314.8	219.0	279.9	323.3	219.3	292.5	330.6
	Input Power (KW)	34.4	33.8	32.8	34.4	34.0	33.1	34.4	34.2	33.4	34.4	34.3	33.6
	Current(AMP.)	59.7	58.8	57.2	59.7	59.1	57.7	59.7	59.3	58.1	59.7	59.5	58.5
	THR (MBH)	488.8	451.9	417.5	495.7	458.4	427.7	497.3	463.5	437.2	507.5	467.9	445.4

Rating Table Notes:

1. Direct interpolation is permissible but do not extrapolate.
2. In calculating the cooling load and power input (kw), the heat generated by the evaporator fan has not been taken into account.
3. Ratings are based on 10 °F subcooling.
4. All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86
5. Standard air cooled condenser rating are based on 125 °F condensing temperature according to ARI Standard 460-(87).

TABLE 30	Anpu-40-A-1 RATINGS												
CT (°F)	CFM	12800			14400			16000			17600		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	520.9	471.3	425.8	531.8	481.0	433.7	540.8	489.8	441.4	549.7	496.9	448.1
	SHC (MBH)	260.8	322.1	382.3	271.9	340.1	409.0	285.0	355.9	427.8	293.0	371.8	448.1
	Input Power (KW)	30.9	30.4	29.9	30.9	30.5	30.0	30.9	30.6	30.1	30.9	30.7	30.2
	Current(AMP.)	51.8	51.3	50.5	51.9	51.4	50.7	52.0	51.5	50.8	52.0	51.6	50.9
	THR (MBH)	626.2	575.2	527.7	637.4	585.2	536.0	646.4	594.2	544.1	655.3	601.6	551.0
115	TC (MBH)	496.4	449.0	404.7	506.6	458.2	412.8	514.5	465.9	421.3	523.2	472.5	430.2
	SHC (MBH)	251.0	313.1	372.8	264.5	330.3	395.8	275.0	345.7	421.3	283.3	361.0	430.2
	Input Power (KW)	34.4	33.7	32.8	34.4	33.8	33.0	34.4	33.9	33.2	34.4	34.0	33.3
	Current(AMP.)	56.5	55.5	54.4	56.6	55.7	54.7	56.6	55.9	54.9	56.6	56.0	55.1
	THR (MBH)	613.8	563.9	516.8	624.1	573.4	525.5	632.1	581.8	534.5	640.8	588.7	544.0
125	TC (MBH)	471.1	425.9	383.8	480.5	434.4	392.3	487.4	441.2	401.6	496.0	447.1	411.5
	SHC (MBH)	242.2	303.5	362.8	254.9	320.9	392.3	266.0	337.1	401.6	272.5	351.6	411.5
	Input Power (KW)	37.8	36.9	35.8	37.8	37.1	36.0	37.8	37.2	36.3	37.8	37.4	36.5
	Current(AMP.)	61.0	59.8	58.3	61.0	60.1	58.7	61.0	60.3	59.0	61.0	60.5	59.4
	THR (MBH)	600.0	551.7	505.9	609.4	561.0	515.2	616.3	568.2	525.3	624.9	574.6	536.2
135	TC (MBH)	445.0	402.0	363.0	453.7	409.6	372.1	459.7	415.7	382.1	468.6	420.9	392.0
	SHC (MBH)	232.3	294.1	354.4	244.7	310.4	372.1	263.0	326.2	382.1	266.0	342.1	392.0
	Input Power (KW)	40.9	40.0	38.7	40.9	40.2	39.0	40.9	40.4	39.3	40.9	40.6	39.7
	Current(AMP.)	65.4	64.1	62.3	65.4	64.4	62.7	65.4	64.7	63.2	65.4	64.9	63.7
	THR (MBH)	584.7	538.6	495.0	593.4	547.0	505.3	599.4	553.7	516.4	608.2	559.5	527.5

TABLE 31	Anpu-10-A-2 RATINGS												
CT (°F)	CFM	3200			3600			4000			4400		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	137.0	123.6	111.0	140.2	126.4	113.6	142.8	128.8	115.8	145.0	131.0	117.6
	SHC (MBH)	68.0	83.0	98.2	70.8	87.6	104.2	73.4	92.0	109.6	76.0	95.8	116.0
	Input Power (KW)	6.9	6.9	6.1	6.9	6.9	6.8	6.9	6.9	6.8	6.8	6.9	6.8
	Current(AMP.)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
	THR (MBH)	160.4	147.0	131.8	163.6	149.8	136.9	166.2	152.2	139.1	168.3	154.4	140.9
115	TC (MBH)	130.8	118.0	106.0	133.6	120.6	108.2	136.2	122.8	110.2	138.2	124.6	112.4
	SHC (MBH)	65.8	80.8	96.0	68.4	85.2	101.6	70.8	89.2	107.0	73.4	93.2	112.0
	Input Power (KW)	7.7	7.6	7.5	7.7	7.7	7.5	7.8	7.7	7.6	7.8	7.7	7.6
	Current(AMP.)	14.7	14.6	14.4	14.7	14.6	14.4	14.7	14.6	14.7	14.7	14.6	14.5
	THR (MBH)	157.2	144.1	131.7	160.0	146.7	133.9	162.7	149.0	136.0	164.7	150.9	138.3
125	TC (MBH)	124.4	112.0	100.6	127.0	114.4	102.6	129.4	116.4	105.0	131.2	118.0	107.4
	SHC (MBH)	63.2	78.4	93.2	66.0	82.6	99.2	68.6	86.6	104.4	70.8	90.4	107.4
	Input Power (KW)	8.6	8.4	8.2	8.6	8.4	8.2	8.6	8.5	8.3	8.6	8.5	8.3
	Current(AMP.)	15.8	15.6	15.3	15.8	15.6	15.4	15.9	15.7	15.4	15.9	15.7	15.5
	THR (MBH)	153.7	140.7	128.6	156.4	143.2	130.7	158.8	145.3	133.3	160.7	147.0	135.9
135	TC (MBH)	118.0	106.1	94.8	120.2	108.2	97.2	122.2	110.0	100.0	124.0	111.4	102.6
	SHC (MBH)	60.8	75.8	90.8	63.6	80.2	96.8	66.2	84.4	100.0	68.4	88.4	102.6
	Input Power (KW)	9.4	9.2	8.9	9.5	9.2	8.9	9.5	9.2	9.0	9.5	9.3	9.1
	Current(AMP.)	16.9	16.6	16.2	17.0	16.7	16.3	17.0	16.7	16.4	17.0	16.8	16.5
	THR (MBH)	151.4	137.4	125.1	152.5	139.7	127.7	154.6	141.5	130.8	156.4	141.9	133.6

Rating Table Notes:

1. Direct interpolation is permissible but do not extrapolate.
2. In calculating the cooling load and power input (KW), the heat generated by the evaporator fan has been taken into account.
3. Ratings are based on 10 °F subcooling.
4. All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86.
5. Standard air cooled condenser ratings are based on 125 °F condensing temperature according to ARI Standard 460-(87) .

TABLE 32	Anpu-15-A-2 RATINGS											
CT (°F)	CFM	4800			5400			6000			6400		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	199.7	180.9	163.2	204.0	184.5	166.6	208.1	187.8	169.7	210.8	190.8	172.7
	SHC (MBH)	99.5	122.9	145.8	103.6	129.6	154.6	108.0	136.0	163.0	109.8	138.5	172.7
	Input Power (KW)	12.8	12.5	12.2	12.8	12.6	12.3	12.9	12.6	12.3	12.9	12.6	12.4
	Current(AMP.)	24.3	23.9	23.4	24.4	24.0	23.5	24.5	24.1	23.6	24.6	24.1	23.7
	THR (MBH)	243.3	223.6	204.8	247.8	227.4	208.5	252.0	230.8	211.8	254.8	233.9	214.9
115	TC (MBH)	190.9	172.8	155.8	194.8	176.2	159.0	197.8	179.2	162.1	200.4	181.8	165.7
	SHC (MBH)	96.2	119.5	142.4	100.7	126.4	151.2	104.7	132.4	162.1	106.1	135.1	165.7
	Input Power (KW)	14.0	13.7	13.3	14.1	13.8	13.4	14.2	13.8	13.4	14.2	13.9	13.5
	Current(AMP.)	26.4	25.7	25.1	26.5	25.9	25.2	26.6	26.0	25.4	26.7	26.1	25.5
	THR (MBH)	238.8	219.5	201.2	243.0	223.1	204.7	246.2	226.4	208.0	248.9	229.1	211.8
125	TC (MBH)	181.2	163.8	147.7	184.6	166.9	150.7	187.3	169.6	154.5	189.7	171.9	158.4
	SHC (MBH)	92.7	116.1	138.8	97.0	122.5	150.7	100.9	128.8	154.5	102.2	131.6	158.4
	Input Power (KW)	15.3	14.9	14.4	15.4	14.94	14.5	15.5	15.0	14.6	15.5	15.1	14.7
	Current(AMP.)	28.4	27.6	26.8	28.6	27.8	27.0	28.7	27.9	27.2	28.8	28.0	27.4
	THR (MBH)	233.5	214.5	196.8	237.1	217.9	200.1	240.2	220.9	204.3	242.7	223.4	208.5
135	TC (MBH)	170.4	153.7	138.7	173.1	156.4	142.6	175.2	158.7	146.6	177.1	160.7	150.2
	SHC (MBH)	88.8	112.1	134.8	92.8	118.2	142.6	96.6	124.5	146.6	98.0	127.7	150.2
	Input Power (KW)	16.6	16.0	15.5	16.7	16.1	15.6	16.8	16.2	15.8	16.8	16.3	15.9
	Current(AMP.)	30.5	29.6	28.6	30.7	29.7	28.8	30.8	29.9	29.1	30.9	30.0	29.3
	THR (MBH)	227.1	208.4	191.5	230.1	211.4	195.9	232.4	214.1	200.5	234.4	216.3	204.5

TABLE 33	Anpu-20-A-2 RATINGS											
CT (°F)	CFM	6400			7200			8000			8800		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	276.3	249.4	225.0	282.5	255.1	230.0	287.4	260.0	234.0	292.0	264.2	237.7
	SHC (MBH)	137.6	167.1	196.9	142.0	176.0	208.5	147.5	184.1	220.1	152.3	192.0	230.6
	Input Power (KW)	17.1	16.8	16.5	17.1	16.9	16.6	17.2	17.0	16.6	17.2	17.0	16.7
	Current(AMP.)	31.6	31.2	30.7	31.6	31.3	30.8	31.7	31.4	30.9	31.7	31.4	30.9
	THR (MBH)	334.6	306.9	281.3	341.0	312.8	286.6	346.0	317.8	290.8	350.7	322.2	294.7
115	TC (MBH)	262.5	237.0	213.5	268.1	242.1	218.0	272.8	246.5	221.8	276.7	250.3	225.6
	SHC (MBH)	131.5	162.1	191.7	136.7	170.5	203.6	141.8	178.9	214.4	269.2	186.2	225.6
	Input Power (KW)	18.9	18.5	18.0	18.9	18.6	18.1	19.0	18.6	18.2	19.0	18.7	18.3
	Current(AMP.)	34.3	33.7	33.0	34.4	33.9	33.1	34.5	34.0	33.3	34.6	34.1	33.4
	THR (MBH)	326.8	300.0	275.0	332.7	305.5	279.8	337.5	310.1	283.8	314.5	314.1	288.0
125	TC (MBH)	248.4	224.4	202.0	253.6	229.0	205.8	257.8	232.8	209.6	261.1	236.2	215.3
	SHC (MBH)	125.9	156.3	186.3	131.2	165.2	198.5	136.6	173.3	209.6	141.9	181.2	215.3
	Input Power (KW)	20.5	20.0	19.4	20.6	20.1	19.5	20.7	20.2	19.7	20.7	20.3	19.8
	Current(AMP.)	37.0	36.2	35.3	37.2	36.4	35.4	37.3	36.5	35.6	37.4	36.6	35.8
	THR (MBH)	318.5	292.7	268.4	324.0	297.8	272.5	328.4	301.8	276.7	331.9	305.9	282.9
135	TC (MBH)	234.4	211.6	190.4	238.9	215.6	194.3	242.5	218.8	200.0	245.3	221.8	204.9
	SHC (MBH)	120.9	151.2	181.3	126.1	160.2	194.3	131.2	167.9	200.0	136.5	175.6	204.9
	Input Power (KW)	22.1	21.5	20.8	22.2	21.6	20.9	22.3	21.7	21.1	22.4	21.8	21.3
	Current(AMP.)	39.6	38.6	37.5	39.8	38.8	37.7	39.9	39.0	38.0	40.0	39.1	38.3
	THR (MBH)	309.9	285.0	261.5	314.8	289.3	265.8	318.7	293.0	272.1	321.7	296.2	277.6

Rating Table Notes:

1. Direct interpolation is permissible but do not extrapolate.
2. In calculating the cooling load and power input (kw), the heat generated by the evaporator fan has not been taken into account.
3. Ratings are based on 10 °F subcooling.
4. All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86
5. Standard air cooled condenser rating are based on 125 °F condensing temperature according to ARI Standard 460-(87).

TABLE 34	Anpu-30-A-2 RATINGS												
CT (°F)	CFM	9600			10800			12000			13200		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	378.5	342.4	308.6	385.7	349.4	314.6	392.4	355.2	319.9	397.4	360.4	326.5
	SHC (MBH)	190.1	235.6	280.7	198.8	248.2	297.7	205.7	260.5	316.3	213.6	271.1	326.5
	Input Power (KW)	23.0	22.6	22.0	23.1	22.7	22.1	23.1	22.7	22.2	23.2	22.8	22.3
	Current(AMP.)	43.2	42.5	41.6	43.3	42.7	41.8	43.4	42.8	41.9	43.5	42.9	42.1
	THR (MBH)	457.0	419.4	383.8	464.4	426.7	390.1	471.3	432.8	395.7	476.6	438.2	402.6
115	TC (MBH)	361.7	327.0	294.7	368.3	333.4	299.8	374.6	338.8	306.5	379.1	343.5	314.1
	SHC (MBH)	184.1	230.0	273.9	192.4	242.0	291.7	199.5	254.3	306.5	207.4	265.3	314.1
	Input Power (KW)	25.5	24.9	24.1	25.6	25.0	24.3	25.7	25.1	24.4	25.8	25.2	24.6
	Current(AMP.)	47.2	46.2	45.0	47.5	46.5	45.2	47.6	46.6	45.5	47.8	46.8	45.8
	THR (MBH)	448.8	411.9	377.0	455.7	418.7	382.6	462.4	424.5	389.8	467.1	429.5	398.1
125	TC (MBH)	344.4	311.2	280.4	350.5	317.0	284.6	356.0	321.9	294.2	360.3	326.2	301.4
	SHC (MBH)	178.3	223.1	267.9	186.5	236.2	284.6	193.5	247.5	294.2	200.8	258.6	301.4
	Input Power (KW)	28.0	27.1	26.2	28.1	27.3	26.3	28.3	27.4	26.6	28.4	27.5	26.9
	Current(AMP.)	51.5	50.0	48.5	51.7	50.3	48.7	51.9	50.5	49.2	52.1	50.7	49.5
	THR (MBH)	439.9	403.8	369.8	446.6	410.1	374.5	452.5	415.6	385.1	457.1	420.2	393.1
135	TC (MBH)	326.6	294.9	266.3	332.3	300.1	273.8	337.5	304.5	281.4	341.1	308.2	288.1
	SHC (MBH)	171.9	294.9	263.5	179.7	230.2	273.9	186.8	241.4	281.4	193.6	251.8	288.1
	Input Power (KW)	30.4	29.4	28.3	30.6	29.6	28.6	30.7	29.7	28.9	30.7	29.8	29.1
	Current(AMP.)	55.7	53.8	51.9	56.0	54.1	25.5	56.2	54.4	53.0	56.2	54.6	53.4
	THR (MBH)	430.5	395.1	362.8	436.8	401.0	371.4	442.4	406.0	380.0	446.1	410.1	387.5

TABLE 35	Anpu-40-A-2 RATINGS												
CT (°F)	CFM	12800			14400			16000			17600		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	478.0	433.6	392.5	487.0	442.1	400.2	494.0	449.1	409.2	499.9	454.3	418.8
	SHC (MBH)	244.2	306.9	367.4	255.1	323.2	390.0	265.1	338.7	408.6	275.5	354.8	418.8
	Input Power (KW)	25.7	25.5	25.2	25.7	25.6	25.3	25.8	25.6	25.3	25.8	25.6	25.4
	Current(AMP.)	47.1	58.8	46.3	47.1	46.8	46.4	47.1	46.9	46.5	47.1	46.9	46.6
	THR (MBH)	565.8	520.7	478.5	574.8	529.3	486.5	583.9	536.5	495.7	587.8	541.8	505.6
115	TC (MBH)	456.1	413.5	374.0	464.0	421.3	383.0	470.5	427.5	392.9	475.7	432.3	402.3
	SHC (MBH)	236.6	299.0	359.6	247.8	315.4	382.0	258.3	331.0	392.0	267.4	346.4	402.3
	Input Power (KW)	28.8	28.3	27.8	28.8	28.4	27.9	28.8	28.5	28.1	28.8	28.6	28.2
	Current(AMP.)	51.3	50.7	49.9	51.4	50.8	62.9	51.4	50.9	50.3	51.4	51.0	50.5
	THR (MBH)	554.4	510.2	468.8	562.4	518.4	478.3	569.0	524.8	488.7	574.1	529.8	498.6
125	TC (MBH)	433.2	392.8	356.1	440.2	398.4	366.5	445.9	405.1	376.7	450.2	409.4	385.2
	SHC (MBH)	229.3	290.8	354.3	240.0	307.2	366.4	249.3	323.5	376.5	260.6	338.4	385.2
	Input Power (KW)	31.8	31.1	30.3	31.8	31.2	30.6	31.8	31.3	30.8	31.8	31.4	31.0
	Current(AMP.)	55.6	54.6	53.5	55.6	54.8	53.8	55.6	54.9	54.1	55.6	55.0	54.4
	THR (MBH)	541.7	499.0	459.7	548.8	506.4	470.8	554.4	512.0	481.8	558.6	516.5	490.9
135	TC (MBH)	409.5	371.5	339.4	415.6	377.5	350.4	420.9	382.0	359.4	424.4	385.7	367.3
	SHC (MBH)	221.2	282.1	339.4	231.5	298.4	350.0	241.8	313.9	359.3	253.0	329.5	367.3
	Input Power (KW)	34.6	33.8	32.9	34.6	34.0	33.2	34.6	34.1	33.5	34.6	34.2	33.7
	Current(AMP.)	59.7	58.5	57.2	59.7	58.8	57.7	59.7	58.9	58.1	59.7	59.1	58.4
	THR (MBH)	527.4	486.9	451.7	533.5	493.4	463.8	538.9	498.3	473.6	542.3	502.3	482.2

Rating Table Notes:

1. Direct interpolation is permissible but do not extrapolate.
2. In calculating the cooling load and power input (KW), the heat generated by the evaporator fan has been taken into account.
3. Ratings are based on 10 °F subcooling
4. All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86.
5. Standard air cooled condenser ratings are based on 125 °F condensing temperature according to ARI Standard 460-(87).

TABLE 36	Anpu-50-A-2 RATINGS											
CT (°F)	CFM	16000			18000			20000			22000		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	603.6	547.2	495.1	615.1	557.8	500.5	624.2	566.9	514.9	631.8	573.9	527.2
	SHC (MBH)	308.4	386.0	460.5	322.6	407.2	494.4	334.7	425.7	514.9	347.0	446.5	527.2
	Input Power (KW)	33.5	33.3	32.6	33.6	33.2	32.7	33.6	33.3	32.8	33.6	33.3	32.9
	Current(AMP.)	59.4	59.1	58.1	59.5	59.0	58.2	59.5	59.1	58.5	59.5	59.2	58.6
	THR (MBH)	718.0	660.7	606.4	693.6	671.2	612.0	738.8	680.4	627.0	746.4	687.7	639.9
115	TC (MBH)	575.7	521.9	470.1	586.3	531.5	481.3	594.4	539.7	495.0	601.0	546.2	507.1
	SHC (MBH)	298.7	375.8	453.0	311.3	396.4	481.2	324.5	416.0	495.0	336.7	435.3	506.4
	Input Power (KW)	37.4	36.7	35.8	37.4	36.8	36.1	37.4	36.9	36.3	37.4	37.0	36.5
	Current(AMP.)	64.9	63.9	62.7	65.0	64.1	63.0	65.0	64.3	63.3	65.0	64.4	63.6
	THR (MBH)	703.3	647.2	592.4	714.0	657.2	604.4	722.2	665.7	619.0	728.8	672.6	631.6
125	TC (MBH)	546.2	495.4	447.5	555.8	504.0	461.4	563.0	510.9	474.0	569.2	516.6	484.9
	SHC (MBH)	288.6	365.4	446.1	301.4	386.6	461.4	314.2	406.0	474.0	327.0	424.8	484.9
	Input Power (KW)	41.1	40.2	39.0	41.1	40.3	39.4	41.1	40.5	39.7	41.1	40.5	39.9
	Current(AMP.)	70.2	68.8	67.2	70.2	69.1	67.7	70.2	69.3	68.2	70.2	69.4	68.5
	THR (MBH)	686.4	632.4	580.8	696.0	641.7	595.8	703.2	649.1	609.4	709.4	654.9	621.3
135	TC (MBH)	515.3	467.3	426.2	524.0	475.1	440.1	529.8	480.6	451.7	535	485.6	461.7
	SHC (MBH)	277.8	353.4	426.2	289.9	374.2	440.1	302.7	395.2	451.7	316.3	413.8	461.7
	Input Power (KW)	44.5	43.5	42.2	44.5	43.7	42.7	44.5	43.9	43.0	44.5	44.0	43.3
	Current(AMP.)	75.1	73.7	71.8	75.1	74.0	72.5	75.1	74.2	73.0	75.1	74.4	73.4
	THR (MBH)	667.1	615.8	570.4	675.9	624.3	585.7	681.6	630.4	598.6	686.8	635.8	609.7

TABLE 37	Anpu-60-A-2 RATINGS											
CT (°F)	CFM	19200			21600			24000			26400		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	738.7	669.8	603.5	753.4	682.6	616.8	766.4	694.2	624.5	774.0	703.7	642.3
	SHC (MBH)	375.9	468.3	559.8	392.1	495.3	592.6	408.3	518.1	629.1	428.0	541.1	642.3
	Input Power (KW)	41.2	40.6	39.8	41.2	40.7	40.0	41.2	40.8	40.2	41.2	40.9	40.3
	Current(AMP.)	69.1	68.3	67.2	69.1	68.5	67.4	69.1	68.6	67.6	69.1	68.7	67.9
	THR (MBH)	879.1	808.4	738.7	893.9	821.6	753.4	906.8	833.6	766.2	914.5	843.4	799.9
115	TC (MBH)	704.6	637.6	574.9	716.9	649.5	588.2	729.7	659.7	602.4	735.3	668.6	617.1
	SHC (MBH)	363.2	455.0	545.6	381.0	480.6	581.0	393.8	504.5	602.4	412.0	529.3	617.1
	Input Power (KW)	45.6	44.9	43.8	45.6	45.1	44.0	45.6	45.2	44.3	45.6	45.3	44.5
	Current(AMP.)	75.7	74.6	73.0	75.7	74.9	73.3	75.7	75.1	73.7	75.7	75.3	74.1
	THR (MBH)	860.4	790.8	724.3	872.6	803.3	738.4	885.4	814.0	753.6	885.0	823.3	769.2
125	TC (MBH)	668.8	603.7	545.6	677.9	614.8	560.1	690.4	623.7	575.8	693.6	631.7	589.7
	SHC (MBH)	347.6	442.3	531.2	367.4	468.2	560.1	380.4	492.4	575.8	400.0	514.0	589.7
	Input Power (KW)	49.8	49.0	47.6	49.8	49.2	48.0	49.8	49.4	48.3	49.8	49.6	48.7
	Current(AMP.)	81.9	80.7	78.6	81.9	81.0	79.2	81.9	81.3	79.7	81.9	81.6	80.2
	THR (MBH)	838.9	770.9	708.0	847.9	782.8	723.8	860.5	792.4	740.8	863.7	800.9	755.7
135	TC (MBH)	632.0	568.4	516.4	637.1	578.0	533.2	649.8	585.8	547.8	650.6	592.6	560.5
	SHC (MBH)	332.8	428.4	516.4	355.5	453.2	533.2	364.2	478.6	547.8	388.0	501.3	560.5
	Input Power (KW)	53.7	52.9	51.3	53.7	53.2	51.8	53.7	53.4	52.3	53.7	53.6	52.7
	Current(AMP.)	87.7	86.6	84.1	87.7	87.0	85.0	87.7	87.3	85.6	87.7	87.6	86.2
	THR (MBH)	815.3	749.0	691.5	820.4	759.6	710.2	833.1	768.1	726.3	833.8	775.6	740.3

Rating Table Notes:

1. Direct interpolation is permissible but do not extrapolate.
2. In calculating the cooling load and power input (KW), the heat generated by the evaporator fan has been taken into account.
3. Ratings are based on 10 °F subcooling
4. All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86.
5. Standard air cooled condenser ratings are based on 125 °F condensing temperature according to ARI Standard 460-(87).

TABLE 38	Anpu-70-A-2 RATINGS											
CT (°F)	CFM	23040			25920			28800			31680		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	883.2	802.3	727.2	900.4	818.1	739.7	915.9	831.1	748.2	924.0	842.9	770.5
	SHC (MBH)	450.2	562.3	672.1	469.6	591.1	711.3	487.0	621.0	754.9	508.0	647.4	770.5
	Input Power (KW)	52.1	51.5	50.6	52.1	51.6	50.8	52.1	51.7	50.9	52.1	51.8	51.1
	Current(AMP.)	94.1	93.3	91.8	94.1	93.4	92.1	94.1	93.5	92.4	94.1	93.7	92.6
	THR (MBH)	1061.0	978.1	899.8	1078.2	994.2	912.9	1093.7	1007.7	928.8	1101.9	1019.7	944.9
115	TC (MBH)	840.4	762.7	690.0	854.8	777.3	704.8	870.5	789.4	720.5	875.5	800.0	738.9
	SHC (MBH)	434.4	545.9	653.9	457.0	575.1	696.5	470.6	603.2	720.5	492.0	632.1	738.9
	Input Power (KW)	58.0	57.0	55.7	58.0	57.3	56.0	58.0	75.4	56.3	58.0	57.6	56.6
	Current(AMP.)	102.9	101.5	99.5	102.9	101.8	99.9	102.9	102.1	100.4	102.9	102.3	100.9
	THR (MBH)	1038.0	957.3	880.1	1052.1	972.7	895.9	1068.4	985.4	912.6	1073.3	996.6	932.2
125	TC (MBH)	795.9	721.3	654.5	806.6	735.1	670.0	826.1	746.2	689.4	827.5	755.4	705.6
	SHC (MBH)	418.4	529.4	636.3	438.0	559.1	670.0	452.0	587.9	689.4	480.0	614.0	705.6
	Input Power (KW)	63.5	62.5	60.8	63.5	62.8	61.2	63.5	63.1	61.7	63.5	63.3	62.1
	Current(AMP.)	111.3	109.7	107.1	111.3	110.2	107.8	111.3	110.6	108.5	111.3	110.9	109.1
	THR (MBH)	1013.0	934.6	861.8	1023.4	949.5	878.8	1043.0	961.4	900.0	1044.4	971.3	917.6
135	TC (MBH)	750.1	680.2	618.4	757.0	691.5	639.0	775.1	701.4	656.1	772.6	709.3	671.0
	SHC (MBH)	402.2	513.2	618.4	424.0	542.9	638.9	436.0	570.0	656.1	468	599.2	671.0
	Input Power (KW)	68.9	67.9	65.8	68.9	68.2	66.5	68.9	68.5	67.1	68.9	68.8	67.6
	Current(AMP.)	119.4	117.9	114.7	119.4	118.5	115.8	119.4	118.9	116.7	119.4	119.3	117.4
	THR (MBH)	985.2	911.9	842.8	992.1	924.4	866.0	1010.2	935.3	885.0	1011.0	944.0	901.7

TABLE 39	Anpu-80-A-2 RATINGS											
CT (°F)	CFM	24800			27900			31000			34100		
	FACE VELOCITY(FPM)	400			450			500			550		
	EWB(°F)	72	67	62	72	67	62	72	67	62	72	67	62
105	TC (MBH)	1037.0	939.1	848.0	1061.4	960.2	865.0	1079.4	976.8	840.2	1094.4	992.1	895.7
	SHC (MBH)	516.4	636.2	752.1	535.7	669.6	799.4	558.2	702.4	880.7	578.3	731.9	881.7
	Input Power (KW)	61.7	60.8	59.7	61.9	61.0	59.9	61.9	61.2	60.1	61.9	61.3	60.3
	Current(AMP.)	103.6	102.5	101.0	103.9	102.8	101.3	103.9	138.0	101.6	103.9	103.2	101.8
	THR (MBH)	1247.5	1146.7	1051.7	1272.5	1168.6	1069.5	1290.6	1185.7	1086.0	1305.7	1202.8	101.6
115	TC (MBH)	988.6	895.3	806.6	1010.3	914.2	822.7	1027.7	929.1	839.2	1039.6	943.0	855.7
	SHC (MBH)	499.3	616.0	733.2	519.7	649.3	778.7	539.0	681.8	822.9	561.5	712.4	852.5
	Input Power (KW)	68.7	67.3	65.6	68.9	67.6	66.0	68.9	67.9	66.3	68.9	68.1	66.6
	Current(AMP.)	112.9	148.9	108.8	113.2	111.5	109.2	113.2	111.8	109.7	113.2	112.1	110.1
	THR (MBH)	1223.1	1125.0	1030.6	1245.4	1145.0	1047.8	1262.8	1160.7	1065.5	1274.7	1175.3	1083.0
125	TC (MBH)	938.6	849.3	764.8	957.0	866.5	781.0	974.4	880.2	798.2	984.5	893.0	817.3
	SHC (MBH)	480.0	599.0	714.8	501.2	631.3	758.0	518.9	663.3	795.1	545.8	691.7	817.2
	Input Power (KW)	75.5	73.7	71.5	75.5	74.1	71.9	75.5	74.4	72.4	75.5	74.7	72.9
	Current(AMP.)	122.1	119.6	116.6	122.1	120.1	117.2	122.1	120.6	117.8	122.1	121.0	118.5
	THR (MBH)	1196.3	1100.8	1008.7	1214.8	1119.4	1026.5	1232.1	1134.1	1045.3	1242.3	1147.9	1066.1
135	TC (MBH)	886.9	801.2	722.7	901.5	817.1	739.6	919.7	829.7	760.0	923.8	841.1	778.7
	SHC (MBH)	461.9	579.5	693.8	485.6	611.4	737.2	499.0	643.8	760.0	528.1	672.8	778.7
	Input Power (KW)	81.9	79.9	77.2	81.9	80.4	77.8	81.9	80.8	78.6	81.9	81.2	79.2
	Current(AMP.)	130.7	128.1	124.4	130.7	128.8	125.8	130.7	129.3	126.2	130.7	129.8	127.1
	THR (MBH)	1166.3	1074.0	986.2	1180.9	1091.7	1005.3	1199.1	1105.5	1028.2	1203.1	1118.1	1049.0

Rating Table Notes:

1. Direct interpolation is permissible but do not extrapolate.
2. In calculating the cooling load and power input (KW), the heat generated by the evaporator fan has been taken into account.
3. Ratings are based on 10 °F subcooling
4. All ratings are based on 80°F EDB according to ARI standards 310-90 and 360-86.
5. Standard air cooled condenser ratings are based on 125 °F condensing temperature according to ARI Standard 460-(87).

Table 40	BYPASS FACTORS*		
COIL FACE VELOCITY FPM	4 ROW	5 ROW	6 ROW
400	0.20	0.14	0.10
450	0.21	0.15	0.11
500	0.23	0.17	0.12
550	0.26	0.19	0.13
600	0.27	0.20	0.14

* FOR 8 FPI COIL

Table 41	SENSIBLE CAPACITY CORRECTION FACTOR*						
COIL BYPAS FACTORS	EVAPORATOR ENTERING AIR DRY BULB TEMPERATUR °F						
	79	78	77	76	74	72	70
	81	82	83	84	86	88	90
0.05	1.03	2.07	3.09	4.13	6.19	8.26	10.33
0.10	0.98	1.96	2.94	3.91	5.87	7.83	9.78
0.15	0.92	1.85	2.77	3.69	5.54	7.39	9.24
0.20	0.87	1.74	2.61	3.48	5.22	6.96	8.69
0.25	0.82	1.63	2.45	3.26	4.89	6.52	8.15
0.30	0.76	1.52	2.28	3.04	4.57	6.09	7.61

* SHC RATINGS ARE BASED ON 80 °F EDB TEMPERATURE OF AIR ENTERING EVAPORATOR COIL.
BELOW 80 °F →CORRECTED SHC = SHC (FROM RATING TABLES) - CFM x CORRECTION FACTOR FROM TABLE 41
ABOVE 80 °F → CORRECTED SHC = SHC (FROM RATING TABLES) + CFM x CORRECTION FACTOR FROM TABLE 41

Table 42	CAPACITY CORRECTION FACTOR FOR FLOW RATE				
CFM / NOM. CFM	80%	90%	100%	110%	120%
HEATING CAPACITY	0.89	0.95	1.00	1.02	1.05

Table 43		COIL AIR SIDE PRESSURE DROP (inch, water)				
CFM / NOM. CFM		80%	90%	100%	110%	120%
COOLING COIL 4-ROW	WET	0.32	0.39	0.45	0.51	0.57
	DRY	0.19	0.24	0.29	0.34	0.38
HEATING COIL	1-ROW	0.06	0.07	0.08	0.09	0.11
	2-ROW	0.12	0.15	0.17	0.21	0.23

Table 44	WATER SIDE PRESSURE DROP CORRECTION FACTOR								
AVERAGE HOT WATER TEMP. °F	100	120	140	150	160	180	200	200	250
CORRECTION FACTOR	0.89	0.86	0.83	0.81	0.80	0.79	0.77	0.76	0.76

ΔP (FROM TABLE 46, 46A) x CORRECTION FACTOR FROM TABLE 44 = CORRECTED PRESSURE DROP

TABLE 45	HOT WATER HEATING COIL RATINGS (MBH)						
MODEL	NOMINAL CFM	EDB (°F)	CIRCUIT	8FPI		14FPI	
				1ROW	2ROW	1ROW	2ROW
AnpuW,A 5-1	2000	40	F	66.3	129.6	98.4	179.0
			H	75.3	138.4	113.1	191.4
		50	F	60.0	118.5	88.8	163.7
			H	68.8	127.1	103.2	176.0
		60	F	53.6	107.4	79.3	148.5
			H	62.3	115.9	93.4	160.6
		70	F	47.3	96.3	69.9	133.3
			H	55.8	104.6	83.5	145.1
AnpuW,A 8-1	3200	40	F	106.2	206.1	158.3	285.8
			H	119.5	219.0	180.0	304.1
		50	F	96.2	188.6	143.1	261.6
			H	109.2	201.3	164.4	279.7
		60	F	86.3	171.1	128.1	237.5
			H	99.0	183.6	148.8	255.3
		70	F	76.3	153.6	113.2	213.3
			H	88.7	165.9	133.4	230.9
AnpuW,A 10-1	4000	40	F	138.6	263.9	207.0	365.6
			H	152.3	277.1	229.3	384.3
		50	F	125.9	241.8	187.8	335.2
			H	139.3	254.8	209.7	353.7
		60	F	113.2	219.7	168.7	304.8
			H	126.4	232.5	190.1	323.0
		70	F	100.7	197.7	149.7	274.4
			H	113.4	210.2	170.6	292.3
AnpuW,A 15-1	6000	40	F	216.4	405.8	323.5	561.2
			H	236.5	425.1	356.3	588.3
		50	F	197.0	372.3	294.2	515.1
			H	216.7	391.2	326.4	541.8
		60	F	177.6	338.7	265.1	469.0
			H	197.0	357.3	296.5	495.3
		70	F	158.3	305.2	236.0	422.9
			H	177.2	323.4	266.7	448.8
AnpuW,A 20-1	8000	40	F	298.9	550.8	448.3	762.2
			H	322.5	573.3	486.8	793.7
		50	F	272.8	506.0	409.0	700.6
			H	296.0	528.0	446.8	731.6
		60	F	246.7	461.0	369.7	639.0
			H	269.5	482.8	406.7	669.5
		70	F	220.8	416.2	330.5	577.3
			H	243.0	437.5	366.8	607.5
AnpuW,A 25-1	10000	40	F	371.6	685.6	557.8	950.0
			H	399.6	712.2	603.3	986.9
		50	F	339.2	629.7	508.8	872.7
			H	366.6	655.9	553.5	909.6
		60	F	306.8	573.8	460.0	795.9
			H	333.8	599.5	503.8	832.2
		70	F	274.6	518.0	411.2	719.1
			H	300.8	543.2	454.1	754.9
AnpuW,A 30-1	12000	40	F	436.5	808.2	656.6	1123.5
			H	469.6	839.8	710.4	1168.1
		50	F	398.4	742.3	598.8	1032.5
			H	430.8	773.3	651.7	1076.5
		60	F	360.3	676.3	541.3	941.5
			H	392.1	706.9	593.2	984.9
		70	F	322.5	610.5	483.8	850.5
			H	353.4	640.5	534.6	893.3

Note:

1. All ratings TABLE 45 are based on 180°F entering water temp., 160°F leaving water temp. For conditions other than 180°F entering 160°F leaving water temperatures apply correction from FIGURE
2. Heating coils with single row and full circuiting have opposite coil connections.

TABLE 45	HOT WATER HEATING COIL RATINGS (MBH) (Continued)						
MODEL	NOMINAL CFM	EDB (°F)	CIRCUIT	8FPI		14FPI	
				1ROW	2ROW	1ROW	2ROW
AnpuW,A 35-1	14000	40	F	527.6	962.2	795.0	1336.5
			H	560.0	993.0	847.8	1379.8
		50	F	482.5	884.6	726.9	1229.7
			H	514.3	915.0	778.8	1272.4
		60	F	437.6	807.1	658.9	1122.9
			H	468.8	837.0	709.8	1165.0
		70	F	392.7	729.6	591.0	1016.1
			H	423.3	758.9	640.9	1057.6
AnpuW,A 40-1	16000	40	F	611.1	1111.2	920.0	1540.6
			H	647.6	1146.0	979.9	1589.4
		50	F	559.1	1021.8	841.4	1417.7
			H	595.2	1056.0	900.2	1765.8
		60	F	507.1	932.4	762.9	1294.7
			H	542.5	966.1	820.6	1342.3
		70	F	455.2	843.0	684.5	1171.8
			H	489.9	876.1	741.1	1218.6
AnpuW,A 10-2	4000	40	F	139.4	265.9	207.8	367.5
			H	154.8	280.6	232.8	388.4
		50	F	126.6	243.5	188.5	336.9
			H	141.7	258.1	213.0	357.4
		60	F	113.8	221.3	169.2	306.2
			H	128.5	235.5	193.2	326.5
		70	F	101.0	199.0	150.0	275.6
			H	115.4	213.0	173.4	295.5
AnpuW,A 15-2	6000	40	F	223.2	413.8	334.0	571.3
			H	241.8	431.4	364.1	595.9
		50	F	203.5	379.9	304.3	524.8
			H	221.7	397.2	333.8	549.1
		60	F	183.9	345.9	274.7	478.3
			H	201.7	362.9	303.6	502.2
		70	F	164.2	312.0	245.2	431.8
			H	181.6	328.1	273.4	455.4
AnpuW,A 20-2	8000	40	F	296.3	546.3	445.1	757.5
			H	318.1	567.0	480.7	786.7
		50	F	270.5	501.8	406.1	696.3
			H	291.9	522.2	441.1	725.1
		60	F	244.7	457.3	367.3	635.1
			H	265.7	477.4	401.5	663.5
		70	F	219.1	412.9	328.5	573.9
			H	239.6	432.6	362.0	601.9
AnpuW,A 30-2	12000	40	F	432.2	798.2	652.1	1114.0
			H	462.2	827.0	701.3	1154.9
		50	F	394.8	733.3	595.4	1024.2
			H	424.3	761.7	643.8	1064.6
		60	F	357.5	668.6	538.8	934.4
			H	386.3	696.4	586.2	974.3
		70	F	320.3	603.8	482.4	844.6
			H	348.5	631.2	528.7	883.9
AnpuW,A 40-2	16000	40	F	603.0	1099.7	908.6	1527.5
			H	640.0	1134.8	968.9	1577.0
		50	F	551.5	1011.1	830.8	1405.4
			H	587.9	1045.7	890.1	1454.3
		60	F	500.1	922.5	753.0	1283.3
			H	535.8	956.5	811.2	1331.5
		70	F	448.9	833.9	675.5	1161.3
			H	483.7	867.4	732.5	1208.7

Note:

1. All ratings TABLE 45 are based on 180 °F entering water temp., 160°F leaving water temp. For conditions other 180 °F entering 160 °F leaving water temperatures apply correction factor from FIGURE1.
2. Heating coils with single row and full circuiting have opposite coil connections.

TABLE 45	HOT WATER HEATING COIL RATINGS (MBH) (Continued)						
MODEL	NOMINAL CFM	EDB (°F)	CIRCUIT	8FPI		14FPI	
				1ROW	2ROW	1ROW	2ROW
AnpuW,A 50-2	20000	40	F	768.5	1391.6	1158.5	1930.9
			H	811.0	1431.8	1227.7	1987.3
		50	F	703.6	1280.0	1060.3	1777.5
			H	745.3	1319.6	1128.4	1833.2
		60	F	638.8	1168.6	962.3	1624.5
			H	679.7	1207.5	1029.1	1679.1
		70	F	574.1	1057.1	864.5	1470.7
			H	614.1	1095.4	929.9	1524.8
AnpuW,A 60-2	24000	40	F	931.4	1683.6	1402.6	2332.1
			H	982.8	1732.1	1486.2	2399.9
		50	F	852.7	1548.8	1283.8	2146.9
			H	903.2	1596.5	1366.0	2213.9
		60	F	774.1	1413.9	1165.2	1961.7
			H	823.7	1460.9	1245.2	2027.8
		70	F	695.7	1279.1	1046.7	1776.5
			H	744.2	1325.3	1125.8	1841.7
AnpuW,A 70-2	28000	40	F	1094.1	1975.5	1646.6	2733.1
			H	1154.5	2032.3	1744.6	2812.3
		50	F	1001.8	1817.3	1507.2	2516.1
			H	1061.0	1873.2	1603.5	2594.3
		60	F	909.5	1659.1	1367.9	2299.2
			H	967.6	1714.2	1462.6	2376.4
		70	F	817.4	1501.0	1229.0	2082.2
			H	874.2	1555.1	1321.7	2158.3
AnpuW,A 80-2	32000	40	F	1210.9	2198.4	1828.3	3058.6
			H	1278.2	2262.3	1938.0	3148.5
		50	F	1108.6	2022.2	1673.3	2815.4
			H	1174.6	2085.0	1781.1	2904.2
		60	F	1006.5	1846.0	1518.5	2572.3
			H	1071.2	1907.8	1624.3	2659.8
		70	F	904.3	1669.8	1364.0	2329.0
			H	967.7	1730.5	1467.7	2415.4

Note:

1. All ratings TABLE 45 are based on 180°F entering water temp., 160°F leaving water temp. For conditions other 180°F entering 160°F leaving water temperatures apply correction factor from FIGURE1.
2. Heating coils with single row and full circuiting have opposite coil connections.

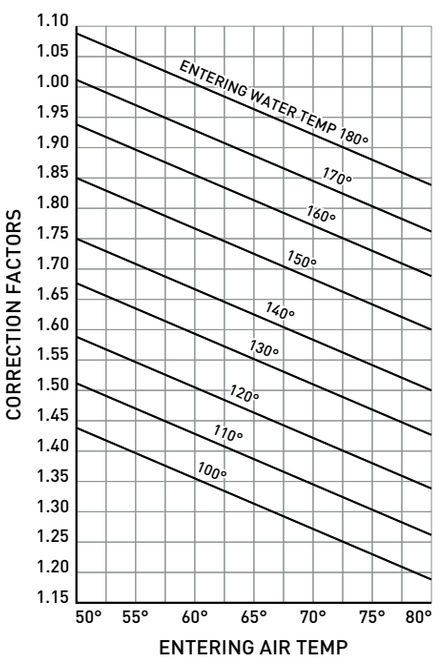


FIGURE 1
HOT WATER COIL LOAD CORRECTION FACTOR

Corrected load = load from TABLE 45 x correction factor from FIGURE 1

Note:

TABLE 46		HEATING COIL (FULL CIRCUIT) WATER SIDE PRESSURE DROP* (feet, water)															
ANPU MODEL	ROW	WATER FLOW RATE (GPM)															
		5	10	20	30	40	50	60	70	80	90	100	120	140	160	180	200
5-1	1	0.1	0.3	0.9	2	3.3	4.9	6.9	—	—	—	—	—	—	—	—	—
	2	0.1	0.4	1.2	2.6	4.3	6.5	9	—	—	—	—	—	—	—	—	—
8-1	1	—	0.1	0.5	1.1	1.8	2.7	3.8	5	6.4	7.9	—	—	—	—	—	—
	2	—	0.2	0.7	1.4	2.4	3.6	5	6.7	8.5	10.5	—	—	—	—	—	—
10-1	1	—	0.1	0.5	1.0	1.7	2.5	3.5	4.6	5.8	7.2	8.7	—	—	—	—	—
10-2	2	—	0.2	0.6	1.3	2.2	3.4	4.7	6.2	7.9	9.7	11.8	—	—	—	—	—
15-1	1	—	0.1	0.3	0.6	1.0	1.5	2.1	2.8	3.6	4.4	5.3	7.4	—	—	—	—
15-2	2	—	0.1	0.4	0.8	1.4	2.1	2.9	3.8	4.9	6.1	7.3	10.2	—	—	—	—
20-1	1	—	—	0.3	0.6	1.0	1.5	2.1	2.7	3.5	4.3	5.2	7.2	9.6	—	—	—
20-2	2	—	—	0.4	0.8	1.4	2.1	2.9	3.8	4.9	6.1	7.3	10.2	13.4	—	—	—
25-1	1	—	—	0.2	0.4	0.7	1.0	1.4	1.9	2.4	2.9	3.5	4.9	6.5	8.3	—	—
25-2	2	—	—	0.3	0.6	1.0	1.4	2.0	2.6	3.3	4.1	5.0	6.9	9.1	11.6	—	—
30-1	1	—	—	—	0.3	0.5	0.8	1.1	1.4	1.8	2.3	2.7	3.8	5.0	6.4	7.9	9.6
30-2	2	—	—	—	0.4	0.7	1.1	1.5	2.0	2.6	3.2	3.8	5.3	7.1	9.0	11.1	13.4
35-1	1	—	—	—	0.4	0.6	0.9	1.3	1.7	2.2	2.7	3.3	4.6	6.1	7.8	9.6	—
	2	—	—	—	0.5	0.9	1.4	1.9	2.5	3.2	4.0	4.8	6.7	8.8	11.2	13.9	—
40-1	1	—	—	—	0.3	0.5	0.7	1.0	1.4	1.7	2.2	2.6	3.6	4.8	6.1	7.6	9.1
	2	—	—	—	0.4	0.7	1.1	1.5	2.0	2.5	3.1	3.8	5.3	6.9	8.8	10.9	13.2
10-2	1	—	0.1	0.4	0.9	1.5	2.2	3.1	4.0	5.1	6.4	7.7	—	—	—	—	—
	2	—	0.2	0.6	1.2	2.0	3.0	4.1	5.4	6.9	8.5	10.3	—	—	—	—	—
15-2	1	—	0.1	0.4	0.8	1.3	1.9	2.7	3.5	4.5	5.5	6.7	9.3	—	—	—	—
	2	—	0.1	0.5	1.1	1.8	2.6	3.7	4.9	6.2	7.7	9.3	12.9	—	—	—	—
20-2	1	—	—	0.3	0.7	1.1	1.6	2.3	3.0	3.8	4.7	5.7	8.0	—	—	—	—
	2	—	—	0.4	0.9	1.5	2.3	3.2	4.2	5.4	6.7	8.1	11.2	—	—	—	—
30-2	1	—	—	—	0.4	0.7	1.0	1.4	1.9	2.4	3.0	3.6	5.1	6.7	8.5	—	—
	2	—	—	—	0.6	1.0	1.5	2.1	2.7	3.5	4.3	5.2	7.2	9.5	12.1	—	—
40-2	1	—	—	—	0.3	1.5	0.7	1.0	1.4	1.7	2.2	2.6	3.6	4.8	6.1	7.6	9.1
	2	—	—	—	0.4	0.7	1.1	1.5	2.0	2.5	3.1	3.8	5.3	6.9	8.8	10.9	13.2
ANPU MODEL	ROW	WATER FLOW RATE (GPM)															
		40	50	60	70	80	90	100	120	140	160	180	200	230	260	290	320
50-2	1	0.4	0.6	0.9	1.2	1.5	1.8	2.2	3.1	4.0	5.1	6.4	7.7	9.9			
	2	0.6	0.9	1.3	1.7	2.2	2.7	3.2	4.5	5.9	7.5	9.3	11.3	14.5			
60-2	1	0.3	0.4	0.6	0.8	1.0	1.3	1.5	2.1	2.8	3.6	4.4	5.3	6.9	8.6	10.5	
	2	0.4	0.6	0.9	1.2	1.5	1.9	2.2	3.1	4.1	5.3	6.5	7.9	10.1	12.6	15.4	
70-2	1		0.3	0.4	0.6	0.8	0.9	1.1	1.6	2.1	2.6	3.3	4.0	5.1	6.4	7.7	9.2
	2		0.5	0.7	0.9	1.1	1.4	1.7	2.3	3.1	3.9	4.8	5.8	7.5	9.3	11.4	13.6
80-2	1		0.3	0.4	0.5	0.7	0.8	1.0	1.4	1.8	2.3	2.9	3.5	4.5	5.6	6.8	8.1
	2		0.4	0.6	0.8	1.0	1.2	1.5	2.0	2.7	3.4	4.2	5.1	6.5	8.2	9.9	11.9

* All ratings are based on standard water velocity range (1-8 FPS).

TABLE 46A		HEATING COIL (HALF CIRCUIT) WATER SIDE PRESSURE DROP* (feet, water)															
ANPU MODEL	ROW	WATER FLOW RATE (GPM)															
		5	10	20	30	40	50	60	70	80	90	100	120	140	160	180	200
5-1	1	0.4	1.2	4.3	9	—	—	—	—	—	—	—	—	—	—	—	—
	2	0.5	1.8	6.4	13.3	—	—	—	—	—	—	—	—	—	—	—	—
8-1	1	0.2	0.7	2.4	5.0	8.5	—	—	—	—	—	—	—	—	—	—	—
	2	0.3	1.0	3.6	7.5	12.6	—	—	—	—	—	—	—	—	—	—	—
10-1	1	—	0.6	2.2	4.7	7.9	11.8	—	—	—	—	—	—	—	—	—	—
10-2	2	—	1.0	3.4	7.1	11.9	17.8	—	—	—	—	—	—	—	—	—	—
15-1	1	—	0.4	1.4	2.9	4.9	7.3	10.2	—	—	—	—	—	—	—	—	—
15-2	2	—	0.6	2.2	4.5	7.5	11.3	15.7	—	—	—	—	—	—	—	—	—
20-1	1	—	0.4	1.4	2.9	4.9	7.3	10.2	13.4	—	—	—	—	—	—	—	—
20-2	2	—	0.6	2.2	4.6	7.7	11.5	16.1	21.2	—	—	—	—	—	—	—	—
25-1	1	—	—	1.0	2.0	3.3	5.0	6.9	9.1	11.6	—	—	—	—	—	—	—
25-2	2	—	—	1.5	3.1	5.2	7.9	10.9	14.4	18.4	—	—	—	—	—	—	—
30-1	1	—	—	0.7	1.5	2.6	3.8	5.3	7.1	9.0	11.1	13.4	—	—	—	—	—
30-2	2	—	—	1.2	2.4	4.1	6.1	8.4	11.1	14.2	17.5	21.2	—	—	—	—	—
35-1	1	—	—	0.9	1.	3.2	4.8	6.7	8.8	11.2	13.9	—	—	—	—	—	—
	2	—	—	1.5	3.1	5.2	7.8	10.8	14.3	18.2	22.5	—	—	—	—	—	—
40-1	1	—	—	0.7	1.5	2.5	3.8	5.3	6.9	8.8	10.9	13.2	—	—	—	—	—
	2	—	—	1.2	2.4	4.1	6.1	8.5	11.2	14.3	17.7	21.4	—	—	—	—	—
10-2	1	—	0.6	2.0	4.1	6.9	10.3	—	—	—	—	—	—	—	—	—	—
	2	—	0.9	3.0	6.2	10.4	15.6	—	—	—	—	—	—	—	—	—	—
15-2	1	—	0.5	1.8	7.3	6.2	9.3	12.9	—	—	—	—	—	—	—	—	—
	2	—	0.8	2.8	5.7	9.7	14.4	21	—	—	—	—	—	—	—	—	—
20-2	1	—	0.4	1.5	3.2	5.4	8.1	11.2	—	—	—	—	—	—	—	—	—
	2	—	0.7	2.4	5.1	8.5	12.8	17.8	—	—	—	—	—	—	—	—	—
30-2	1	—	—	1.0	2.1	3.5	5.2	7.2	9.5	12.1	—	—	—	—	—	—	—
	2	—	—	1.8	3.3	5.5	8.3	11.5	15.2	19.3	—	—	—	—	—	—	—
40-2	1	—	—	0.7	1.3	2.5	3.8	5.3	6.9	8.8	10.9	13.2	—	—	—	—	—
	2	—	—	1.2	2.4	4.1	6.1	8.5	11.2	14.3	17.7	21.4	—	—	—	—	—
ANPU MODEL		WATER FLOW RATE (GPM)															
		40	50	60	70	80	90	100	120	140	160	180	200	230	260	290	320
50-2	1	2.2	3.2	4.5	5.9	7.5	9.3	11.3	15.7	—	—	—	—	—	—	—	—
	2	3.5	5.3	7.4	9.7	12.4	15.3	18.5	25.7	—	—	—	—	—	—	—	—
60-2	1	1.5	2.2	3.1	4.1	5.3	6.5	7.9	10.9	14.4	—	—	—	—	—	—	—
	2	2.5	3.7	5.1	6.8	8.6	10.6	12.9	17.9	23.7	—	—	—	—	—	—	—
70-2	1	1.1	1.7	2.3	3.1	3.9	4.8	5.8	8.1	10.7	13.6	—	—	—	—	—	—
	2	1.8	2.7	3.6	5.0	6.4	7.9	9.5	13.2	17.5	22.3	—	—	—	—	—	—
80-2	1	1.0	1.5	2.0	2.7	3.4	4.2	5.1	7.1	9.3	11.9	14.7	—	—	—	—	—
	2	1.6	2.4	3.3	4.4	5.6	6.9	8.3	11.6	15.3	19.5	24.1	—	—	—	—	—

* All ratings are based on standard water velocity range (1-8 FPS).

TABLE 47	HEATING COIL CONNECTION SIZES				
MODEL	1 ROW	2 ROWS	MODEL	1 ROW	2 ROWS
5-1	3/4"	1"	10-2	1"	11/4"
8-1	3/4"	1"	15-2	11/4"	11/4"
10-1	1"	11/4"	20-2	11/4"	2"
15-1	11/4"	11/2"	30-2	11/2"	2 x 11/2"
20-1	2 x 1"	2 x 11/4"	40-2	2 x 11/4"	2 x 11/2"
25-1	2 x 1"	2 x 11/4"	50-2	2 x 11/2"	2 x 2"
30-1	2 x 11/4"	2 x 11/2"	60-2	2 x 11/2"	2 x 2"
35-1	2 x 11/2"	2 x 2"	70-2	2 x 2"	2 x 2"
40-1	2 x 11/2"	2 x 2"	80-2	2 x 2"	2 x 21/2"

TABLE 48			FAN RATINGS													
MODEL ANPU W,A	FAN SIZE	CFM	TOTAL STATIC PRESSURE (inch of water gage)													
			0.5		0.75		1		1.25		1.5		1.75		2	
			RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
5-1	1x13"	1500	581	0.25	700	0.5	819	0.5	928	0.75	-	-	-	-	-	-
		1700	600	0.33	703	0.5	808	0.5	913	0.75	1010	1	-	-	-	-
		1900	625	0.5	717	0.5	809	0.75	903	0.75	997	1	-	-	-	-
		2100	653	0.5	737	0.75	819	0.75	903	1	989	1	1072	1.5	1154	1.5
		2300	683	0.5	762	0.75	837	0.75	913	1	990	1.5	1068	1.5	1145	1.5
		2500	714	0.75	790	0.75	860	1	929	1	999	1.50	1070	1.5	1141	1.5
8-1 10-1 10-2	1x14"	2400	532	0.5	611	0.75	690	0.75	760	1	840	1.5	-	-	-	-
		2700	560	0.75	632	0.75	701	1	769	1	840	1.5	907	1.5	974	2
		3000	590	0.75	657	1	719	1	782	1.5	845	1.5	908	2	970	2
		3300	621	1	685	1	743	1.5	801	1.5	857	2	915	2	972	2
		3600	653	1	715	1.5	771	1.5	824	2	875	2	928	2	980	3
		3900	685	1.5	746	1.5	800	2	850	2	898	2	946	3	995	3
		4200	717	1.5	778	2	831	2	879	2	924	3	969	3	1014	3
		4500	750	2	810	2	862	3	909	3	953	3	995	3	1037	4
		4800	-	-	842	3	893	3	939	3	983	3	1023	4	1063	4
		5100	-	-	874	3	925	3	971	4	1013	4	1052	43	1091	4
15-1 15-2	1x16"	4500	596	1.5	642	1.5	691	2	737	2	782	3	828	3	874	3
		4800	642	1.5	664	2	712	2	757	3	799	3	842	3	885	3
		5100	-	-	686	2	734	3	777	3	818	3	858	3	898	4
		5400	-	-	709	3	756	3	799	3	838	3	876	4	915	4
		5700	-	-	732	3	778	3	821	3	859	4	896	4	933	4
		6000	-	-	756	3	801	4	843	4	881	4	916	4	952	5.5
		6300	-	-	781	4	824	4	865	4	903	4	938	5.5	973	5.5
		6600	-	-	-	-	847	4	888	4	925	5.5	959	5.5	994	5.5
		6900	-	-	-	-	871	4	911	5.5	947	5.5	981	5.5	1015	5.5
		7200	-	-	-	-	-	-	934	5.5	970	5.5	1004	7.5	1037	7.5
		7500	-	-	-	-	-	-	957	5.5	993	7.5	1026	7.5	1059	7.5
20-1 20-2	1x17"	6000	564	2	615	3	658	3	698	3	735	4	773	4	810	4
		6500	-	-	643	3	686	3	725	4	760	4	795	4	830	5.5
		7000	-	-	672	4	714	4	752	4	786	4	820	5.5	853	5.5
		7500	-	-	701	4	742	4	780	5.5	814	5.5	846	5.5	878	5.5
		8000	-	-	-	-	770	5.5	808	5.5	842	5.5	873	7.5	904	7.5
		8500	-	-	-	-	800	5.5	836	7.5	870	7.5	901	7.5	931	7.5
		9000	-	-	-	-	-	-	865	7.5	899	7.5	929	7.5	959	10
		9500	-	-	-	-	-	-	895	7.5	927	10	957	10	987	10
		10000	-	-	-	-	-	-	-	-	957	10	986	10	1015	10
25-1	1x19"	7500	-	-	522	3	568	3	610	4	653	4	696	4	739	5.5
		8000	-	-	538	3	583	4	623	4	664	4	704	5.5	744	5.5
		8500	-	-	554	3	598	4	637	4	676	5.5	714	5.5	752	5.5
		9000	-	-	569	4	614	4	653	5.5	689	5.5	725	5.5	761	7.5
		9500	-	-	585	4	630	5.5	668	5.5	704	5.5	738	7.5	773	7.5
		10000	-	-	-	-	647	5.5	685	5.5	719	7.5	752	7.5	785	7.5
		10500	-	-	-	-	664	5.5	701	7.5	735	7.5	767	7.5	799	7.5
		11000	-	-	-	-	-	-	717	7.5	751	7.5	782	10	814	10
		11500	-	-	-	-	-	-	733	7.5	767	10	798	10	829	10
		12000	-	-	-	-	-	-	-	-	783	10	814	10	844	10
		12500	-	-	-	-	-	-	-	-	-	-	-	-	860	15

Note:

1. Ratings are based on standard air (Density = 0.075 Lbs/ft^3 at sea level 70 °F, 29.921 inches of mercury barometric pressure.)
2. Shaded regions denote unstable surge conditions.

TABLE 48				FAN RATINGS (CONTINUED)											
TOTAL STATIC PRESSURE (inch of water gage)															
2.25		2.5		2.75		3		3.25		3.5		3.75		4	
RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1220	2	1295	2	-	-	-	-	-	-	-	-	-	-	-	-
1212	2	1283	2	1353	3	1422	3	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1028	3	1084	3	-	-	-	-	–	-	-	-	-	-	-	-
1033	3	1085	3	1136	3	1186	4	-	-	-	-	-	-	-	-
1043	3	1091	3	1139	4	1187	4	1234	4	1280	4	-	-	-	-
1058	3	1103	4	1148	4	1193	4	1237	5.5	1281	5.5	1325	5.5	1368	5.5
1079	4	1120	4	1162	4	1204	4	1245	5.5	1278	5.5	1328	5.5	1369	5.5
1102	4	1141	4	1180	5.5	1219	5.5	1258	5.5	1297	5.5	1336	5.5	1375	7.5
1128	4	1165	5.5	1202	5.5	1239	5.5	1275	5.5	1311	5.5	1348	7.5	1385	7.5
921	3	967	4	1014	4	1061	4	1108	5.5	1156	5.5	1200	5.5	1244	5.5
928	4	971	4	1015	4	1059	5.5	1104	5.5	1148	5.5	1191	5.5	1234	7.5
939	4	979	4	1020	4	1061	5.5	1103	5.5	1144	5.5	1185	7.5	1227	7.5
953	4	991	4	1029	5.5	1067	5.5	1106	5.5	1144	7.5	1184	7.5	1223	7.5
969	4	1004	5.5	1040	5.5	1076	5.5	1112	5.5	1149	7.5	1186	7.5	1224	7.5
986	5.5	1021	5.5	1054	5.5	1088	7.5	1122	7.5	1157	7.5	1192	7.5	1227	7.5
1006	5.5	1038	5.5	1071	7.5	1103	7.5	1135	7.5	1168	7.5	1201	7.5	1234	7.5
1026	5.5	1058	7.5	1088	7.5	1119	7.5	1150	7.5	1181	7.5	1212	10	1243	10
1047	7.5	1078	7.5	1108	7.5	1137	7.5	1167	7.5	1196	10	1226	10	1255	10
1068	7.5	1098	7.5	1127	7.5	1157	7.5	1185	10	1213	10	1241	10	1269	10
1090	7.5	1120	7.5	1148	10	1177	10	1204	10	1232	10	1259	10	1285	10
848	4	886	5.5	925	5.5	964	5.5	1002	7.5	1041	7.5	1078	7.5	1116	7.5
864	5.5	899	5.5	934	5.5	969	7.5	1005	7.5	1041	7.5	1076	7.5	1111	10
885	5.5	917	7.5	949	7.5	981	7.5	1014	7.5	1047	7.5	1080	10	1113	10
908	7.5	938	7.5	968	7.5	998	7.5	1028	7.5	1059	10	1089	10	1119	10
933	7.5	9662	7.5	990	7.5	1018	10	1046	10	1075	10	1103	10	1131	10
959	7.5	987	10	1014	10	1041	10	1067	10	1094	10	1120	10	1147	15
986	10	1014	10	1039	10	1065	10	1090	10	1116	15	1141	15	1166	15
1014	10	1041	10	1066	10	1091	15	1115	15	1140	15	1163	15	1187	15
1042	15	1068	15	1093	15	1118	15	1141	15	1165	15	1188	15	1211	15
783	5.5	826	7.5	869	7.5	913	7.5	954	7.5	996	10	1034	10	1073	10
784	5.5	825	7.5	866	7.5	907	7.5	947	10	987	10	1026	10	1065	10
789	7.5	827	7.5	866	7.5	904	10	942	10	981	10	1019	10	1057	15
797	7.5	832	7.5	868	7.5	904	10	940	10	977	10	1013	10	1050	15
806	7.5	840	7.5	873	10	907	10	941	10	975	10	1010	15	1045	15
817	7.5	849	10	881	10	913	10	945	10	977	15	1010	15	1043	15
830	10	861	10	891	10	921	10	951	15	981	15	1013	15	1044	15
843	10	873	10	902	10	931	15	960	15	988	15	1018	15	1047	15
858	10	887	10	915	15	943	15	970	15	997	15	1025	15	1053	15
873	15	901	15	928	15	956	15	982	15	1008	15	1035	15	1061	15
888	15	916	15	943	15	970	15	995	15	1020	15	1046	20	1071	20

Note:
1. Ratings are based on standard air
(Density = 0.075 Lbs/ft^3 at sea level 70 °F, 29.921 inches of mercury barometric pressure.)
2. Shaded regions denote unstable surge conditions. * TWO FANS with one electric motor on each model.

TABLE 48			FAN RATINGS (Continued)													
MODEL ANPU W,A	FAN SIZE	CFM	TOTAL STATIC PRESSURE (inch of water gage)													
			0.5		0.75		1		1.25		1.5		1.75		2	
			RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
30-1 35-1 30-2 40-1 40-2 50-2	2*x17"	9000	479	2	533	3	583	3	633	4	686	4	737	5.5	788	5.5
		9500	493	3	546	3	594	4	641	4	691	5.5	739	5.5	787	7.5
		10000	507	3	559	3	605	4	650	4	697	5.5	742	5.5	787	7.5
		10500	522	3	573	4	618	4	661	5.5	704	5.5	747	7.5	790	7.5
		11000	536	3	587	4	631	4	672	5.5	714	5.5	755	7.5	795	7.5
		11500	550	4	601	4	644	5.5	685	7.5	724	7.5	763	7.5	802	7.5
		12000	564	4	615	5.5	658	5.5	698	5.5	735	7.5	773	7.5	810	7.5
		12500	-	-	629	5.5	686	5.5	711	7.5	747	7.5	783	7.5	819	10
		13000	-	-	643	5.5	700	7.5	725	7.5	760	7.5	795	10	830	10
		13500	-	-	657	7.5	714	7.5	738	7.5	733	10	807	10	841	10
		14000	-	-	672	7.5	728	7.5	752	7.5	786	10	820	10	853	10
		14500	-	-	686	7.5	742	10	766	10	800	10	833	10	865	10
		15000	-	-	701	7.5	756	10	780	10	814	10	846	10	878	15
		15500	-	-	-	-	770	10	794	10	828	10	859	15	891	15
		16000	-	-	-	-	785	10	808	10	842	15	873	15	904	15
		16500	-	-	-	-	800	15	822	15	856	15	887	15	918	15
		17000	-	-	-	-	-	-	836	15	870	15	901	15	931	15
		17500	-	-	-	-	-	-	851	15	884	15	915	15	945	15
		18000	-	-	-	-	-	-	865	15	899	15	929	15	959	20
		18500	-	-	-	-	-	-	880	15	913	15	943	20	973	20
		19000	-	-	-	-	-	-	895	15	927	20	957	20	987	20
		19500	-	-	-	-	-	-	-	-	942	20	972	20	1001	20
		20000	-	-	-	-	-	-	-	-	957	20	986	20	1015	20
		20500	-	-	-	-	-	-	-	-	972	20	1001	20	1029	25
		21000	-	-	-	-	-	-	-	-	987	20	1015	25	1043	25
		21500	-	-	-	-	-	-	-	-	1003	25	1030	25	1058	25
		22000	-	-	-	-	-	-	-	-	-	-	-	-	1072	25
		22500	-	-	-	-	-	-	-	–	-	-	-	-	1087	30
		23000	-	-	-	-	-	-	-	-	-	-	-	-	1101	30
		23500	-	-	-	-	-	-	-	-	-	-	-	-	1116	30
		24000	-	-	-	-	-	-	-	-	-	-	-	-	1131	30
		24500	-	-	-	-	-	-	-	-	-	-	-	-	1147	30
		25000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60-2	2*x19"	18000	-	-	569	7.5	614	10	653	10	689	10	725	15	761	15
		18500	-	-	577	7.5	622	10	660	10	697	10	732	15	767	15
		19000	-	-	585	10	630	10	668	10	704	15	738	15	773	15
		19500	-	-	593	10	639	10	676	10	712	15	745	15	779	15
		20000	-	-	-	-	647	10	685	15	719	15	752	15	785	15
		20500	-	-	-	-	658	10	693	15	727	15	760	15	792	15
		21000	-	-	-	-	664	15	701	15	735	15	767	15	799	15
		21500	-	-	-	-	-	-	709	15	743	15	775	15	806	20
		22000	-	-	-	-	-	-	717	15	751	15	782	20	814	20
		22500	-	-	-	-	-	-	725	15	759	15	790	20	821	20
		23000	-	-	-	-	-	-	733	15	767	20	798	20	829	20
		23500	-	-	-	-	-	-	-	-	775	20	806	20	837	20
		24000	-	-	-	-	-	-	-	-	783	20	814	20	844	20
		24500	-	-	-	-	-	-	-	-	791	20	822	20	852	25
		25000	-	-	-	-	-	-	-	-	-	-	-	-	860	25
		25500	-	-	-	-	-	-	-	-	-	-	-	-	869	25
		26000	-	-	-	-	-	-	-	–	-	-	-	-	877	25
		26500	-	-	-	-	-	-	-	-	-	-	-	-	885	25
		27000	-	-	-	-	-	-	-	-	-	-	-	-	893	30
		27500	-	-	-	-	-	-	-	-	-	-	-	-	902	30
		28000	-	-	-	-	-	-	-	-	-	-	-	-	910	30
		28500	-	-	-	-	-	-	-	-	-	-	-	-	918	30
		29000	-	-	-	-	-	-	-	-	-	-	-	-	927	30
		29500	-	-	-	-	-	-	-	-	-	-	-	-	936	30
		30000	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note:
1. Ratings are based on standard air
(Density = 0.075 Lbs/ft³ at sea level 70 °F, 29.921 inches of mercury barometric pressure.)
2. Shaded regions denote unstable surge conditions. *TWO FANS with one electric motor on each model.

TABLE 48				FAN RATINGS (Continued)											
TOTAL STATIC PRESSURE (inch of water gage)															
2.25		2.5		2.75		3		3.25		3.5		3.75		4	
RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
839	7.5	889	7.5	-	-	-	-	-	-	-	-	-	-	-	-
835	7.5	884	7.5	931	10	977	10	-	-	-	-	-	-	-	-
834	7.5	881	7.5	926	10	972	10	1017	10	1062	15	-	-	-	-
835	7.5	879	10	924	10	968	10	1010	15	1053	15	-	-	-	-
838	7.5	880	10	922	10	964	10	1006	15	1047	15	1088	15	1128	15
842	10	882	10	923	10	963	10	1003	15	1043	15	1082	15	1121	15
848	10	886	10	925	10	964	15	1002	15	1041	15	1078	15	1116	15
856	10	892	10	929	15	966	15	1003	15	1040	15	1077	15	1113	15
864	10	899	10	934	15	969	15	1005	15	1041	15	1076	15	1111	20
874	10	907	15	941	15	975	15	1009	15	1043	15	1077	15	1111	20
885	15	917	15	949	15	981	15	1014	15	1047	15	1080	20	1113	20
896	15	927	15	958	15	989	15	1021	15	1053	15	1084	20	1115	20
908	15	938	15	968	15	998	15	1028	15	1059	20	1089	20	1119	20
920	15	950	15	979	15	1008	15	1037	20	1066	20	1095	20	1125	20
933	15	962	15	990	15	1018	20	1046	20	1075	20	1103	20	1131	20
946	15	974	15	1002	20	1029	20	1056	20	1084	20	1111	20	1138	20
959	15	987	20	1014	20	1041	20	1067	20	1094	20	1120	20	1147	25
973	20	1000	20	1027	20	1053	20	1079	20	1104	20	1130	25	1156	25
986	20	1014	20	1039	20	1065	20	1090	20	1116	25	1141	25	1166	25
1000	20	1027	20	1053	20	1078	25	1103	25	1127	25	1152	25	1176	25
1014	20	1041	20	1066	25	1091	25	1115	25	1140	25	1163	25	1187	25
1028	20	1054	25	1079	25	1104	25	1128	25	1152	25	1175	30	1199	30
1042	25	1068	25	1093	25	1118	25	1141	25	1165	30	1188	30	1211	30
1056	25	1082	25	1107	25	1131	25	1155	30	1178	30	1201	30	1223	30
1070	25	1096	25	1121	30	1145	30	1168	30	1192	30	1214	30	1236	30
1084	25	1110	30	1135	30	1159	30	1182	30	1205	30	1227	40	1249	40
1098	30	1124	30	1149	30	1173	30	1196	30	1219	40	1240	40	1262	40
1113	30	1139	30	1163	30	1187	30	1210	40	1233	40	1254	40	1275	40
1127	30	1153	30	1177	30	1201	30	1223	40	1246	40	1268	40	1289	40
1142	30	1167	30	1191	40	1215	40	1237	40	1260	40	1281	40	1302	40
1157	30	1182	40	1205	40	1229	40	1251	40	1274	40	1295	40	1315	40
1171	40	1196	40	1220	40	1243	40	1265	40	1288	40	1308	40	1329	50
-	-	1211	40	1234	40	1258	40	1279	40	1301	40	1322	50	1342	50
797	15	832	15	868	15	904	20	940	20	977	20	1013	25	1050	25
801	15	836	15	870	20	905	20	940	20	967	20	1011	25	1047	25
806	15	840	15	873	20	907	20	941	20	975	20	1010	25	1045	25
812	15	844	20	877	20	910	20	943	20	976	25	1010	25	1044	25
817	15	849	20	881	20	913	20	945	20	977	25	1010	25	1043	25
823	20	855	20	886	20	917	20	948	25	979	25	1011	25	1043	25
830	20	861	20	891	20	921	20	951	25	981	25	1013	25	1044	30
837	20	867	20	896	20	926	25	955	25	985	25	1015	25	1045	30
843	20	873	20	902	20	931	25	960	25	988	25	1018	30	1047	30
851	20	880	20	908	25	937	25	965	25	993	25	1021	30	1050	30
858	20	887	25	915	25	943	25	970	25	997	30	1025	30	1053	30
865	20	894	25	922	25	949	25	976	30	1003	30	1030	30	1057	30
873	25	901	25	928	25	956	25	982	30	1008	30	1035	30	1061	30
881	25	909	25	936	25	962	25	988	30	1014	30	1040	30	1066	30
888	25	916	25	943	30	970	30	995	30	1020	30	1046	30	1071	40
896	25	924	25	950	30	977	30	1002	30	1027	30	1052	40	1077	40
904	25	932	30	958	30	984	30	1009	30	1034	30	1058	40	1083	40
912	30	939	30	965	30	991	30	1016	30	1040	40	1065	40	1089	40
920	30	947	30	973	30	999	30	1023	40	1047	40	1071	40	1095	40
928	30	955	30	980	30	1006	40	1030	40	1055	40	1078	40	1102	40
936	30	963	30	988	30	1013	40	1038	40	1062	40	1085	40	1108	40
944	30	970	40	996	40	1021	40	1045	40	1069	40	1092	40	1115	40
953	30	978	40	1003	40	1028	40	1052	40	1076	40	1099	40	1122	50
961	40	986	40	1010	40	1035	40	1059	40	1083	40	1106	40	1129	50
-	-	993	40	1018	40	1042	40	1066	40	1090	40	1113	50	1135	50

TABLE 48		FAN RATINGS (Continued)													
MODEL ANPU W,A	FAN SIZE	CFM	TOTAL STATIC PRESSURE (inch of water gage)												
			0.5		0.75		1		1.25		1.5		1.75		2	
			RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
70-2 80-2	2*x22"	21000	409	7.5	449	7.5	487	10	522	10	558	10	594	15	630	15
		22000	421	7.5	460	7.5	496	10	531	10	564	15	599	15	633	15
		23000	433	7.5	471	10	506	10	540	15	572	15	605	15	637	15
		24000	446	10	482	10	516	15	549	15	580	15	611	15	643	20
		25000	459	10	493	10	527	15	559	15	589	15	619	15	649	20
		26000	472	10	505	15	537	15	569	15	598	15	627	20	656	20
		27000	-	-	517	15	548	15	579	15	608	20	636	20	664	20
		28000	-	-	530	15	559	15	590	20	618	20	645	20	673	20
		29000	-	-	543	15	571	20	600	20	628	20	655	20	681	25
		30000	-	-	-	-	582	20	611	20	638	20	665	25	691	25
		31000	-	-	-	-	595	20	622	20	649	25	675	25	700	25
		32000	-	-	-	-	607	20	634	25	660	25	685	25	710	30
		33000	-	-	-	-	620	25	646	25	671	25	696	30	720	30
		34000	-	-	-	-	-	-	657	25	682	30	706	30	731	30
		35000	-	-	-	-	-	-	670	30	693	30	717	30	741	30
		36000	-	-	-	-	-	-	682	30	705	30	728	30	752	40
		37000	-	-	-	-	-	-	695	30	716	40	739	40	763	40
		38000	-	-	-	-	-	-	-	-	728	40	751	40	774	40
		39000	-	-	-	-	-	-	-	-	740	40	763	40	785	40
		40000	-	-	-	-	-	-	-	-	-	-	-	-	796	50

Note:

1. Ratings are based on standard air (Density = 0.075 Lbs/ft³ at sea level 70 °F, 29.921 inches of mercury barometric pressure.)
2. Shaded regions denote unstable surge conditions.

* TWO FANS with one electric motor on each model.

TABLE 48				FAN RATINGS (Continued)											
TOTAL STATIC PRESSURE (inch of water gage)															
2.25		2.5		2.75		3		3.25		3.5		3.75		4	
RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
666	15	702	20	737	20	772	20	807	25	841	25	875	25	908	30
667	20	702	20	736	20	770	20	803	25	837	25	870	30	902	30
670	20	703	20	736	20	769	25	801	25	833	25	865	30	897	30
674	20	706	20	737	25	769	25	800	25	831	30	862	30	893	30
679	20	709	20	740	25	770	25	800	25	830	30	860	30	890	30
685	20	714	25	743	25	772	25	801	30	830	30	859	30	888	40
692	25	719	25	747	25	775	25	803	30	831	30	859	30	887	40
699	25	726	25	753	25	780	30	806	30	833	30	860	40	887	40
707	25	733	25	759	30	785	30	811	30	836	40	862	40	888	40
716	25	741	30	766	30	791	30	815	30	840	40	865	40	890	40
725	30	749	30	773	30	797	40	821	40	845	40	870	40	894	40
734	30	758	30	781	30	804	40	828	40	851	40	874	40	898	40
744	30	767	30	790	40	812	40	835	40	858	40	880	40	903	50
754	30	777	40	799	40	820	40	843	40	865	40	887	50	909	50
764	40	787	40	808	40	829	40	851	40	872	50	894	50	915	50
774	40	797	40	818	40	838	40	859	50	880	50	901	50	922	50
785	40	807	40	828	40	848	50	869	50	889	50	909	50	930	50
796	40	818	40	838	50	858	50	878	50	898	50	918	50	938	60
807	50	828	50	848	50	868	50	888	50	907	50	927	60	946	60
818	50	839	50	859	50	878	50	898	60	917	60	936	60	955	60

TABLE 49	ELECTRIC HEATING COIL SPECIFICATION		
AVAILABLE CAPACITIES (KW)	NUMBER OF CIRCUITES	NUMBER OF CIRCUITES x KW	THERMOSTAT STAGES
12	1	1 x 12	1
18	1	1 x 18	1
24	1	1 x 24	1
30	2	(1 x 12) + (1 x 18)	2
36	2	(2 x 18)	2
42	3	(2 x 12) + (1 x 18)	3
48	3	(1 x 12) + (2 x 18)	3
54	3	3 x 18	3
60	3	(2 x 18) + (1 x 24)	3
66	3	2 x 18 + 1 x 24	3
72	3	3 x 24	3
78	4	(1 x 12) + (1 x 18) + 2 x 24)	4
84	4	(2 x 18) + (2 x 24)	4
90	4	(1 x 18) + (3 x 24)	4
96	4	4 x 24	4

TABLE 50	ELECTRIC HEATING ELEMENT DATA
ELECTRICAL ELEMENT POWER (KW)	AMPS *
12	18.1
18	27.2
24	36.6

* 380 V - 3 Phase - 50 Cycle, star connection

Note:

1. For ducted applications of AzarNasim Packaged Units with electric heating coils, an automatic air flow switch will be supplied separately. Before starting up the unit, the air flow switch must be installed in the duct and wired to the electrical control panel as per electrical wiring diagram instructions. Failure to do so will cause damage to the electric heating elements and void the guarantee.
2. Before switching unit to winter season application, system pump down must be performed.

TABLE 51	WATER COOLED PACKAGED UNITS*					
MODEL	COMPRESSOR		EVAPORATOR FAN MOTOR		TOTAL	
	INPUT (KW)	AMPS.	HP	FLA	POWER (KW)	AMPS.
ANPU-5-W-1	3.4	6.8	0.75	1.7	4.0	8.5
ANPU-8-W-1	6.3	11.9	2	4	7.8	15.9
ANPU-10-W-1	8.5	15.6	2	4	10.0	19.6
ANPU-15-W-1	11.2	21.2	4	7.5	14.2	28.7
ANPU-20-W-1	12.7	23.3	5.5	8.8	16.8	32.1
ANPU-25-W-1	16.4	29.2	5.5	8.8	20.5	38.0
ANPU-30-W-1	20.0	33.7	7.5	12.2	25.6	45.9
ANPU-35-W-1	25.4	46.0	7.5	12.2	31.0	58.2
ANPU-40-W-1	30.1	50.9	10	16.5	37.6	67.4
ANPU-10-W-2	6.8	13.6	2	4	8.3	17.6
ANPU-15-W-2	12.6	23.8	4	7.5	15.6	31.3
ANPU-20-W-2	17.0	31.2	5.5	8.8	21.1	40.0
ANPU-30-W-2	22.4	42.2	7.5	12.2	28.0	54.4
ANPU-40-W-2	25.4	46.6	10	16.5	32.9	63.1
ANPU-50-W-2	32.8	58.4	15	23.8	44.1	82.2
ANPU-60-W-2	40.0	67.4	15	23.8	51.3	91.2
ANPU-70-W-2	50.8	92.0	15	23.8	62.1	115.8
ANPU-80-W-2	60.2	101.8	20	32	75.2	133.8

*All data are based on 105°F condensing, 45°F evaporating temperature.

TABLE 52	AIR COOLED SPLIT TYPE PACKAGED UNITS*					
MODEL	COMPRESSOR		EVAPORATOR FAN MOTOR		TOTAL	
	INPUT (KW)	AMPS.	HP	FLA	POWER (KW)	AMPS.
ANPU-5-A-1	4.2	7.7	0.75	1.7	4.8	9.4
ANPU-8-A-1	7.4	13.7	2	4	8.9	17.7
ANPU-10-A-1	9.9	18.0	2	4	11.4	22.0
ANPU-15-A-1	13.3	24.6	4	7.5	16.3	32.1
ANPU-20-A-1	15.2	26.8	5.5	8.8	19.3	35.6
ANPU-25-A-1	19.6	33.7	5.5	8.8	23.7	42.5
ANPU-30-A-1	23.6	39.0	7.5	12.2	29.2	51.2
ANPU-35-A-1	30.2	53.3	7.5	12.2	35.8	65.5
ANPU-40-A-1	35.8	58.4	10	16.5	43.3	74.9
ANPU-10-A-2	8.4	15.4	2	4	9.9	19.4
ANPU-15-A-2	14.8	27.4	4	7.5	17.8	34.9
ANPU-20-A-2	19.8	36.0	5.5	8.8	23.9	44.8
ANPU-30-A-2	26.6	49.2	7.5	12.2	32.2	61.4
ANPU-40-A-2	30.4	53.6	10	16.5	37.9	70.1
ANPU-50-A-2	39.2	67.4	15	23.8	50.5	91.2
ANPU-60-A-2	47.2	78.0	15	23.8	58.5	101.8
ANPU-70-A-2	60.4	106.6	15	23.8	71.7	130.4
ANPU-80-A-2	71.6	116.8	20	32	86.6	148.8

*All data are based on 105°F condensing, 45°F evaporating temperature.

Note:

1. Compressor circuit breakers are current sensitive and temperature compensated to ensure compressor cutoff if current draw becomes excessive. Breakers must be resent manually.
2. Internal protection with automatic reset de-energizes the control circuit if extreme compressor motor temperature should occur from excessive return gas temperature or motor overloading.
3. High and low pressure controls automatically shut off compressor(s) if refrigerant pressure exceeds switch settings. This action protects against loss of charge.
4. All compressors are 380/420 volts – 3 phase – 50 cycles.

TABLE 53	AIR COOLED ROOF TOP PACKAGED UNIT*											
MODEL	A	B	C	D	DD	E	F	G	GG	H	L	J
ANPU-5-AR-1	2800	1200	1300	445	-	411	415	1200	700	450	1200	100
ANPU-8-AR-1	2800	1400	1400	470	-	466	470	1300	700	600	1300	100
ANPU-10-AR-1	2800	1450	1600	570	-	466	470	1500	800	650	1500	100
ANPU-15-AR-1	3350	1700	1800	640	-	515	519	1700	800	850	1700	120
ANPU-20-AR-1	3600	1800	2200	820	-	561	566	2100	900	860	2100	120
ANPU-25-AR-1	3800	2100	2200	790	-	616	621	2100	900	1050	2100	120
ANPU-30-AR-1	4000	2150	2200	240	500	561	566	2100	900	1200	2100	140
ANPU-35-AR-1	4000	2100	2700	490	600	561	566	2600	1000	1150	2600	140
ANPU-40-AR-1	4250	2250	2750	515	600	561	566	2650	1000	1300	2650	140
ANPU-10-AR-2	2850	1500	1550	540	-	466	470	1450	700	670	1450	100
ANPU-15-AR-2	2900	1650	2000	740	-	515	519	1900	700	750	1900	120
ANPU-20-AR-2	3600	1800	2250	845	-	561	566	2150	800	820	2150	120
ANPU-30-AR-2	3800	2000	2400	340	500	561	566	2300	800	1050	2300	140
ANPU-40-AR-2	4150	2300	2700	490	600	561	566	2600	900	1350	2600	140
ANPU-50-AR-2	5300	2450	3000	640	600	561	566	2900	900	1500	2900	140
ANPU-60-AR-2	5300	2800	3000	560	650	616	621	2900	900	1800	2900	140
ANPU-70-AR-2	5450	3250	3000	405	740	725	730	2900	1000	2100	2900	140
ANPU-80-AR-2	5450	3400	3000	405	740	725	730	2900	1000	2250	2900	140

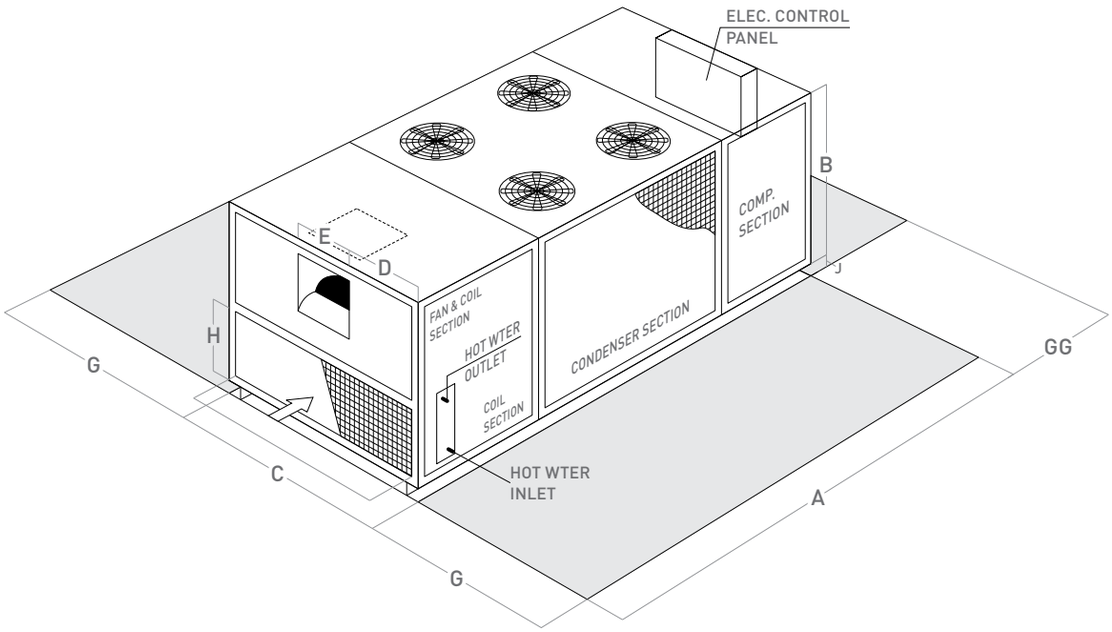
Note:

1. All dimensions are in mm.
2. All dimensions are subject to change without notice.
3. All dimensions indicated are for front discharge only.
4. Top discharge units are also available as special request.
5. Fan installation for single and double fan applications are illustrated for front discharge models.
6. Refrigerator and water piping connections for vertical, air-cooled and water-cooled models are also applicable to horizontal units.
7. Unit width (C) will vary according to the electric heating element capacity requirements.

TABLE 54	AIR COOLED ROOF TOP PACKAGED UNITS ELECTRICAL DATA							
MODEL	COMPRESSOR		EVAPORATOR FAN MOTOR		CONDENSER FAN MOTOR		TOTAL	
	INPUT (KW)	AMPS.	HP	FLA	NOxHP	FLA	POWER (KW)	AMPS.
ANPU-5-AR-1	4.2	7.7	0.75	1.7	1x1.5	3.2	5.9	12.6
ANPU-8-AR-1	7.4	13.7	2	4	1x4.0	7.7	11.9	25.4
ANPU-10-AR-1	9.9	18.0	2	4	1x4.0	7.7	14.4	29.7
ANPU-15-AR-1	13.3	24.6	4	7.5	2x4.0	15.4	22.2	47.5
ANPU-20-AR-1	15.2	26.8	5.5	8.8	2x4.0	15.4	25.3	51.0
ANPU-25-AR-1	19.6	33.7	5.5	8.8	4x1.5	12.8	28.2	55.3
ANPU-30-AR-1	23.6	39.0	7.5	12.2	5x1.5	16.0	34.8	67.2
ANPU-35-AR-1	30.2	53.3	7.5	12.2	5x1.5	16.0	41.4	81.5
ANPU-40-AR-1	35.8	58.4	10	16.5	4x4.0	30.8	55.2	105.7
ANPU-10-AR-2	8.4	15.4	2	4	1x4.0	7.7	12.9	27.1
ANPU-15-AR-2	14.8	27.4	4	7.5	1x4.0	7.7	20.8	42.6
ANPU-20-AR-2	19.8	36.0	5.5	8.8	2x4.0	15.4	29.9	60.2
ANPU-30-AR-2	26.6	49.2	7.5	12.2	4x1.5	12.8	36.7	74.2
ANPU-40-AR-2	30.4	53.6	10	16.5	4x4.0	30.8	49.8	100.9
ANPU-50-AR-2	39.2	67.4	15	23.8	6x4.0	46.2	68.3	137.4
ANPU-60-AR-2	47.2	78.0	15	23.8	6x4.0	46.2	76.3	148.0
ANPU-70-AR-2	60.4	106.6	15	23.8	6x4.0	46.2	89.5	176.6
ANPU-80-AR-2	71.6	116.8	20	32	6x4.0	46.2	104.4	195.0

Note:

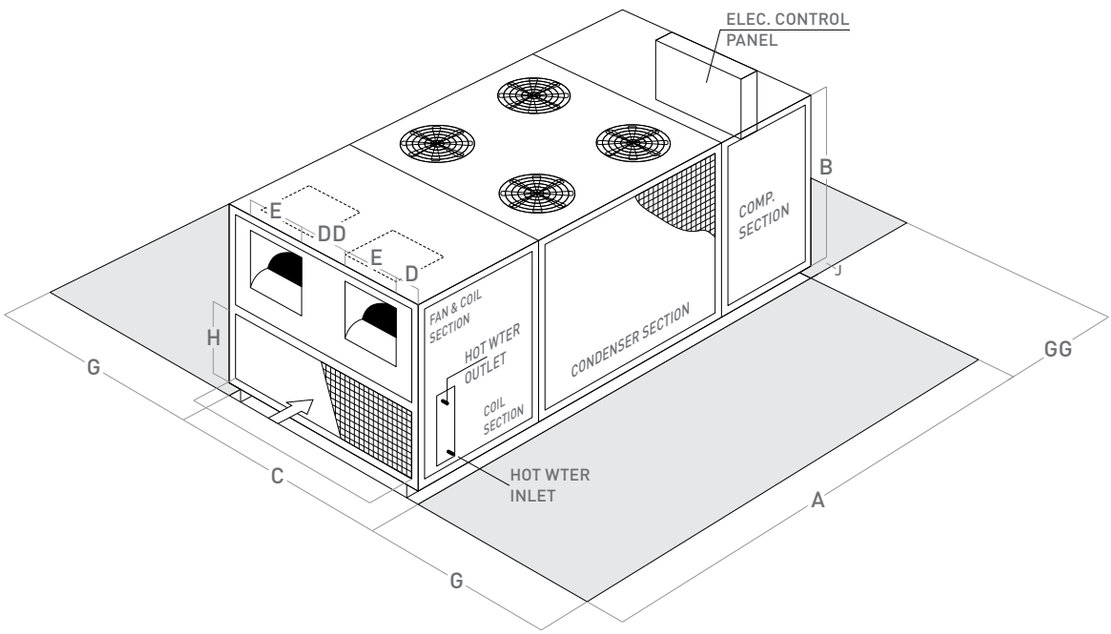
1. Compressor circuit breakers are current sensitive and temperature compensated to ensure compressor cutoff if current draw becomes excessive. Breakers must be reset manually.
2. Internal protection with automatic reset de-energizes the control circuit if extreme compressor motor temperature should occur from excessive return gas temperature or motor overloading.
3. High and low pressure control, automatically shut off compressor(s) if refrigerant pressure exceed switch settings. This action protects compressor against loss of charge or damaged caused by excessive pressures.
4. All data are based on 125 °F condensing, 45 °F evaporating & 95 °F ambient air temperature.
5. All compressor are 380/420 Volts-3 phase-50 cycles.



FFIGURE 2. SINGLE FAN MODELS

AIR FLOW

SERVICE AREA



FFIGURE 3. DOUBLE FAN MODELS

TABLE 55	WATER COOLED											
MODEL	A	B	C	D	DD	E	F	G	GG	H	L	J
ANPU-5-WV-1	1300	1800	900	445	-	411	415	1200	700	450	1200	100
ANPU-8-WV-1	1400	2000	900	470	-	466	470	1300	700	600	1300	100
ANPU-10-WV-1	1600	2000	900	570	-	466	470	1500	800	650	1500	100
ANPU-15-WV-1	1800	2300	900	640	-	515	519	1700	800	850	1700	120
ANPU-20-WV-1	2200	2450	1050	820	-	561	566	2100	900	860	2100	120
ANPU-25-WV-1	2200	3000	1050	790	-	616	621	2100	900	1050	2100	120
ANPU-30-WV-1	2200	3000	1050	240	500	561	566	2100	900	1200	2100	140
ANPU-35-WV-1	2700	3000	1100	490	600	561	566	2600	1000	1150	2600	140
ANPU-40-WV-1	2750	3200	1200	515	600	561	566	2650	1000	1300	2650	140
ANPU-10-WV-2	1550	2100	900	540	-	466	470	1450	700	670	1450	100
ANPU-15-WV-2	2000	2200	900	740	-	515	519	1900	700	750	1900	120
ANPU-20-WV-2	2250	2400	1100	845	-	561	566	2150	800	820	2150	120
ANPU-30-WV-2	2400	3100	1200	340	500	561	566	2300	800	1050	2300	120
ANPU-40-WV-2	2700	3350	1300	490	600	561	566	2600	900	1350	2600	140
ANPU-50-WV-2	3000	3500	1300	640	600	561	566	2900	900	1500	2900	140
ANPU-60-WV-2	3000	3900	1300	560	650	616	621	2900	900	1800	2900	140
ANPU-70-WV-2	4000	4300	1400	405	740	725	730	2900	1000	2100	2900	140
ANPU-80-WV-2	4000	4500	1500	405	740	725	730	2900	1000	2250	2900	140

1. All dimensions are in mm.
2. All dimensions are subject to change without notice.

TABLE 56	AIR COOLED (SPLIT TYPE)											
MODEL	A	B	C	D	DD	E	F	G	GG	H	L	J
ANPU-5-AV-1	1300	1800	800	445	-	411	415	1200	700	450	1200	100
ANPU-8-AV-1	1400	2000	850	470	-	466	470	1300	700	600	1300	100
ANPU-10-AV-1	1600	2000	850	570	-	466	470	1500	800	650	1500	100
ANPU-15-AV-1	1800	2300	900	640	-	515	519	1700	800	850	1700	120
ANPU-20-AV-1	2200	2450	1000	820	-	561	566	2100	900	860	2100	120
ANPU-25-AV-1	2200	3000	1000	790	-	616	621	2100	900	1050	2100	120
ANPU-30-AV-1	2200	3000	1000	240	500	561	566	2100	900	1200	2100	140
ANPU-35-AV-1	2700	3000	1000	490	600	561	566	2600	1000	1150	2600	140
ANPU-40-AV-1	2750	3200	1100	515	600	561	566	2650	1000	1300	2650	140
ANPU-10-AV-2	1550	2100	850	540	-	466	470	1450	700	670	1450	100
ANPU-15-AV-2	2000	2200	900	740	-	515	519	1900	700	750	1900	120
ANPU-20-AV-2	2250	2400	1000	845	-	561	566	2150	800	820	2150	120
ANPU-30-AV-2	2400	3100	1000	340	500	561	566	2300	800	1050	2300	120
ANPU-40-AV-2	2700	3350	1000	490	600	561	566	2600	900	1350	2600	140
ANPU-50-AV-2	3000	3500	1000	640	600	561	566	2900	900	1500	2900	140
ANPU-60-AV-2	3000	3900	1000	560	650	616	621	2900	900	1800	2900	140
ANPU-70-AV-2	4000	4300	1200	405	740	725	730	2900	1000	2100	2900	140
ANPU-80-AV-2	4000	4500	1200	405	740	725	730	2900	1000	2250	2900	140

Note:

1. All dimensions are in mm.
2. All dimensions are subject to change without notice.
3. All dimensions indicated are for front discharge only.
4. Top discharge units are also available as special request.
5. Fan installation for single and double fan applications are illustrated for front discharge models.
6. Refrigerator and water piping connections for vertical, air-cooled and water-cooled models are also applicable to horizontal units.
7. Unit width (C) will vary according to the electric heating element capacity requirements

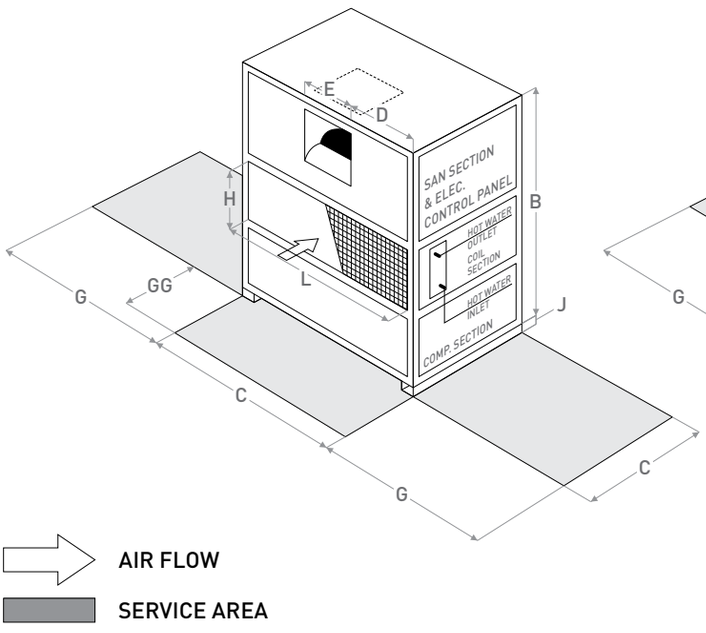


FIGURE 4. SINGLE FAN TYPE

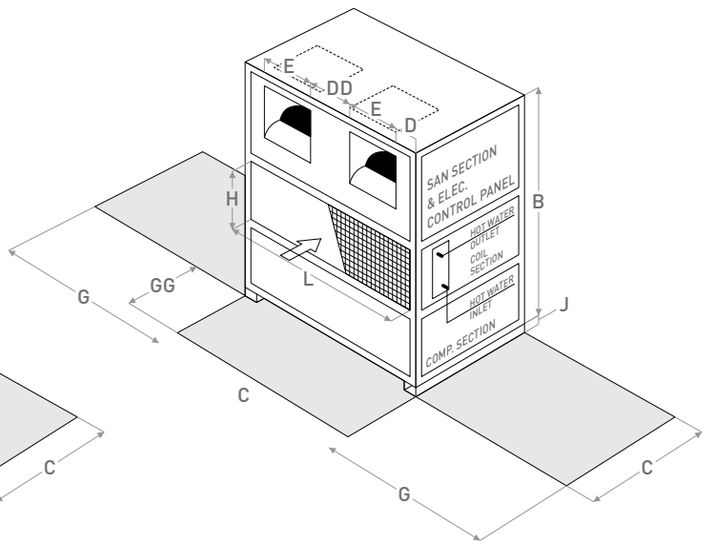


FIGURE 5. DOUBLE FAN TYPE

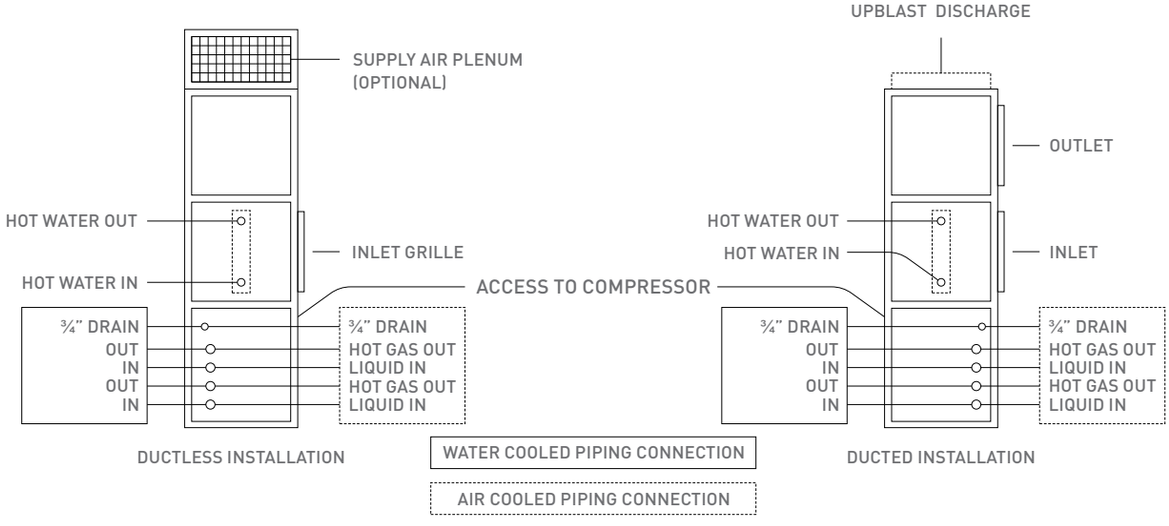


FIGURE 6. VERTICAL PACKAGED UNITS CONNECTIONS

TABLE 57	WATER COOLED											
MODEL	A	B	C	D	DD	E	F	G	GG	H	L	J
ANPU-5-WC-1	1700	1200	1300	445	-	411	415	1200	700	450	1200	100
ANPU-8-WC-1	1800	1400	1400	470	-	466	470	1300	700	600	1300	100
ANPU-10-WC-1	1800	1450	1600	570	-	466	470	1500	800	650	1500	100
ANPU-15-WC-1	1850	1700	1800	640	-	515	519	1700	800	850	1700	120
ANPU-20-WC-1	2000	1800	2200	820	-	561	566	2100	900	860	2100	120
ANPU-25-WC-1	2100	2100	2200	790	-	616	621	2100	900	1050	2100	120
ANPU-30-WC-1	2100	2200	2200	240	500	561	566	2100	900	1200	2100	140
ANPU-35-WC-1	2100	2100	2700	490	600	561	566	2600	1000	1150	2600	140
ANPU-40-WC-1	2150	2250	2750	515	600	561	566	2650	1000	1300	2650	140
ANPU-10-WC-2	1800	1500	1550	540	-	466	470	1450	700	670	1450	100
ANPU-15-WC-2	1850	1650	2000	740	-	515	519	1900	700	750	1900	120
ANPU-20-WC-2	1900	1800	2250	845	-	561	566	2150	800	820	2150	120
ANPU-30-WC-2	1900	2000	2400	340	500	561	566	2300	800	1050	2300	120
ANPU-40-WC-2	2000	2300	2700	490	600	561	566	2600	900	1350	2600	140
ANPU-50-WC-2	2100	2450	3000	640	600	561	566	2900	900	1500	2900	140
ANPU-60-WC-2	2150	2800	3000	560	650	616	621	2900	900	1800	2900	140
ANPU-70-WC-2	2300	3300	3000	405	740	725	730	2900	1000	2100	2900	140
ANPU-80-WC-2	2300	3400	3000	405	740	725	730	2900	1000	2250	2900	140

1. All dimensions are in mm.
2. All dimensions are subject to change without notice.

TABLE 58	AIR COOLED (SPLIT TYPE)											
MODEL	A	B	C	D	DD	E	F	G	GG	H	L	J
ANPU-5-AC-1	1500	1200	1300	445	-	411	415	1200	700	450	1200	100
ANPU-8-AC-1	1600	1400	1400	470	-	466	470	1300	700	600	1300	100
ANPU-10-AC-1	1600	1450	1600	570	-	466	470	1500	800	650	1500	100
ANPU-15-AC-1	1650	1700	1800	640	-	515	519	1700	800	850	1700	120
ANPU-20-AC-1	1850	1800	2200	820	-	561	566	2100	900	860	2100	120
ANPU-25-AC-1	1900	2100	2200	790	-	616	621	2100	900	1050	2100	120
ANPU-30-AC-1	1900	2200	2200	240	500	561	566	2100	900	1200	2100	140
ANPU-35-AC-1	1900	2100	2700	490	600	561	566	2600	1000	1150	2600	140
ANPU-40-AC-1	1950	2250	2750	515	600	561	566	2650	1000	1300	2650	140
ANPU-10-AC-2	1600	1500	1550	540	-	466	470	1450	700	670	1450	100
ANPU-15-AC-2	1650	1650	2000	740	-	515	519	1900	700	750	1900	120
ANPU-20-AC-2	1700	1800	2250	845	-	561	566	2150	800	820	2150	120
ANPU-30-AC-2	1700	2000	2400	340	500	561	566	2300	800	1050	2300	120
ANPU-40-AC-2	1850	2300	2700	490	600	561	566	2600	900	1350	2600	140
ANPU-50-AC-2	1850	2450	3000	640	600	561	566	2900	900	1500	2900	140
ANPU-60-AC-2	1950	2800	3000	560	650	616	621	2900	900	1800	2900	140
ANPU-70-AC-2	2100	3300	3000	405	740	725	730	2900	1000	2100	2900	140
ANPU-80-AC-2	2100	3400	3000	405	740	725	730	2900	1000	2250	2900	140

Note:

1. All dimensions are in mm.
2. All dimensions are subject to change without notice.
3. All dimensions indicated are for front discharge only.
4. Top discharge units are also available as special request.
5. Fan installation for single and double fan applications are illustrated for front discharge models.
6. Refrigerator and water piping connections for vertical, air-cooled and water-cooled models are also applicable to horizontal units.
7. Unit width (C) will vary according to the electric heating element capacity requirements

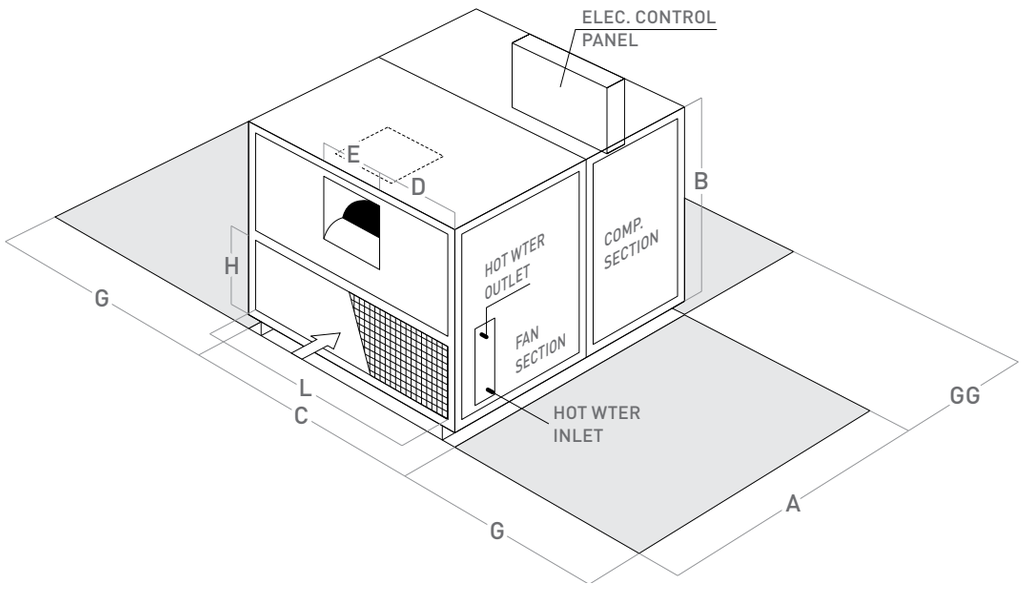


FIGURE 7. SINGLE FAN TYPE

AIR FLOW

SERVICE AREA

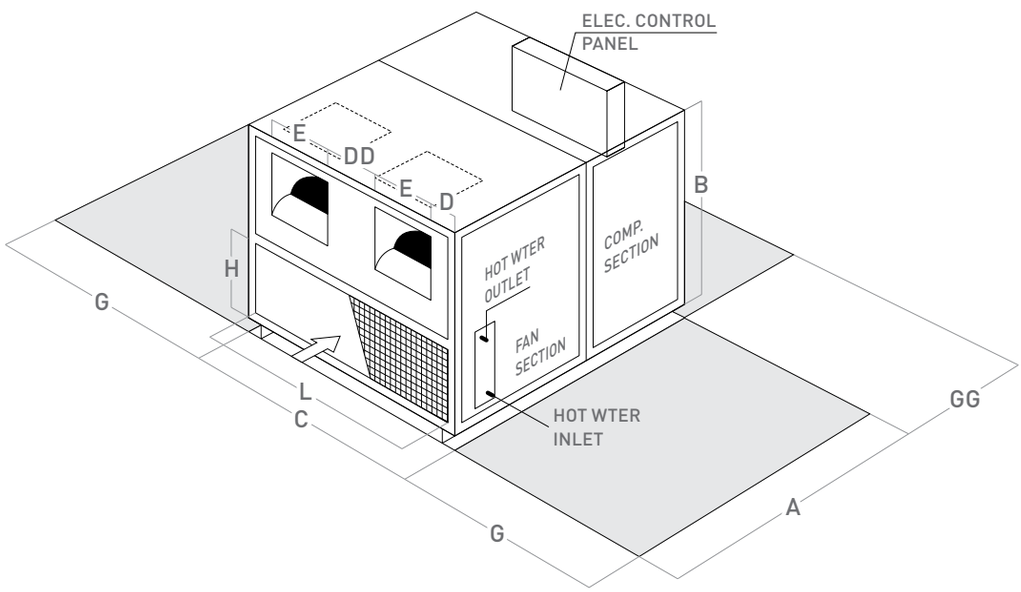


FIGURE 8. DOUBLE FAN TYPE

TABLE 59	WATER COOLED									
MODEL	A	B	C	D	DD	E	F	G	GG	J
ANPU-5-WH-1	2650	700	1300	445	-	411	415	1200	700	100
ANPU-8-WH-1	2750	800	1400	470	-	466	470	1300	700	100
ANPU-10-WH-1	2750	800	1600	570	-	466	470	1500	800	100
ANPU-15-WH-1	2800	1000	1800	640	-	515	519	1700	800	120
ANPU-20-WH-1	3000	1000	2200	820	-	561	566	2100	900	120
ANPU-25-WH-1	3000	1200	2200	790	-	616	621	2100	900	120
ANPU-30-WH-1	3000	1350	2200	240	500	561	566	2100	900	140
ANPU-35-WH-1	3100	1300	2700	490	600	561	566	2600	1000	140
ANPU-40-WH-1	3100	1400	2750	515	600	561	566	2650	1000	140
ANPU-10-WH-2	2750	900	1550	540	-	466	470	1450	700	100
ANPU-15-WH-2	2800	950	2000	740	-	515	519	1900	700	120
ANPU-20-WH-2	2850	1000	2250	845	-	561	566	2150	800	120
ANPU-30-WH-2	2850	1200	2400	340	500	561	566	2300	800	120
ANPU-40-WH-2	3000	1500	2700	490	600	561	566	2600	900	140
ANPU-50-WH-2	3000	1650	3000	640	600	561	566	2900	900	140
ANPU-60-WH-2	3100	1950	3000	560	650	616	621	2900	900	140
ANPU-70-WH-2	3250	2300	3000	405	740	725	730	2900	1000	140
ANPU-80-WH-2	3250	2400	3000	405	740	725	730	2900	1000	140

1. All dimensions are in mm.
2. All dimensions are subject to change without notice.

TABLE 60	AIR COOLED (SPLIT TYPE)									
MODEL	A	B	C	D	DD	E	F	G	GG	J
ANPU-5-AH-1	2450	700	1300	445	-	411	415	1200	700	100
ANPU-8-AH-1	2550	800	1400	470	-	466	470	1300	700	100
ANPU-10-AH-1	2550	800	1600	570	-	466	470	1500	800	100
ANPU-15-AH-1	2600	1000	1800	640	-	515	519	1700	800	120
ANPU-20-AH-1	2800	1000	2200	820	-	561	566	2100	900	120
ANPU-25-AH-1	2850	1200	2200	790	-	616	621	2100	900	120
ANPU-30-AH-1	2850	1350	2200	240	500	561	566	2100	900	140
ANPU-35-AH-1	2850	1300	2700	490	600	561	566	2600	1000	140
ANPU-40-AH-1	2900	1400	2750	515	600	561	566	2650	1000	140
ANPU-10-AH-2	2550	900	1550	540	-	466	470	1450	700	100
ANPU-15-AH-2	2600	950	2000	740	-	515	519	1900	700	120
ANPU-20-AH-2	2650	1000	2250	845	-	561	566	2150	800	120
ANPU-30-AH-2	2650	1200	2400	340	500	561	566	2300	800	120
ANPU-40-AH-2	2800	1500	2700	490	600	561	566	2600	900	140
ANPU-50-AH-2	2800	1650	3000	640	600	561	566	2900	900	140
ANPU-60-AH-2	2900	1950	3000	560	650	616	621	2900	900	140
ANPU-70-AH-2	3050	2300	3000	405	740	725	730	2900	1000	140
ANPU-80-AH-2	3050	2400	3000	405	740	725	730	2900	1000	140

Note:

1. All dimensions are in mm.
2. All dimensions are subject to change without notice.
3. All dimensions indicated are for front discharge only.
4. Top discharge units are also available as special request.
5. Fan installation for single and double fan applications are illustrated for front discharge models.
6. Refrigerator and water piping connections for vertical, air-cooled and water-cooled models are also applicable to horizontal units.
7. Unit width (C) will vary according to the electric heating element capacity requirements

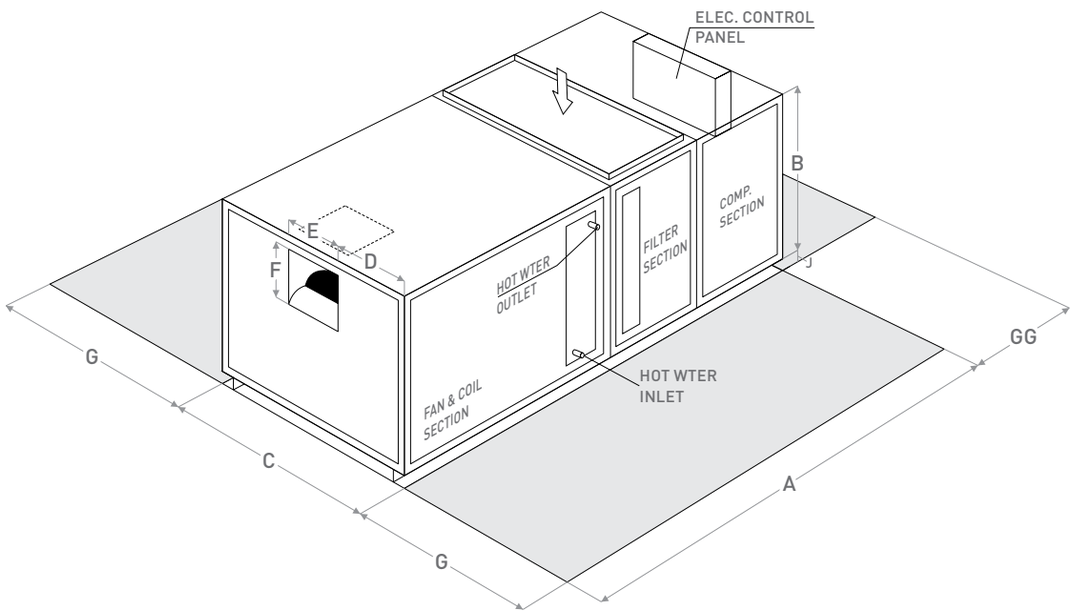


FIGURE 9. SINGLE FAN TYPE

AIR FLOW

SERVICE AREA

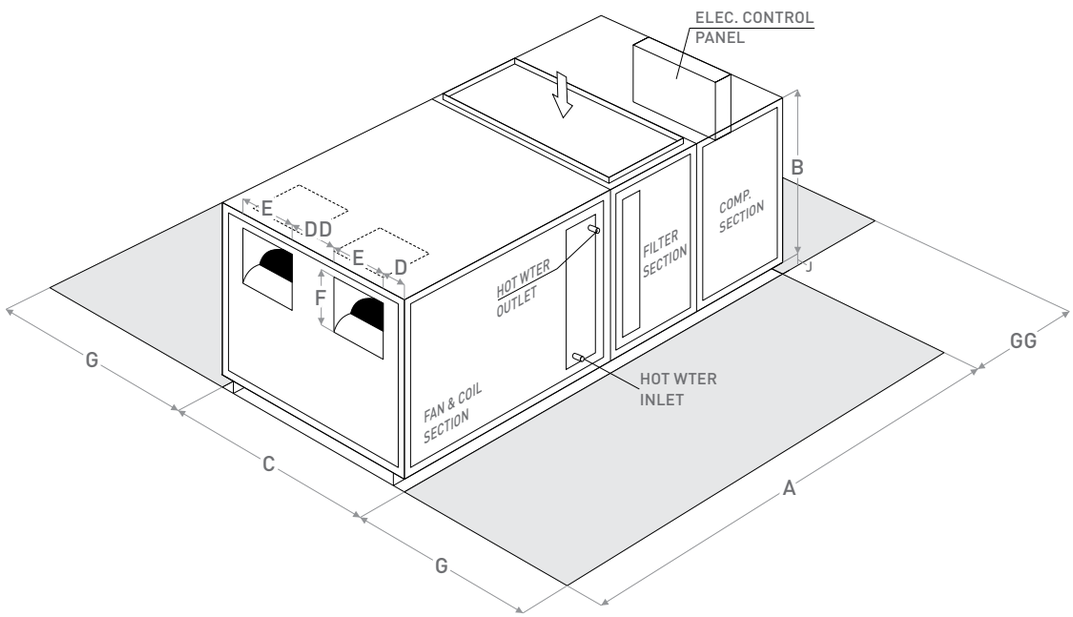


FIGURE 10. DOUBLE FAN TYPE

TABLE 61	AIR COOLED ROOF TOP PACKAGED UNIT (WITH MIXING BOX)												
MODEL	A	B	C	D	DD	E	F	G	GG	K	L	M	J
ANPU-5-AM-1	3850	1250	1300	445	-	411	415	1200	700	600	1100	410	100
ANPU-8-AM-1	3800	1350	1400	470	-	466	470	1300	700	650	1200	410	100
ANPU-10-AM-1	3850	1350	1600	570	-	466	470	1500	800	650	1400	410	100
ANPU-15-AM-1	4500	1550	1800	640	-	515	519	1700	800	700	1600	410	120
ANPU-20-AM-1	4700	1550	2200	820	-	561	566	2100	900	800	2000	410	120
ANPU-25-AM-1	5100	1750	2200	790	-	616	621	2100	900	800	2000	410	120
ANPU-30-AM-1	5300	1900	2200	240	500	561	566	2100	900	800	2000	410	140
ANPU-35-AM-1	5350	1900	2700	490	600	561	566	2600	1000	800	2500	410	140
ANPU-40-AM-1	5600	2000	2750	515	600	561	566	2650	1000	800	2550	410	140
ANPU-10-AM-2	3850	1350	1550	540	-	466	470	1450	700	650	1350	410	100
ANPU-15-AM-2	4000	1450	2000	740	-	515	519	1900	700	700	1800	410	120
ANPU-20-AM-2	4700	1550	2250	845	-	561	566	2150	800	800	2050	410	120
ANPU-30-AM-2	5100	1750	2400	340	500	561	566	2300	800	800	2200	410	120
ANPU-40-AM-2	5500	2100	2700	490	600	561	566	2600	900	800	2500	410	140
ANPU-50-AM-2	6600	2200	3000	640	600	561	566	2900	900	800	2800	410	140
ANPU-60-AM-2	6700	2500	3000	560	650	616	621	2900	900	800	2800	410	140
ANPU-70-AM-2	6800	2800	3000	405	740	725	730	2900	1000	1000	2800	410	140
ANPU-80-AM-2	7000	2950	3000	405	740	725	730	2900	1000	1000	2800	410	140

Note:

1. All dimensions are in mm.
2. All dimensions are subject to change without notice.
3. All dimensions indicated are for front discharge only.
4. Top discharge units are also available as special request.
5. Fan installation for single and double fan applications are illustrated for front discharge models.
6. Refrigerator and water piping connections for vertical, air-cooled and water-cooled models are also applicable to horizontal units.
7. Unit width (C) will vary according to the electric heating element capacity requirements

TABLE 62	AIR COOLED ROOF TOP PACKAGED UNITS (WITH MIXING BOX) ELECTRICAL DATA							
MODEL	COMPRESSOR		EVAPORATOR FAN MOTOR		CONDENSER FAN MOTOR		TOTAL	
	INPUT (KW)	AMPS.	HP	FLA	NOxHP	FLA	POWER (KW)	AMPS.
ANPU-5-AM-1	4.2	7.7	0.75	1.7	1x1.5	3.2	5.9	12.6
ANPU-8-AM-1	7.4	13.7	2	4	1x4.0	7.7	11.9	25.4
ANPU-10-AM-1	9.9	18.0	2	4	1x4.0	7.7	14.4	29.7
ANPU-15-AM-1	13.3	24.6	4	7.5	2x4.0	15.4	22.2	47.5
ANPU-20-AM-1	15.2	26.8	5.5	8.8	2x4.0	15.4	25.3	51.0
ANPU-25-AM-1	19.6	33.7	5.5	8.8	4x1.5	12.8	28.2	55.3
ANPU-30-AM-1	23.6	39.0	7.5	12.2	5x1.5	16.0	34.8	67.2
ANPU-35-AM-1	30.2	53.3	7.5	12.2	5x1.5	16.0	41.4	81.5
ANPU-40-AM-1	35.8	58.4	10	16.5	4x4.0	30.8	55.2	105.7
ANPU-10-AM-2	8.4	15.4	2	4	1x4.0	7.7	12.9	27.1
ANPU-15-AM-2	14.8	27.4	4	7.5	1x4.0	7.7	20.8	42.6
ANPU-20-AM-2	19.8	36.0	5.5	8.8	2x4.0	15.4	29.9	60.2
ANPU-30-AM-2	26.6	49.2	7.5	12.2	4x1.5	12.8	36.7	74.2
ANPU-40-AM-2	30.4	53.6	10	16.5	4x4.0	30.8	49.8	100.9
ANPU-50-AM-2	39.2	67.4	15	23.8	6x4.0	46.2	68.3	137.4
ANPU-60-AM-2	47.2	78.0	15	23.8	6x4.0	46.2	76.3	148.0
ANPU-70-AM-2	60.4	106.6	15	23.8	6x4.0	46.2	89.5	176.6
ANPU-80-AM-2	71.6	116.8	20	32	6x4.0	46.2	104.4	195.0

Note:

1. Compressor circuit breakers are current sensitive and temperature compensated to ensure compressor cutoff if current draw becomes excessive. Breakers must be reset manually.
2. Internal protection with automatic reset de-energizes the control circuit if extreme compressor motor temperature should occur from excessive return gas temperature or motor overloading.
3. High and low pressure controls, automatically shut off compressor(s) if refrigerant pressure exceed switch settings. This action protects compressor against loss of charge or damaged caused by excessive pressures.
4. All data are based on 125 °F condensing, 45 °F evaporating & 95 °F ambient air temperature.
5. 5- All compressors are 380/420 Volts-3 phase-50 cycles.

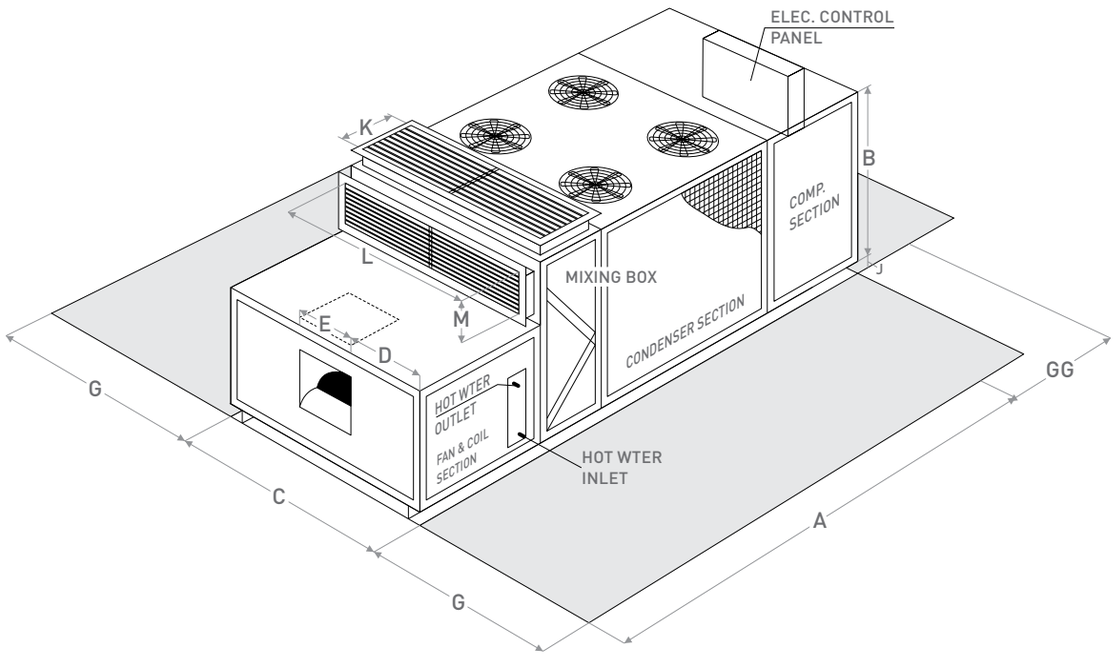


FIGURE 11. SINGLE FAN TYPE

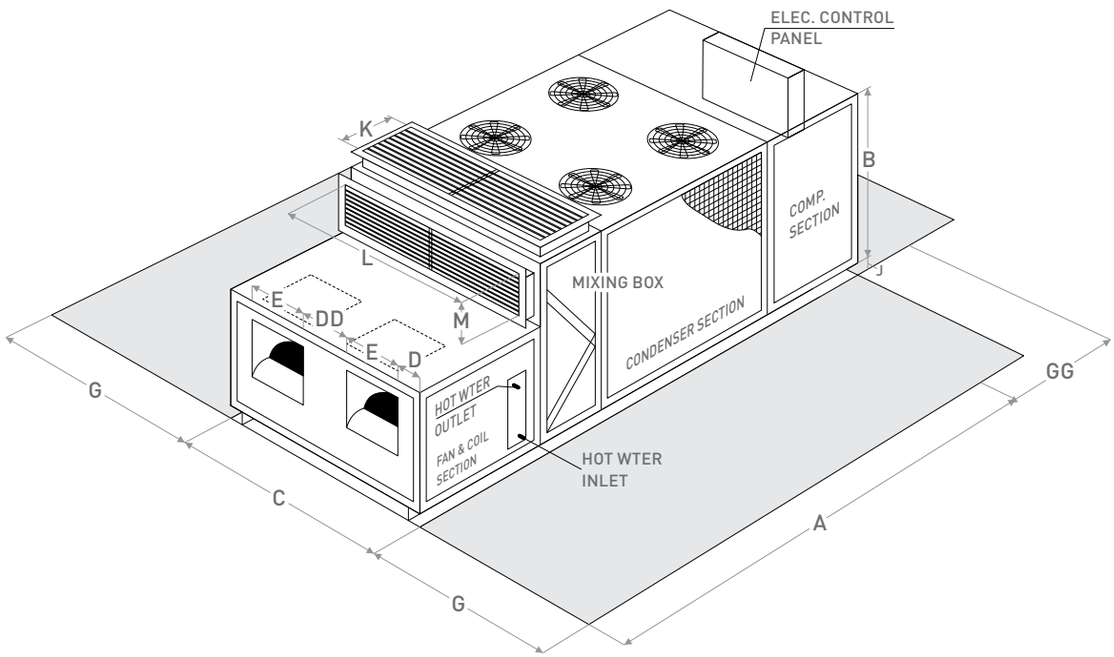


FIGURE 12. DOUBLE FAN TYPE

TABLE 63	PIPE SIZING* FOR SPLIT TYPE AIR COOLED CONDENSER									
Leq**	32 ft (10m)		64 ft (20m)		96 ft (30m)		120 ft (40m)		160 ft (50m)	
Model	Discharge	liquid	Discharge	liquid	Discharge	liquid	Discharge	liquid	Discharge	liquid
ANPU-5-A-1	3/4"	1/2"	7/8"	1/2"	7/8"	1/2"	7/8"	5/8"	7/8"	5/8"
ANPU-8-A-1	7/8"	1/2"	11/8"	5/8"	11/8"	5/8"	11/8"	3/4"	11/8"	3/4"
ANPU-10-A-1	7/8"	5/8"	11/8"	5/8"	11/8"	5/8"	11/8"	3/4"	11/8"	3/4"
ANPU-15-A-1	11/8"	5/8"	11/8"	3/4"	13/8"	3/4"	13/8"	7/8"	13/8"	7/8"
ANPU-20-A-1	11/8"	5/8"	11/8"	3/4"	13/8"	3/4"	13/8"	7/8"	13/8"	7/8"
ANPU-25-A-1	11/8"	3/4"	13/8"	7/8"	1 3/8"	7/8"	1 15/8"	1 1/8"	1 5/8"	1/8"
ANPU-30-A-1	11/8"	3/4"	13/8"	7/8"	1 15/8"	1 1/8"	1 5/8"	1 1/8"	1 5/8"	1/8"
ANPU-35-A-1	13/8"	7/8"	13/8"	7/8"	1 5/8"	1 1/8"	1 5/8"	1 1/8"	1 5/8"	1/8"
ANPU-40-A-1	13/8"	7/8"	15/8" 1	1/8"2	2 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 3/8"
ANPU-10-A-2	2x3/4"	2x1/2"	2x7/8"	2x1/2"	2x7/8"	2x1/2"	2x7/8"	2x3/4"	2x7/8"	2x5/8"
ANPU-15-A-2	2x7/8"	2x1/2"	2x11/8"	2x5/8"	2x11/8"	2x5/8"	2x11/8"	2x3/4"	2x11/8"	2x3/4"
ANPU-20-A-2	2x7/8"	2x5/8"	2x11/8"	2x5/8"	2x11/8"	2x5/8"	2x11/8"	2x7/8"	2x11/8"	2x3/4"
ANPU-30-A-2	2x11/8"	2x5/8"	2x11/8"	2x3/4"	2x13/8"	2x3/4"	2x13/8"	2x7/8"	2x13/8"	2x7/8"
ANPU-40-A-2	2x11/8"	2x5/8"	2x11/8"	2x3/4"	2x13/8"	2x3/4"	2x13/8"	2x7/8"	2x11/3"	2x7/8"
ANPU-50-A-2	2x11/8"	2x3/4"	2x11/8"	2x7/8"	2x13/8"	2x7/8"	2x15/8"	2x11/8"	2x15/8"	2x11/8"
ANPU-60-A-2	2x11/8"	2x3/4"	2x13/8"	2x7/8"	2x15/8"	2x11/8"	2x15/8"	2x11/8"	2x15/8"	2x11/8"
ANPU-70-A-2	2x13/8"	2x7/8"	2x13/8"	2x7/8"	2x15/8"	2x11/8"	2x15/8"	2x11/8"	2x15/8"	2x11/8"
ANPU-80-A-2	2x13/8"	2x7/8"	2x15/8"	2x11/8"	2x21/8"	2x11/8"	2x21/8"	2x11/8"	2x21/8"	2x13/8"

*All pipe size at standard condition (CT =125 °F, FV = 500 FPM, EWB = 67 °F)
** Leq = Equivalent length of pipe from package to condenser ft (meter)

TABLE 64	EQUIVALENT LENGTH IN PIPE DIAMETERS (Leq / D*) OF VARIOS AND FITTINGS		
DESCRIPTION OF PRODUCT			EQUIVALENT LENGTH IN PIPE DIAMETERS (L/D)
Fittings	90 Degree standard elbow		30
	45 Degree standard elbow		16
	90 Degree long radius elbow		20
	90 Degree street elbow		50
	45 Degree street elbow		26
	Square corner elbow		57
	Standard tee (with ow throgh run)		20
	Standard tee (with ow throgh branch)		60
Check Valves	Close pattern return bend		50
	Conventional swing	0.5 T ... Fully open	135
	Clearway swing	0.5 T ... Fully open	50
	Globe lift or stop; Y-pattern	0.2 T ... Fully open	175
	Angle lift or stop	0.2 T ... Fully open	200
	in line ball	2.5 vertical and 0.25 horizontal T ... Fully open	150

*Leq = Equivalent length (feet)
D = Interrnal diameter of pipe (feet)

† Minimum calculated pressure differential (psi) across the valve to fully lift the disc.

Remote Air Cooled Condenser Notes:

1. Refrigerant piping design must accommodate the flow of both refrigerant and oil. Proper return of oil to the crankcase is accomplished by ensuring a minimum refrigerant velocity not less than 500 fpm in horizontal lines and not less than 1500 fpm in vertical refrigerant risers. Horizontal refrigerant lines must be pitched in the direction of refrigerant flow.
2. Copper tubing installed in remote air cooled condenser systems should be entirely free of dirt, scale, and oxides. The liquid line from the condenser should be maintained dry.
3. Current practice limits the maximum pressure drop in liquid lines corresponding to a change of saturated temperature ΔTsuc = 1 °F as 3.05 psi at a condensing temperature of 105 °F.

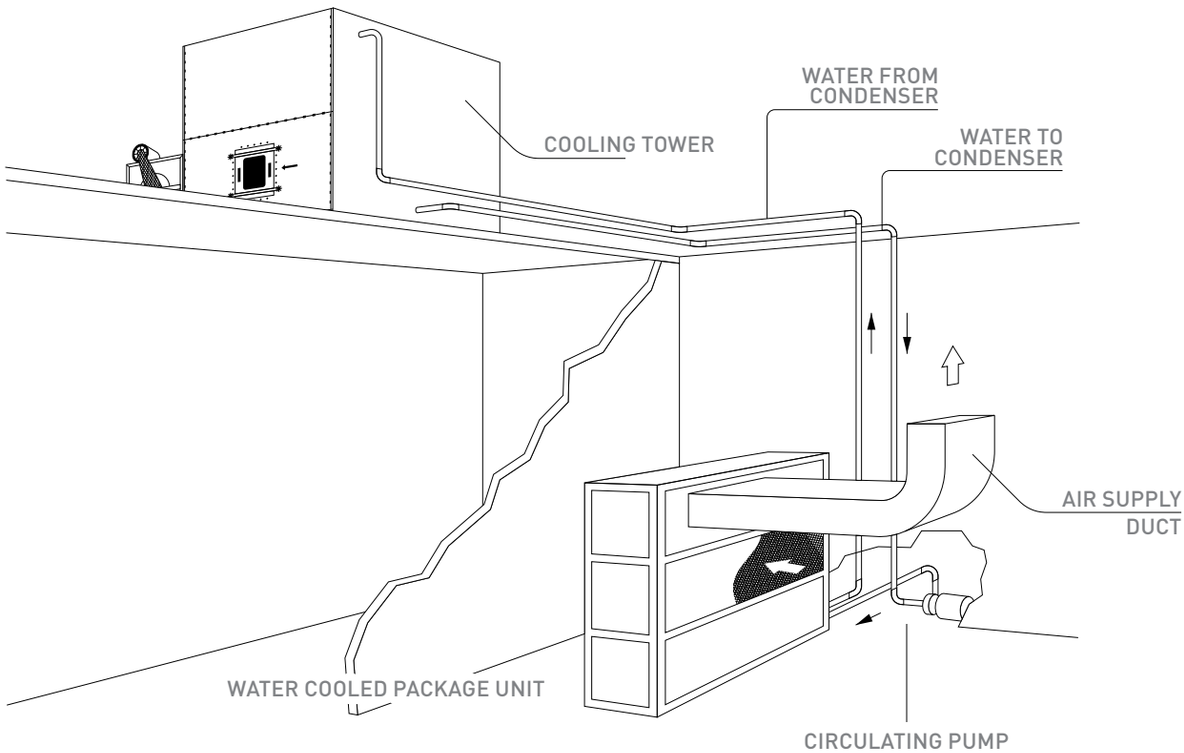


FIGURE 13.
WATER COOLED CONDENSER PIPING DETAIL

The above diagram is intended as a general guideline for connection points and equipment arrangement for water cooled condenser applications and is not a proposed detail for a specific installation. All piping and duct work must follow standard techniques and all wiring must comply with applicable codes.

Note:

1. when vertical lift exceeds 7.5 meters, install oil traps at every 6 meters.
2. Discharge check valves must be installed on remote air-cooled condenser applications to prevent refrigerant migration during off cycle.
3. "Over Traps" on top of risers must not be less than 150 mm.
4. Oil separators are mandatory on systems where distance between packaged unit and remote aircooled condenser exceeds 20 meters.

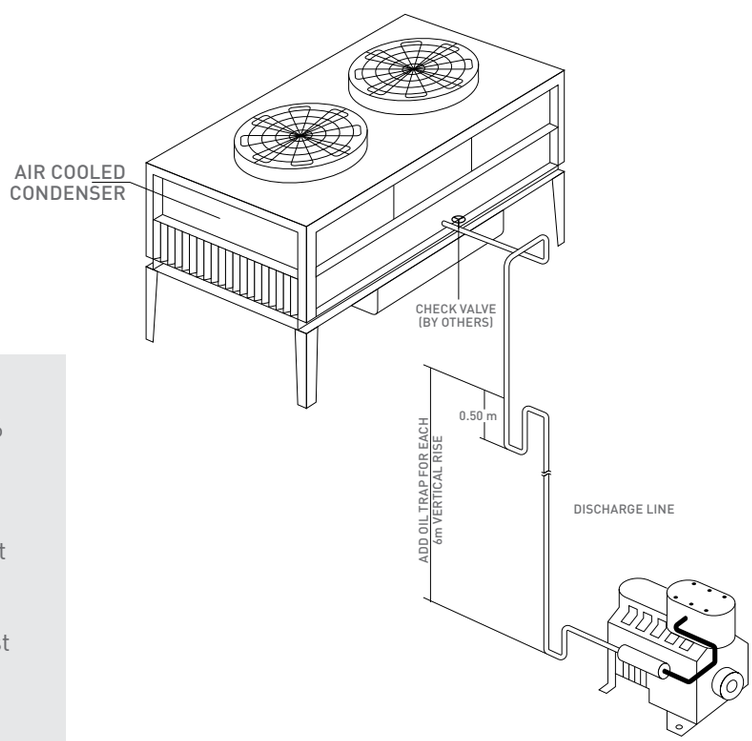
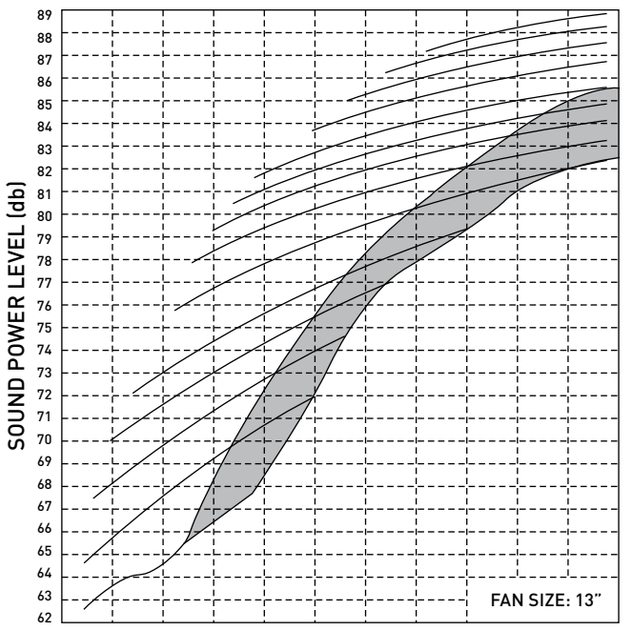
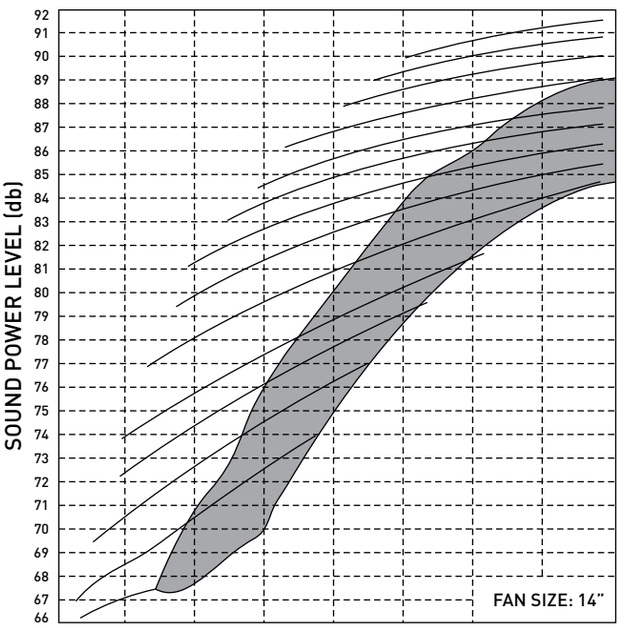


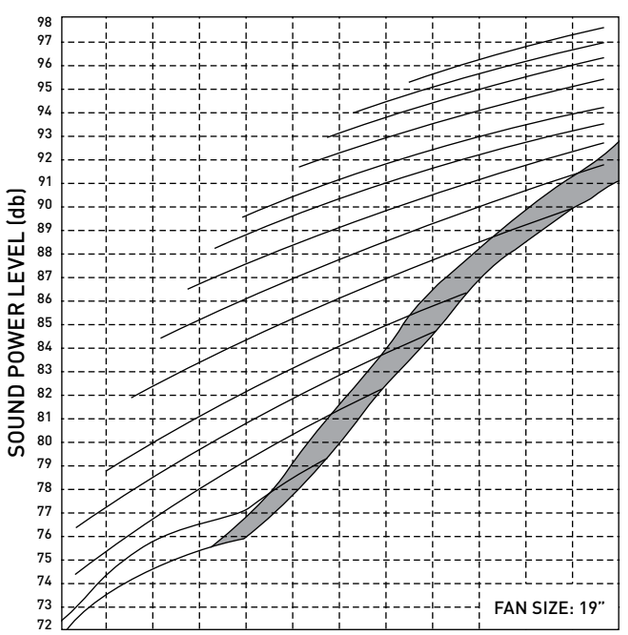
FIGURE 14. DISCHARGE PIPING CONNECTIONS TO REMOTE AIR COOLED CONDENSER



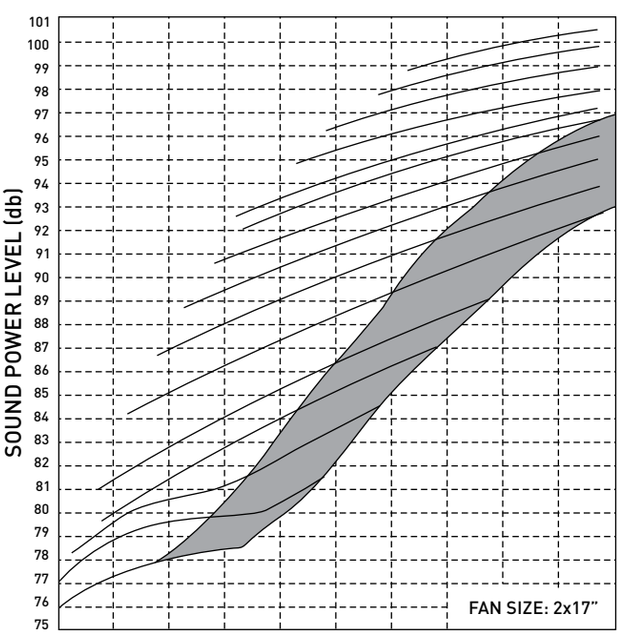
Volumetric air flow rate(CFM)
ANPU-W,A-5-1



Volumetric air flow rate(CFM)
ANPU-W,A-8-1
ANPU-W,A-10-1
ANPU-W,A-10-2



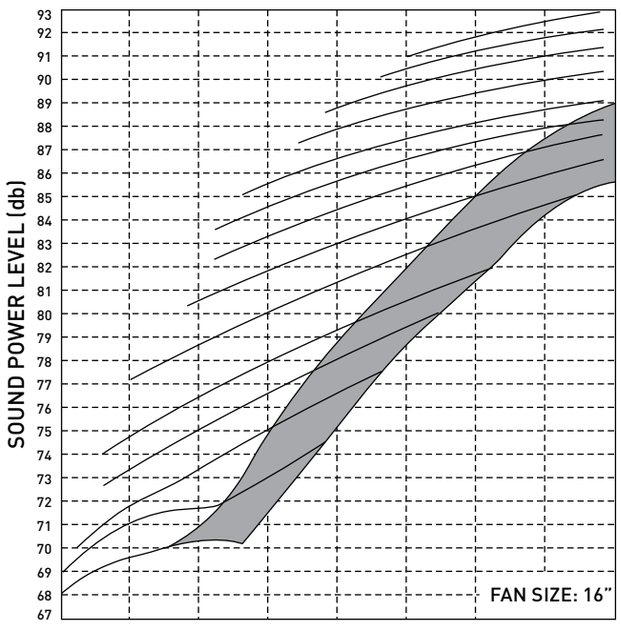
Volumetric air flow rate(CFM)
ANPU-W,A-25-1



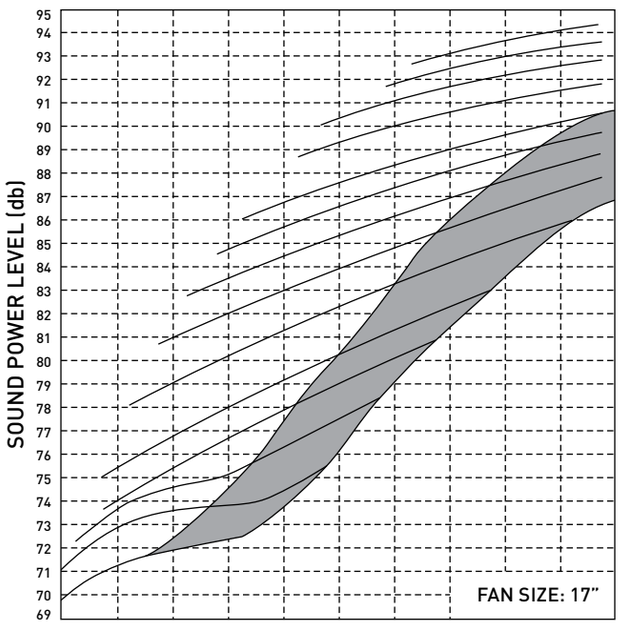
Volumetric air flow rate(CFM)
ANPU-W,A-30-1 ANPU-W,A-35-1
ANPU-W,A-30-2 ANPU-W,A-40-2
ANPU-W,A-50-2

Note:

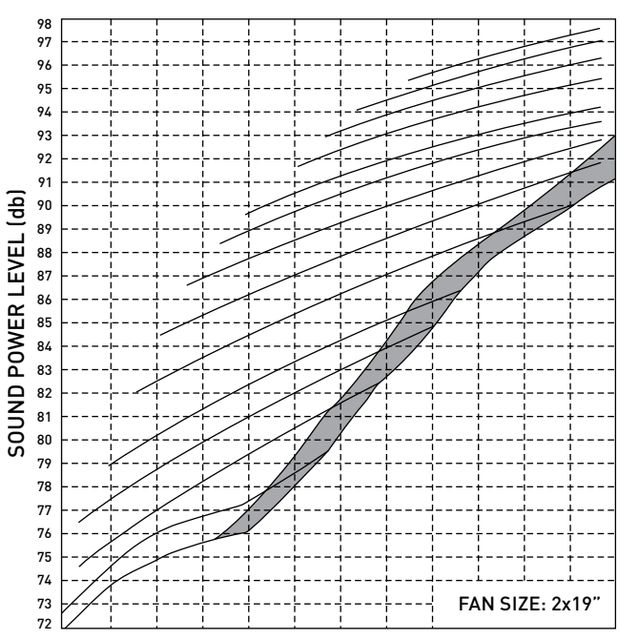
1. When sound power level falls within the shaded area,add 3 to 6 db to the given sound power level from left to right boundary respectively.
2. Sound ratings are based on a distance of 1m from the unit



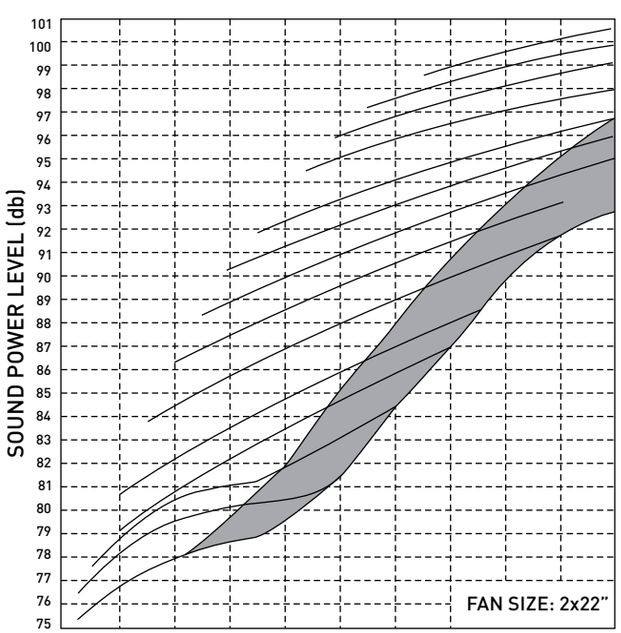
Volumetric air flow rate(CFM)
ANPU-W,A-15-1
ANPU-W,A-15-2



Volumetric air flow rate(CFM)
ANPU-W,A-20-1
ANPU-W,A-20-2



Volumetric air flow rate(CFM)
ANPU-W,A-60-2



Volumetric air flow rate(CFM)
ANPU-W,A-70-2
ANPU-W,A-80-2

Note:

1. When sound power level falls within the shaded area, add 3 to 6 db to the given
2. sound power level from left to right boundary respectively.
3. Sound ratings are based on a distance of 1m from the unit

Table 65 ENTHALPY vs. ALTITUDE						
Wet Bulb Temp. °F	Altitude					
	0	1000 (ft.)	2000 (ft.)	3000 (ft.)	4000 (ft.)	5000 (ft.)
	0	315 (m)	625 (m)	940 (m)	1250 (m)	1560 (m)
	Enthalpy of Air (Btu/lb.)					
35	13.01	13.18	13.36	13.54	13.74	13·94
36	13.44	13.62	13.8	14	14.20	14.41
37	13.87	14.06	14.25	14.46	14.67	14·89
38	14.32	14.51	14.71	14.92	15.14	15·37
39	14.77	14.97	15.18	15.4	15.63	15.87
40	15.23	15.44	15.66	15.89	16.12	16·37
41	15.7	15.92	16.14	16.38	16.63	16·89
42	16.17	16.42	16.64	16.88	17.14	17·41
43	16.66	16.89	17.14	17.39	17.66	17·94
44	17.15	17.39	17.65	17.92	18.20	18·49
45	17.65	17.91	18.17	18.45	18.74	19·04
46	18.16	18.43	18.7	18.99	19.29	19·61
47	18.68	18.96	19.25	19.55	19.86	20·19
48	19.21	19.5	19.8	20.11	20.44	20·78
49	19.75	20.05	20.36	20.69	21.03	21·38
50	20.30	20.61	20.94	21.27	21.63	22·00
51	20.86	21.19	21.52	21.87	22.24	22·62
52	21.44	21.77	22.12	22.49	22.87	23·27
53	22.02	22.37	22.73	23.11	23.51	23·92
54	22.62	22.98	23.36	23.75	24.16	24·59
55	23.22	23.6	23.99	24.4	24.83	25.28
56	23.84	24.24	24.64	25.07	25.51	25·98
57	24.48	24.88	25.31	25.75	26.21	26·69
58	25.12	25.55	25.99	26.44	26.92	27·42
59	25.78	26.22	26.68	27.15	27.65	28·17
60	26.46	26.92	27.39	27.88	28.40	28·94
61	27.15	27.62	28.11	28.62	29.16	29·72
62	27.85	28.34	28.85	29.39	29.94	30·52
63	28.57	29.08	29.61	30.16	30.74	31·35
64	29.31	29.84	30.39	30.96	31.56	32·19
65	30.06	30.61	31.18	31.77	32.39	33·05
66	30.83	31.4	31.99	32.61	33.25	33·93
67	31.62	32.21	32.82	33.46	34.13	34·83
68	32.42	33.03	33.67	34.33	35.03	35·75
69	33.25	33.88	34.54	35.32	35.95	36·70
70	34.09	34.74	35.43	36.14	36.89	37·67
71	34.95	35.63	36.34	37.08	37.85	38·67
72	35.83	36.54	37.27	38.04	38.84	39·69
73	36.74	37.46	38.23	39.02	39.86	40·73
74	37.66	38.42	39.2	40.03	40.89	41·80
75	38.61	39.39	40.21	41.06	41.96	42·90
76	39.57	40.39	41.23	42.12	43.05	44·02
77	40.57	41.41	42.29	43.21	44.17	45·18
78	41.58	42.45	43.36	44.32	45.32	46·36
79	42.62	43.53	44.47	45.46	46.49	47·58
80	43.69	44.62	45.6	46.63	47.70	48·83
81	44.78	45.75	46.76	47.83	48.94	50·10
82	45.9	46.91	47.95	49.05	50.21	51·42
83	47.04	48.09	49.18	50.32	51.51	52·76
84	48.22	49.3	50.43	51.61	52.85	54·15
85	49.43	50.33	51.71	52.94	54.22	55·57

Cont.Table 65 DENSITY vs. ALTITUDE		
Altitude Feet (meters)	Density	
	lb./ft.3	Ratio
0	0.075	1.000
500 (156)	0.0737	0.982
1000 (315)	0.0724	0.96
1500 (469)	0.0710	0.947
2000 (625)	0.0697	0.930
2500 (781)	0.0685	0.913
3000 (940)	0.0672	0.896
3500 (1094)	0.0660	0.880
4000 (1250)	0.0648	0.864
4500 (1400)	0.0636	0.848
5000 (1560)	0.0624	0.832
5500 (1720)	0.0613	0.817
6000 (1875)	0.0601	0.801
6500 (2031)	0.0590	0.786
7000 (2190)	0.0579	0.772
7500 (2344)	0.0568	0.757
8000 (2500)	0.0557	0.743
8500 (2656)	0.0547	0.729
9000 (2813)	0.0536	0.715
9500 (2970)	0.0526	0.701
10000 (3125)	0.0516	0.688

GENERAL

Furnish and install AzarNasim Packaged Air Conditioning unit(s) utilizing reciprocating industrial-duty semi-hermetic compressor(s). Unit shall supply air through ductwork based on the schedule of capacities as shown on the contract drawings and the following specifications.

The unit shall consist of serviceable semi-hermetic compressors(s), coil section complete with directexpasion coil, condensate drain pan, liquid receiver, filter rack, fan section, factory wiring, and controls. A holding charge of (R-22) shall be furnished. All units shall be rated to ARI Standards 310 and 360.

CASINGS

The enclosure shall be of heavy gage galvanized steel sheet panels, cleaned and finished with baked enamel. The inside of the panels shall be completely insulated with 19 mm rock wool panel with aluminum foil cover. Panels shall be removable for access to the components.

FAN SECTION

Double-inlet centrifugal fan wheel with forward curved blades shall be designed for continuous operation at maximum fan speed. Fan wheel shall be constructed of galvanized steel sheets and shall be statically and dynamically balanced for smooth running and quiet operation.

Fan shall be belt driven and mounted on a solid steel shaft with greasable ball bearings. Fan shaft shall be phosphatized.

FAN MOTOR

The electric motor shall be totally enclosed, fan cooled motor selected to match the fan bhp. The motor shall operate at 1450 rpm suitable for 380 volts, 3 phase and 50 cycle operation. Fan motor shall have V-Belt driven, with oversized V-Belt for long lift. The motor base shall be adjustable for belt tension control. The driven shall incorporate multiroove sheave and pulley.

COOLING COIL

The cooling coil shall be multi-row, direct expansion type, designed and tested in accordance with ANSI/ASHRAE 15 Safety Code for Mechanical Refrigeration. Primary surface is 5/8" (16mm) O.D. seamless copper tube with all joints brazed. Secondary surface shall be aluminum/copper fin plates in spacings of 8/14 fins per inch. A filter frame designed to accept standard 2" cleanable aluminum mesh filter shall be installed upstream of the DX-Cooling Coil.

HEATING COIL

Hot water heating coils shall be factory tested for leakage at 350 psig air pressure with the coil submerged in water. Electric heating coil shall be constructed of stainless steel heating elements and interlocked with the supply fan.

CONDENSATE PAN

Condensate pan shall be of heavy gage galvanized steel sheet with a coating of bitumen. The pan shall be equipped with drain connection.

CONDENSER (Water Cooled Only)

The condenser shall be shell and tube type with removable steel heads. The tubes shall be integrally finned copper tubes. The tubes shall be designed for a working pressure of 250 psig and tested in accordance with ASME Section VIII, Div. 1 code requirements.

Each condenser shall be constructed to provide subcooling of the liquid refrigerant. The condenser shall be equipped with a safety relief valve mounted on the shell for safe operation.

CONDENSER COIL (Air Cooled Only)

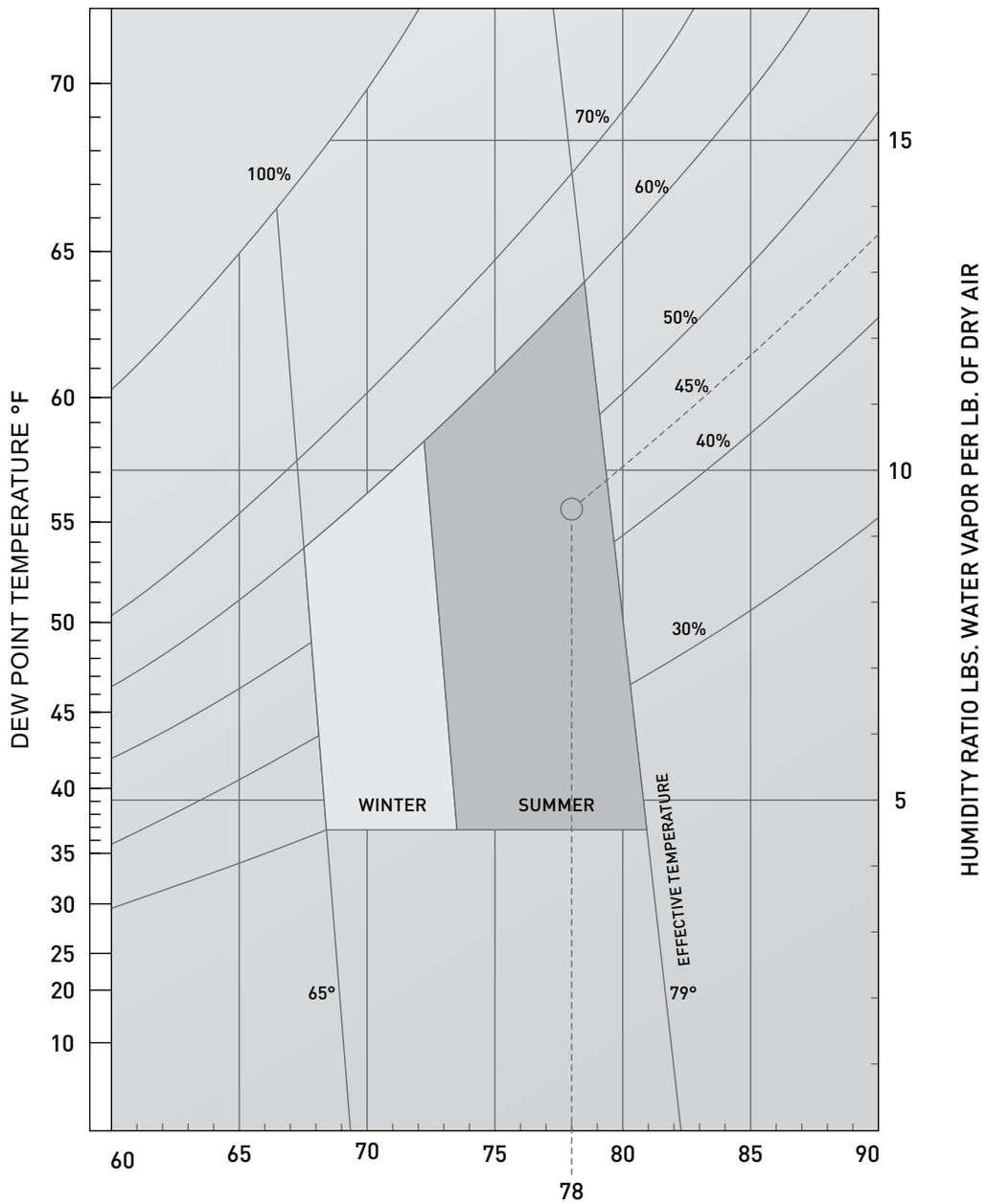
Air cooled condenser coils shall be rated according to ARI 460 and constructed 5/8" O.D. seamless copper tube with secondary surface consisting of a choice of aluminum/copper fin plates in spacings of 8/14 fins per inch.

REFRIGERATION CIRCUIT

Refrigeration control provided by thermal expansion valve. Sight glass shall be installed upstream of the expansion valve. All models shall be equipped with back seating shutoff valve in liquid lines. Filter-drier and operating charge of R-22 shall be standard.

RECEIVER
Liquid refrigerant receiver shall be sized to hold refrigerant charge on pump down application as per ASHRAE 15 and designed, fabricated, and tested to ASME Section VIII, Div. 1 requirements.

CONTROLS AND SAFETIES
All control circuits shall be 220V-50Hz-single phase. A single/multi stage thermostat shall provide capac-ity modulation by cycling compressor(s) ON/OFF along with control of condenser fan(s). An electrical interlock for remote condenser fan shall be provided. Contactors plus overload protections shall be provided for all motors.
The compressor shall be provided with the following controls: high pressure, low pressure, overtemperature, overcurrent, and short cycle in addition to oil pressure safety cut out.



AIR DRY TEMPERATURE °F

Research conducted over 50 years by ASHREA was consolidated in the 1993 edition of the ASHREA Handbook of Fundamentals. It shows that during the summer months, the majority of the population is most comfortable between temperatures of 74 and 80°F with coincident relative humidities between 25 and 60%. The center of that comfort zone - the most comfortable point for the majority of the population - is 78°F and 45% rh.

Note:

AIR HANDLING UNIT

AzarNasim
HVAC SYSTEMS

Features

In all Azar Nasim air handling units the frames are made from aluminum profiles while the chassis and body panels are made from galvanized steel sheets in appropriate thicknesses. Azar Nasim air handling units are manufactured in some features of which are offered below. All units are completely painted in the proper thickness.

1. **Fan section:**
   In this section double width-double inlet centrifugal fans with forward curved blades are normally used for low pressure downfall requirements as opposed to fans with backward curved blades which are for high pressure downfall applications. Fans and housings are made of galvanized steel each set offaplus other related components such as shafts are statically and dynamically balanced, shafts are selected from proper material and size.Other power transmission components such as pulleys and belts are also suitably chosen depending on the required fan speed and electric motor power. Fan(s) and the corresponding electric motor(s) are installed on an independent chassis which is itself installed on the main chassis using vibration dampers in order to eliminate transfer of vibrations to the structure. To further reduction the effects of vibrations, fan outlet (s) are also connected to the structure via flexible material such as canvas. Where an air washer section is included, the blower electric motor is installed outside of this section to prevent adverse effects of moisture. In other cases, blower electric motor is installed in the fan section. All 380V/30/50hz electricmotors are selected with insulation class of (f) and ingress protection of (ip -54). Electricmotors with ingress protection of (ip-55) are also available upon request.

2. **Coil section:**
   This section may include cooling and heating coils or either one of the two depending on the Requirement.
   Cooling coils are available in two types of chilled water and direct expansion (D.X.) As per client's requirements. The chilled water coils are constructed of 5/8"O.D copper tubes plate finned (8, 10, 12 or 14 fpi) in aluminum or copper upon request. The DX Coils are constructed of 3/8" OD copper tubes also plate finned (10, 12 or 14 fpi) in aluminum or copper as required. The chilled water for cooling coils is to be supplied by a water chiller and in the D.X. coils cooling is provided through the use of refrigerant such as R-22, R- 407c or R-134a.
   Chilled water coils may be requested in 4, 6 & 8 rows and as to the D.X. coils; they are available in 4 or 6 rows configurations.
   Heating coils are available in two types of hot water and steam. The hot water coil just like chilled water coil is offered in 1, 2, 3 & 4-row configurations. Steam heating coils are constructed of 1/2" seamless steel pipe spiral finned in aluminum or copper. Coils in 1&2 -row configurations are available upon request.
3. **Mixing box section:**
   This section is where the fresh and return air streams are mixed. An independent air damper is included for each air stream. Dampers are manufactured from aluminum in opposed blade configuration and air sealed through the use of rubber strip gasket.

Damper actuators maybe easily installed when required. 2 inches Washable aluminum filter modules are arranged in (V) type configuration inside these boxes. Housing for pleated type air filters may also be considered in the mixing box.

4. **Special filter section:**
This section may include pleated or bag filter which are installed as per customer requirements. Efficiency and class of special filters are specified by the client.

Notes:

- Allowable air velocity must be over the special filter section.
- In cases where only pleated filters are required they are easily installed in themixing box and not in the special filter section.

5. **Multi - Zone Section:**
In some cases the air conditioning design of a building defines different zones to be air conditioned, each zone requiring its own air flow rate and air temperature. In these cases instead of using a few air handling units, a multi -zone unit is usually installed. Inthemulti-zone air handling unit, cooling and the heating coils are paralleled with each other which means that some of the air passes over the cooling coil and the remainder passes over the heating coil and at the outlet the result is a mixture of the two which has the suitable temperature for each zone. Inmulti-zone units the cooling coil area is the same size as that of a regular air handling unit while the size of the heating coil is less. For each zone two outlet dampers are installed one which is on the cooling coil side and one that is on the heating coil side active. When outlet damper is open, the other one is close. The same amount, therefore, by adjusting the outlet dampers for each zone, the desired zone temperature is controlled. Number and the effective area of dampers for each zone are dependent on the number of zones and the air flow rate needed for that zone. These aluminum dampers are located either on top or the blank side of this section depending on the type of air handling unit is up blast or horizont al blast discharge. Multi-zone section is usually installed after the fan section and in order to have the proper air flow over the coils air diffuser is also installed. Humidifiers are also installed in this section when required.

Selection procedure

The first parameter to consider in the selection of an air handling unit is the required air flow rate (CFM) therefore,by having the required air flow rate, coil face area and the available nominal air flow rate for the unit, the appropriate model may be chosen.

Notes:

Allowable air velocity over cooling coils is less than 550FPM.In air handling units equipped with air Washers this allowable airvelocity shall be reduced further to less than 500 FPM.

Considering the cooling and heating loads and the entering air conditions. The number of coil rows, pressure drops on both water and air sides and the required model of fan may be determined using the data available in the catalogue. Other components and accessories such as air mixing box, special filters, humidifier, etc. May also be selected from the ccatalogue as needed.

Chilled water Cooling, Hot water Heating

Given:

Required air flow rate = 10000 CFM

Cooling entering air condition = 80 F DB, 67 F WB

Heating entering air condition = 60 F DB

Entering chilled water temp. = 45 F Leaving chilled water temp. = 55 F Entering hot water temp. = 180

F Leaving hot water temp. = 160 F Total cooling load = 480 MBH

Total heating load = 700 MBH Cooling & heating coil FPI = 14

External static pressure drop. = 0.78 In W. G

Maximum coil face velocity = 500 FPM

Filter arrangement = V - type

Considering the required airflow rateincfm and the uninominal airflow rate, model AHU-1000 is chosen. From table 5@ the given cooling capacity and the chilled water temp. A 6-Rows coi l are chosen. (Cooling capacity of the unit is 498 MBH) From table 7@ the given heating capacity and the hot water temp. A 2 - Rows coil are chosen. (Heating capacity of the unit is 726MBH).

Note: Incases where there rquirement for number of fin per inchis not specified, a coil with the least number Of rows with 8, 10, 12 or14FPI which fulfills the requirement is chosen. Preference is usually given to 14 FPI.

- Determine the actual coil face velocity.

$$\text{F.V. Actual} = \frac{\text{CFM}}{\text{F.A}} = \frac{10000}{20} = \textbf{500 F.P.M}$$

- Knowing the actual coil velocity and the coils chosen, determine the total internal air side pressure downfall for the unit. From the table

P.D. Cooling coil = P. D. (Table 17) x C.F. (T able 10A) = 0.85 * 1.45 = 1.19 In W.G

P.D. Heating coil = P. D. (Table 17) x C.F. (Table10A) = 0.22 * 1.45 = 0.32 In W.G

P.D. Filter = 0.099 In W.G

P.D. Accessories= 0.05 + 0.06 = 0.11 In W.G (damper & mixing box from table 18).

Total internal pressure drop (T. I.P .D)

Tot al external pressure drop (T.E.P .D)

T.I.P .D = P.D. Cooling coil + P.D. Heating c o i l + P.D. Filter + P.D. aaccessories

T.I.P .D = 1.19 + 0.32 + 0.099 + 0.11 = 1.719 In W.G

Total static pressure (T.S.P)= T.I.P .D + T.E.P .D = 1.719 + 0.78 = 2.5 In W.G

Therefore, by using table 1 and performing interpolation the required fan size is determined as 22" at the speed of 703 RPM and electric motor power requi rement of 10 HP.

- Determine the water side P.D. (Cooling Coil):

$$\text{Water flow rate (GPM)} = \frac{\text{Total heating load}}{500 \times \Delta T} = \frac{498000}{500 \times 10} =$$

$$\rightarrow \textbf{= 99.6 GM}$$

Water velocity inside the tubes =

$$\rightarrow \frac{\text{Water Flow Rate (GPM)}}{\text{No. of coils} \times \text{No. of circuits } \textbf{(Table 19)}} = 1.235 =$$

$$\rightarrow \frac{\textbf{99.6}}{\textbf{1 × 28}} \textbf{= × 1.235 = 4.39 Ft / Sec}$$

- From table 21consideringthe 6 rows cooling coil, the water v e l o c i t y of 4.39 Ft/Sec the pressure drop is given as 10.52 Ft. W.G.

-Determine the water side pressure drop (Heating Coil):

$$\text{Water flow rate (GPM)} = \frac{\text{Total heating load}}{500 \times \Delta T} = \frac{726000}{500 \times 10} =$$

$$\rightarrow \textbf{= 72.6 GM}$$

Water velocity inside the tubes =

$$\rightarrow \frac{\text{Water Flow Rate (GPM)}}{\text{No. of coils} \times \text{No. of circuits } \textbf{(Table 19)}} = 1.235 =$$

$$\rightarrow \frac{\textbf{72.6}}{\textbf{1 × 28}} \textbf{= × 1.235 = 3.2 Ft / Sec}$$

From Table 21 considering the 2 row heating coil, the water velocity of 3.2 Ft /Sec, the pressure drop is given 2.62 Ft w.g and a.The average water temp, of 170 F correction factor is0.77 theref ore, the actual P.D. is 2.02 Ft W.G.

D.X. COOLING, STEAM HEATING

Given:

Required air flow rate = 9500 CFM
Cooling entering air condition = 80°F DB, 67°F WB
Heating entering air condition = 60°F DB
Total cooling load = 450 MBH
Total heating load = 950 MBH
Cooling coil FPI = 14
Heating coil FPI = 8
Evaporating temperature = 45 °F
Steam pressure = 5 psig
External static pressure downfall. = 0.5 in. WG
Maximum coil face velocity = 500 FPM
Filter arrangement = flat type

Considering the required air flow rate in cfm and the unit available nominal air flow rate, air handling unit model AHU- 1000 is chosen.

- Fromtable 9@ the givenwilling capacity and the evap. temp. a 6-rows chosen (willingcapacity of the units is 471 MBH)
- Fromtable 8@the given heating capacity and the steampressure of 5psig, a 2-rows heating coil is chosen. (Heating capacity of the unit is 980MBH)

Determine the actual coil face velocity.

$$\text{Actual F.V.} = \frac{\text{CFM}}{\text{F.A}} = \frac{9500}{20} = \textbf{475 F.P.M}$$

Referring to the correction factors in table12, the cooling and the heating capacity correction factors are given as 0.97 And 0.98 Respectively.

- Corrected cooling capacity = 471x0.97= 456.8 MBH
- Corrected heating capacity= 980x0.98= 960.4MBH

Therefore, the chosen cooling and heating coils fulfill the requirements.

- Knowing the actual coil face velocity and the coils chosen, determine the total internal air side pressure drop for the unit.

P.D. DX coil = P.D. (Table 17) x C.F. (Table 17A) =→
→ 0.79 x 1.45 = 1.15 in W.G

P.D. Heating coil = P.D. (Table 17) x C.F. →
→ (Table 10A) = 0.21 x 1 = 0.21 in W.G
P.D. Filter = 0.09 in W.G (table 9)

P.D. Accessories = 0.05 in W.G (Table 18) →
→ Total internal pressure d downfall. (T. I.P .D)→
→ Tot al external pressure downfall (T.E.P.D)

T.I.P.D = P.D. DX Coil + P.D. Heating coil+ →
→ P. D. Filter accessories = →
→ 1.15 + 0.2 + 0.09 + 0.05 = 1.5 in W.G

Total static pressure(T .S.P) = T.I.P .D + T.E.P .D→
→=1.5 +0.5 = 2 in W.G

Therefore, by using table18 and performing interpolation the required fan size is determined as22" At the speed of 629 RPM and electric motor power requirement of 7.5 HP.

Table 1

Model	Fan Size	Coil Face area sq.ft²	FPM	CFM	Total static pressure in inches of water											
					0.5"		0.75"		1"		1.25"		1.5"		2"	
					RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
AHU 250	1 × 14"	5	400	2000	515	0.5	614	0.5	702	0.75	—	—	—	—	—	—
			450	2250	536	0.5	623	0.75	709	0.75	—	—	—	—	—	—
			500	2500	561	0.5	639	0.75	714	0.75	784	1	865	1.5	—	—
			550	2750	583	0.75	654	0.75	726	1	793	1.5	868	1.5	—	—
			600	3000	609	0.75	677	1	742	1	806	1.5	872	1.5	998	2
			700	3500	662	1	726	1.5	783	1.5	842	1.5	896	2	1005	3
			800	4000	717	1.5	780	1.5	837	2	886	2	933	3	1030	3
AHU 350	1 × 16"	7	400	2800	478	0.5	554	0.75	632	1	708	1.5	785	1.5		
			450	3150	501	0.75	570	1	637	1.5	707	1.5	777	1.5	908	3
			500	3500	526	1	589	1	650	1.5	711	1.5	774	2	898	3
			550	3850	553	1	613	1.5	668	1.5	723	2	780	2	892	3
			600	4200	580	1.5	639	1.5	691	2	742	2	791	3	893	4
			700	4900	—	—	691	2	741	3	786	3	830	3	617	4
			800	5600	—	—	746	3	794	3	837	4	878	4	955	4
AHU 500	1 × 17"	10	400	4000	454	1	515	1	571	1.5	631	1.5	692	2	803	3
			450	4500	478	1.5	539	1.5	592	1.5	641	2	693	2	798	3
			500	5000	535	1.5	566	1.5	610	2	656	3	702	3	798	4
			550	5500	541	1.5	591	2	636	3	682	3	722	3	803	4
			600	6000	—	—	621	2	665	3	732	4	723	3	818	4
			700	7000	—	—	677	3	721	4	757	4	796	5.5	858	5.5
			800	8000	—	—	—	—	778	5.5	818	5.5	848	5.5	914	5.5
AHU 700	1 × 19"	15	400	6000	414	1.5	474	1.5	530	2	543	3	648	3	748	4
			450	6750	436	1.5	491	2	542	3	593	3	645	3	750	4
			500	7500	—	—	512	3	560	3	605	3	651	4	755	5.5
			550	8200	—	—	533	3	580	4	621	4	664	4	757	5.5
			600	9000	—	—	557	4	601	4	642	4	681	5.5	757	5.5
			700	10500	—	—	—	—	646	5.5	684	5.5	722	7.5	791	7.5
			800	12000	—	—	—	—	—	—	729	7.5	763	10	888	10
AHU 1000	1 × 22"	20	400	8000	353	2	401	3	448	3	497	4	545	4	627	5.5
			450	9000	373	3	418	3	459	4	502	4	548	5.5	630	7.5
			500	10000	395	3	436	4	475	4	513	5.5	551	5.5	638	7.5
			550	11000	417	4	457	4	493	5.5	528	5.5	563	7.5	640	7.5
			600	12000	—	—	478	5.5	512	5.5	546	7.5	577	7.5	641	10
			700	14000	—	—	525	7.5	554	7.5	585	10	614	10	669	15
			800	16000	—	—	—	—	601	15	628	15	655	15	705	15
AHU 1200	1 × 22"	25	400	10000	318	3	357	3	394	4	443	4	482	5.5	563	7.5
			450	11250	339	3	373	4	405	4	450	5.5	484	5.5	555	7.5
			500	12500	358	4	391	5.5	422	5.5	483	5.5	493	7.5	554	10
			550	13750	380	5.5	428	5.5	440	7.5	478	7.5	500	7.5	560	10
			600	15000	386	5.5	432	7.5	459	7.5	496	10	522	10	572	15
			700	17500	—	—	474	10	499	10	533	15	554	15	600	15
			800	20000	—	—	—	—	542	15	574	15	596	20	636	20
AHU 1500	1 × 26"	30	400	12000	326	3	362	4	396	4	430	5.5	464	5.5	536	7.5
			450	13500	349	4	382	5.5	413	5.5	444	7.5	474	7.5	538	10
			500	15000	373	5.5	404	5.5	434	7.5	461	7.5	488	7.5	542	10
			550	16500	—	—	427	7.5	454	7.5	481	10	506	10	555	15
			600	18000	—	—	458	10	477	10	502	10	526	15	571	15
			700	21000	—	—	—	—	524	15	547	15	569	15	610	20
AHU 1700	1 × 26"	35	400	14000	294	4	327	4	358	5.5	389	5.5	422	7.5	489	10
			450	15750	314	5.5	344	5.5	372	7.5	400	7.5	428	7.5	484	10
			500	17500	335	5.5	363	7.5	389	7.5	414	10	439	10	490	15
			550	19250	352	7.5	382	10	405	10	431	10	453	15	500	15
			600	21000	—	—	413	10	425	15	448	15	470	15	512	15
			700	24500	—	—	425	15	466	15	486	20	506	20	534	20

Cont-Table 1

Model	Fan Size	Coil Face area sq.ft²	FPM	CFM	Total static pressure in inches of water											
					0.5"		0.75"		1"		1.25"		1.5"		2"	
					RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
AHU 2000	1 × 29"	40	400	16000	306	5.5	336	5.5	364	7.5	391	7.5	419	10	475	10
			450	18000	329	5.5	357	7.5	383	7.5	408	10	432	10	482	15
			500	20000	—	—	379	10	403	10	427	15	449	15	494	15
			550	22000	—	—	403	15	425	15	447	15	469	15	509	20
			600	24000	—	—	—	—	448	15	469	15	489	20	537	20
			700	28000	—	—	—	—	—	—	514	25	533	25	567	30
AHU 2200	1 × 29"	45	400	18000	260	5.5	289	5.5	317	7.5	344	10	371	10	429	15
			450	20250	278	5.5	305	7.5	330	7.5	354	10	379	10	428	15
			500	22500	296	5.5	322	10	345	10	361	15	390	15	433	15
			550	24750	302	7.5	340	10	363	15	383	15	403	15	443	20
			600	27000	—	—	359	15	381	15	400	15	419	20	456	20
			700	31500	—	—	—	—	415	20	436	25	453	25	486	30
			800	36000	—	—	—	—	—	—	—	—	—	—	—	—
AHU 2500	2 × 22"	50	400	20000	401	2 x 3	442	2 x 4	480	2 x 4	517	2 x 5.5	554	2 x 5.5	629	2 x 7.5
			450	22500	459	2 x 3	468	2 x 5.5	504	2 x 5.5	538	2 x 5.5	571	2 x 7.5	637	2 x 10
			500	25000	—	—	497	2 x 5.5	530	2 x 7.5	562	2 x 7.5	592	2 x 7.5	651	2 x 10
			550	27500	—	—	528	2 x 7.5	557	2 x 10	587	2 x 10	616	2 x 10	672	2 x 15
			600	30000	—	—	—	—	587	2 x 10	615	2 x 10	642	2 x 15	694	2 x 15
			700	35000	—	—	—	—	—	—	675	2 x 15	698	2 x 20	746	2 x 20
			800	40000	—	—	—	—	—	—	—	—	—	—	802	2 x 25
AHU 3000	2 × 26"	60	400	24000	326	2 x 3	362	2 x 4	396	2 x 4	430	2 x 5.5	464	2 x 5.5	536	2 x 7.5
			450	27000	349	2 x 4	382	2 x 5.5	413	2 x 5.5	444	2 x 7.5	474	2 x 7.5	535	2 x 10
			500	30000	373	2 x 5.5	404	2 x 5.5	434	2 x 7.5	461	2 x 7.5	488	2 x 7.5	542	2 x 10
			550	33000	—	—	427	2 x 7.5	454	2 x 7.5	481	2 x 10	506	2 x 10	555	2 x 15
			600	36000	—	—	458	2 x 10	477	2 x 10	502	2 x 10	526	2 x 15	571	2 x 15
			700	42000	—	—	—	—	524	2 x 15	547	2 x 15	569	2 x 15	610	2 x 20
AHU 3500	2 × 29"	70	400	28000	284	2 × 4	317	2 × 4	348	2 × 5.5	379	2 × 5.5	412	2 × 7.5	479	2 × 10
			450	31500	304	2 × 5.5	334	2 × 5.5	362	2 × 7.5	390	2 × 7.5	418	2 × 7.5	474	2 × 10
			500	35000	325	2 × 5.5	353	2 × 7.5	379	2 × 7.5	404	2 × 10	429	2 × 10	480	2 × 15
			550	38500	342	2 × 7.5	371	2 × 10	397	2 × 10	421	2 × 10	443	2 × 15	489	2 × 15
			600	42000	—	—	393	2 × 10	415	2 × 15	438	2 × 15	460	2 × 15	502	2 × 15
			700	49000	—	—	415	2 × 15	456	2 × 15	476	2 × 20	496	2 × 20	534	2 × 20
AHU 4000	2 × 29"	80	400	32000	306	2 x 5.5	336	2 x 5.5	364	2 x 7.5	391	2 x 7.5	419	2 x 10	475	2 x 10
			450	36000	329	2 x 5.5	357	2 x 7.5	383	2 x 7.5	408	2 x 10	432	2 x 10	482	2 x 15
			500	40000	—	—	379	2 x 10	403	2 x 10	427	2 x 15	449	2 x 15	494	2 x 15
			550	44000	—	—	403	2 x 15	425	2 x 15	447	2 x 15	469	2 x 15	509	2 x 20
			600	48000	—	—	—	—	448	2 x 15	469	2 x 15	489	2 x 20	537	2 x 20
			700	56000	—	—	—	—	—	—	514	2 x 25	533	2 x 25	567	2 x 30
AHU 4500	2 × 32"	88	400	35200	260	2 × 5.5	289	2 × 5.5	317	2 × 7.5	344	2 × 10	371	2 × 10	429	2 × 15
			450	39600	278	2 × 5.5	305	2 × 7.5	330	2 × 7.5	354	2 × 10	379	2 × 10	428	2 × 15
			500	44000	296	2 × 5.5	322	2 × 10	345	2 × 10	361	2 × 15	390	2 × 15	433	2 × 15
			550	48400	302	2 × 7.5	340	2 × 10	363	2 × 15	383	2 × 15	403	2 × 15	443	2 × 20
			600	52800	—	—	359	2 × 15	381	2 × 15	400	2 × 10	419	2 × 20	456	2 × 20
			700	61600	—	—	—	—	415	2 × 20	436	2 × 10	453	2 × 25	486	2 × 30

Note: Selections in shaded areas not recommended for cooling applications.

Cont. Table 1

Model	Fan Size	Coil Face area sq.ft²	FPM	CFM	Total static pressure in inches of water											
					2.5"		3"		3.5"		4"		5"		6"	
					RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
AHU 250	1 × 14"	5	450	2000	1334	3	—	—	—	—	—	—	—	—	—	—
				2250												
			500		1323	3	1465	3	—	—	—	—	—	—	—	—
				2500												
			550		1313	3	1449	3	1578	4	—	—	—	—	—	—
				2750												
			600	3000	1317	3	1440	3	1564	4	1577	5.5	—	—	—	—
			700	3500	1349	4	1452	4	1555	4	1661	5.5	—	—	—	—
			800	4000	1409	4	1499	5.5	1586	5.5	1679	5.5	—	—	—	—
AHU 350	1 × 16"	7	400	2800	—	—	—	—	—	—	—	—	—	—	—	—
			450	3150	—	—	—	—								
			500	3500	1118	3	—	—	—	—	—	—	—	—	—	—
			550	3850	1124	4	1223	4								
			600	4200	1136	4	1230	4	1230	5.5	—	—	—	—	—	—
			700	4900	1184	5.5	1263	5.5	1340	7.5	1420	7.5	1578	10	—	—
			800	5600	1247	5.5	1316	7.5	1384	7.5	1452	7.5	1590	10	—	—
AHU 500	1 × 17"	10	400	4000	980	4	—	—	—	—	—	—	—	—	—	—
			450	4500	978	4	1073	5.5	1168	5.5	1252	7.5	—	—	—	—
			500	5000	986	4	1071	5.5	1156	5.5	1242	7.5	—	—	—	—
			550	5500	1005	5.5	1081	5.5	1157	7.5	1235	7.5	1389	10	—	—
			600	6000	1031	5.5	1100	7.5	1169	7.5	1239	10	1383	10	—	—
			700	7000	1095	7.5	1155	10	1214	10	1237	10	1391	15	—	—
			800	8000	1168	10	1222	10	1277	15	1328	15	—	—	—	—
AHU 700	1 × 19"	15	400	6000	860	5.5	947	7.5	—	—	—	—	—	—	—	—
			450	6750	850	5.5	940	7.5	1020	10	—	—	—	—	—	—
			500	7500	840	7.5	930	7.5	1012	10	1089	10	—	—	—	—
			550	8200	833	7.5	920	7.5	1003	10	1081	15	—	—	—	—
			600	9000	834	7.5	913	10	993	10	1070	15	1211	15	—	—
			700	10500	853	10	919	10	986	15	1054	15	1190	20	—	—
			800	12000	889	15	945	15	1002	15	1060	15	1178	20	—	—
AHU 1000	1 × 22"	20	400	8000	—	—	—	—	—	—	—	—	—	—	—	—
			450	9000	711	7.5	—	—	—	—	—	—	—	—	—	—
			500	10000	704	10	778	10	—	—	—	—	—	—	—	—
			550	11000	701	10	771	15	839	15	—	—	—	—	—	—
			600	12000	704	10	768	15	832	15	886	20			—	—
			700	14000	723	15	777	15	836	20	895	20	996	25	—	—
AHU 1200	1 × 22"	25	400	10000	639	7.5	—	—	—	—	—	—	—	—	—	—
			450	11250	628	10	685	10	—	—	—	—				
			500	12500	620	15	682	15	739	15	—	—	—	—	—	—
			550	13750	618	15	675	15	734	20	788	20				
			600	15000	622	15	674	15	727	20	781	25	867	30	955	30
			700	17500	644	20	687	20	730	20	775	25	868	35	945	40
AHU 1500	1 × 26"	30	400	12000	608	10	—	—	—	—	—	—	—	—	—	—
			450	13500	599	10	662	15	—	—	—	—				
			500	15000	597	15	654	15	713	20	—	—	—	—	—	—
			550	16500	604	15	655	15	707	20	759	20				
			600	18000	617	15	662	20	708	20	754	25	851	30	—	—
			700	21000	649	20	688	25	727	25	766	30	846	35	927	40
AHU 1700	1 × 26"	35	400	14000	563	15	—	—	—	—	—	—	—	—	—	—
			450	15750	553	15	614	15	658	20	—	—	—	—		
			500	17500	551	15	605	20	655	20	697	25	—	—	—	—
			550	19250	555	20	702	20	650	25	695	25	719	35		
			600	21000	564	20	604	20	648	25	692	30	778	35	850	50
			700	24500	590	25	625	25	661	30	697	35	770	40	845	50

Cont. Table 1

Model	Fan Size	Coil Face area sq.ft²	FPM	CFM	Total static pressure in inches of water											
					2.5"		3"		3.5"		4"		5"		6"	
					RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
AHU 2000	1 × 29"	40	400	16000	532	15	594	15	—	—	—	—	—	—	—	—
			450	18000	534	15	584	20	634	20	—	—	—	—	—	—
			500	20000	538	20	582	20	629	25	674	25	—	—	—	—
			550	22000	549	20	589	25	630	25	6752	30	756	40	—	—
			600	24000	564	25	601	25	638	30	675	30	751	40	827	50
			700	28000	601	30	633	25	664	35	696	40	758	50	823	60
AHU 2200	1 × 29"	45	400	18000	485	15	534	20	—	—	—	—	—	—	—	—
			450	20250	479	20	529	20	575	25	—	—	—	—	—	—
			500	22500	478	20	524	25	570	25	613	30	—	—	—	—
			550	24750	483	20	523	25	565	30	608	30	—	—	—	—
			600	27000	492	25	528	30	565	30	604	35	680	50	—	—
			700	31500	518	30	549	35	580	40	611	40	675	50	—	—
			800	36000	—	—	—	—	—	—	—	—	—	—	742	60
AHU 2500	2 × 22"	50	400	20000	703	2 x 10	776	2 x 10	—	—	—	—	—	—	—	—
			450	22500	703	2 x 10	769	2 x 15	835	2 x 15	899	2 x 15	—	—	—	—
			500	25000	710	2 x 15	770	2 x 15	830	2 x 15	890	2 x 20	—	—	—	—
			550	27500	725	2 x 15	778	2 x 15	833	2 x 20	886	2 x 20	995	2 x 25	—	—
			600	30000	744	2 x 15	794	2 x 20	742	2 x 20	891	2 x 20	992	2 x 25	1091	2 x 30
			700	35000	791	2 x 20	834	2 x 25	876	2 x 25	918	2 x 25	1002	2 x 30	1087	2 x 35
			—	40000	—	—	—	—	—	—	—	—	—	—	—	—
AHU 3000	2 × 26"	60	400	24000	608	2 x 10	—	—	—	—	—	—	—	—	—	—
			450	27000	599	2 x 10	662	2 x 15	—	—	—	—	—	—	—	—
			500	30000	597	2 x 15	654	2 x 15	713	2 x 20	—	—	—	—	—	—
			550	33000	604	2 x 15	655	2 x 15	707	2 x 20	759	2 x 20	—	—	—	—
			600	36000	617	2 x 15	662	2 x 20	708	2 x 20	754	2 x 25	851	2 x 30		
			700	42000	649	2 x 20	688	2 x 25	727	2 x 25	766	2 x 30	846	2 x 35	927	2 x 40
AHU 3500	2 × 29"	70	400	28000	543	2 × 15	—	—	—	—	—	—	—	—	—	—
			450	31500	533	2 × 15	594	2 × 15	638	2 × 20	—	—	—	—	—	—
			500	35000	531	2 × 15	585	2 × 20	635	2 × 20	677	2 × 25	—	—	—	—
			550	38500	535	2 × 20	681	2 × 20	630	2 × 25	675	2 × 25	759	2 × 35	—	—
			600	42000	544	2 × 20	584	2 × 20	628	2 × 25	672	2 × 30	758	2 × 35	830	2 × 50
			700	49000	570	2 × 25	605	2 × 25	641	2 × 30	677	2 × 35	750	2 × 40	825	2 × 50
AHU 4000	2 × 29"	80	400	32000	534	2 x 15	794	2 x 15	—	—	—	—	—	—	—	—
			450	36000	532	2 x 15	784	2 x 20	634	2 x 20	—	—	—	—	—	—
			500	40000	538	2 x 20	582	2 x 20	629	2 x 25	674	2 x 25	—	—	—	—
			550	44000	549	2 x 20	589	2 x 25	630	2 x 25	672	2 x 30	756	2 x 35	—	—
			600	48000	564	2 x 25	601	2 x 25	638	2 x 30	675	2 x 30	751	2 x 40	827	2 x 50
			700	56000	601	2 x 30	633	2 x 30	664	2 x 35	696	2 x 40	758	2 x 45	823	2 x 60
AHU 4500	2 × 32"	88	400	35200	485	2 × 15	534	2 × 20	—	—	—	—	—	—	—	—
			450	39600	479	2 × 20	529	2 × 20	575	2 × 25	—	—	—	—	—	—
			500	44000	478	2 × 20	524	2 × 25	570	2 × 25	613	2 × 30	—	—	—	—
			550	48400	483	2 × 20	523	2 × 25	565	2 × 30	608	2 × 30	—	—	—	—
			600	52800	492	2 × 25	528	2 × 30	565	2 × 30	604	2 × 35	680	2 × 50	—	—
			700	61600	518	2 × 30	549	2 × 35	580	2 × 40	611	2 × 40	675	2 × 50	741	2 × 60

Note: Selections in shaded areas not recommended for cooling applications.

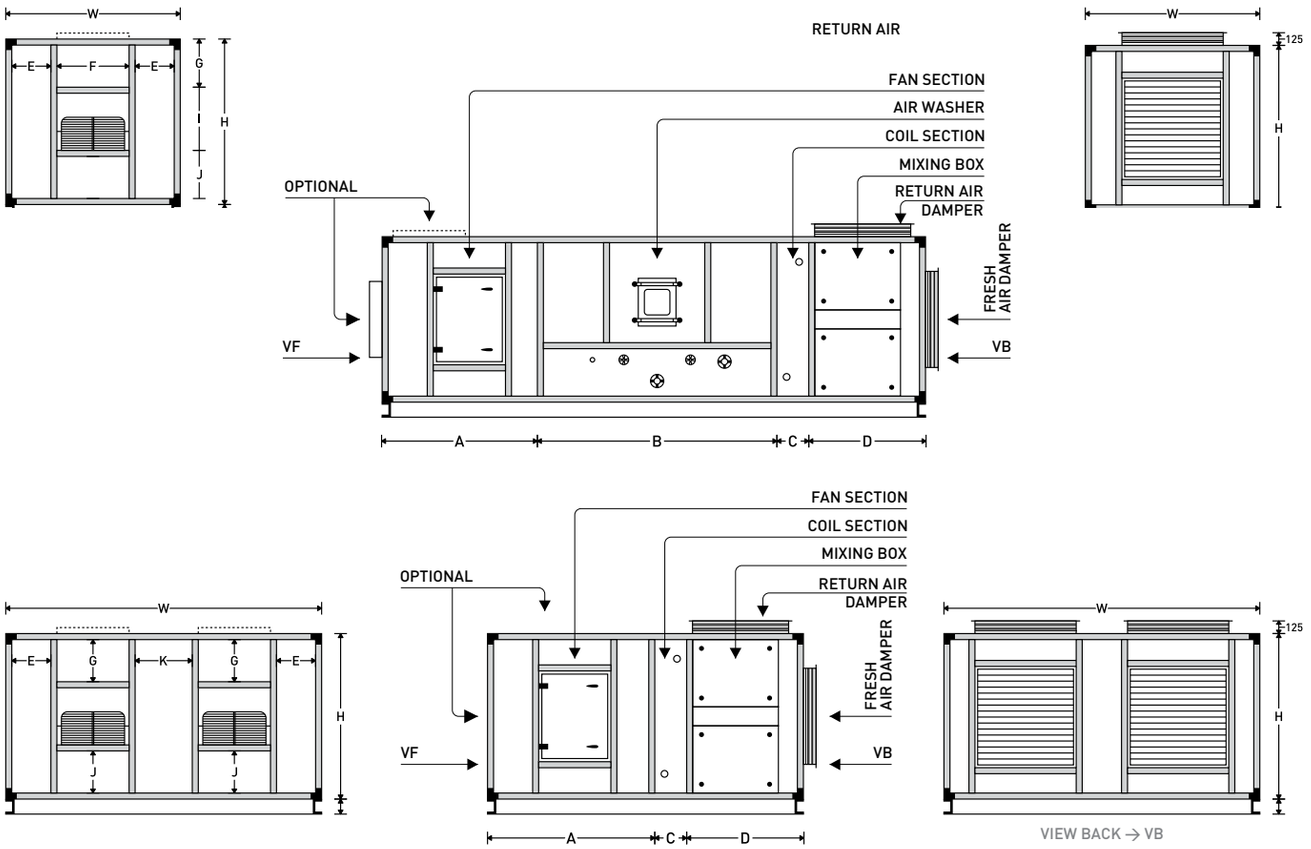


Table 2	Dimensions														
Model	A	B	H.A	C		D	E	F	G	I	J	K	L	H	W
AHU 250	1000	Class 4 1200	350	No. of Row	Coil Width	650	1900	520	20	480	220	--	80	820	1000
AHU 350	1150					700	230	540	90	490	240	--	80	920	1100
AHU 500	1200					800	415	570	270	500	250	--	80	1120	1500
AHU 700	1300					900	375	550	295	655	270	--	80	1320	1500
AHU 1000	1500					1000	590	720	290	730	280	--	100	1400	2000
AHU 1200	1500	Class 6 1800	400	1	100	1100	590	720	490	730	280	--	100	1600	2000
AHU 1500	1700			2	150	1300	520	860	650	830	320	--	100	1900	2000
AHU 1700	1700			3	180	1400	645	860	650	830	320	--	100	1900	2250
AHU 2000	1800			4	200	1300	687	925	640	890	350	--	120	1980	2400
AHU 2200	1800			6	280	1400	387	925	540	890	350	--	120	2180	2400
AHU 2500	1500	Class 8 2400	400	8	330	1200	415	720	440	890	350	830	120	1780	3200
AHU 3000	1700					1300	545	860	525	835	320	1090	120	1780	4000
AHU 3500	1800					1350	562	925	540	890	350	1125	120	1880	4200
AHU 4000	1800					1400	637	925	660	890	350	1275	120	2000	4500
AHU 4500	2100					1800	700	1050	620	990	390	1400	120	2100	5000

Note:
- All Dimensions in mm
- For Air Handling Units with BAG filter add 70 cm and also for HEPA filter add 70 cm to mentioned dimensions

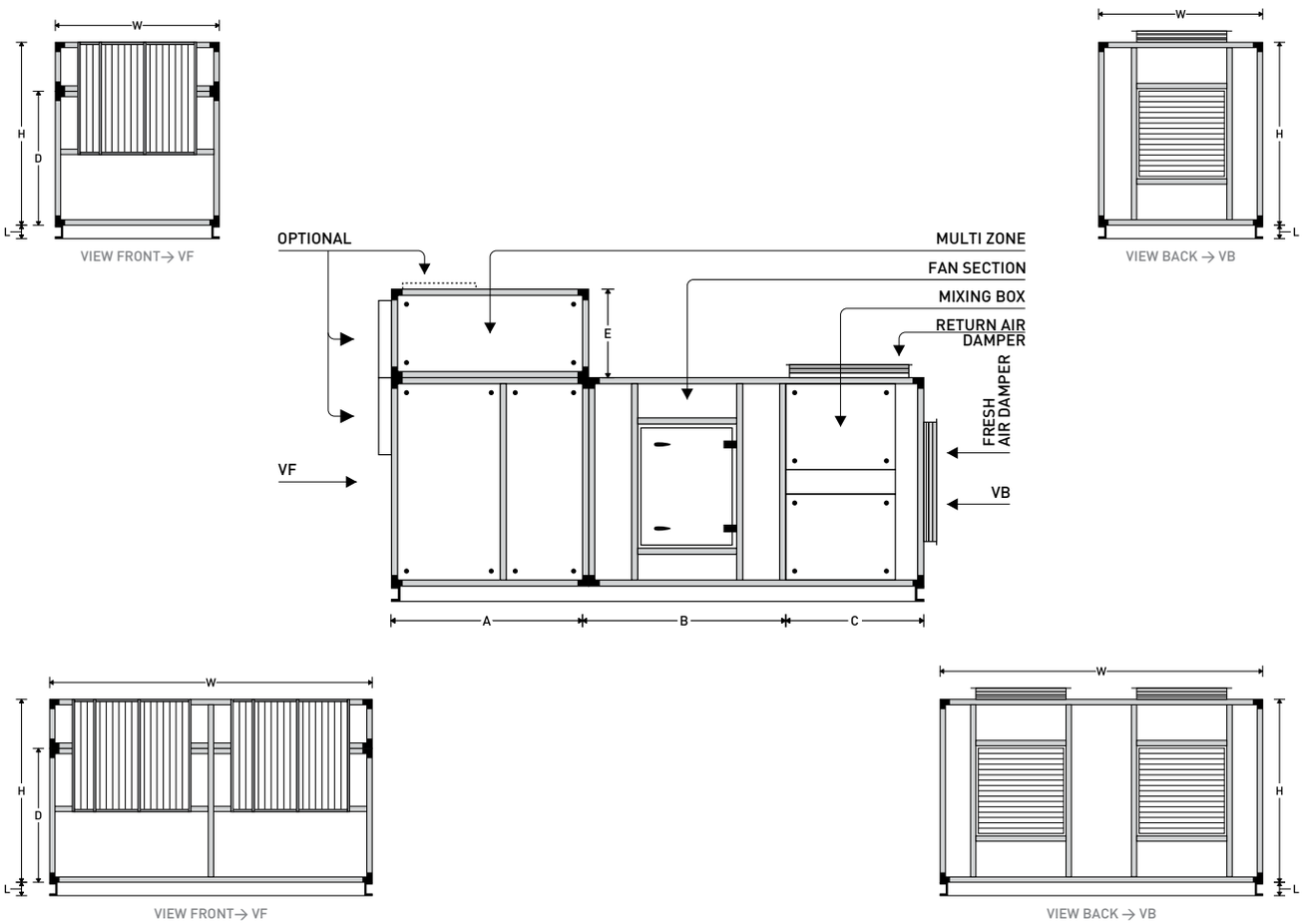


Table 3	Dimensions							
Model	A	B	C	D	E	L	H	W
AHU 250	1150	1150	880	1050	250	80	1050	1050
AHU 350	1350	1200	880	1150	350	80	1150	1050
AHU 500	1350	1350	980	1300	450	80	1300	1500
AHU 700	1550	1400	1070	1400	450	100	1400	1500
AHU 1000	1600	1600	1070	1500	550	100	1500	2000
AHU 1200	1750	1800	1070	1700	550	100	1700	2000
AHU 1500	2000	1900	1270	2000	500	120	2000	2000
AHU 1700	2000	1900	1470	2000	600	120	2000	2250
AHU 2000	2000	2050	1470	2100	650	120	2100	2500
AHU 2200	2150	2050	1570	2100	700	120	2100	2650
AHU 2500	1750	1800	1070	1700	750	140	1700	4000
AHU 3000	2000	1900	1270	2000	850	140	2000	4000
AHU 3500	2000	1900	1470	2000	850	140	2000	4500
AHU 4000	2000	2050	1470	2100	850	140	2100	5000
AHU 4500	2150	2050	1570	2100	900	140	2100	5300

Note:
- All Dimensions in mm

Table 4	Chilled Water Rating (8 FPI)															
Model	Nominal CFM	EDB (°F)	EWB (°F)	4 Rows				6 Rows				8 Rows				
				Total Load (MBH)	Sensible Load (MBH)	LVG DB (°F)	LVG WB (°F)	Total Load (MBH)	Sensible Load (MBH)	LVG DB (°F)	LVG WB (°F)	Total Load (MBH)	Sensible Load (MBH)	LVG DB (°F)	LVG WB (°F)	
AHU 250	2500	80	67	59	54	61	60	88	68	57	56	110	78	53	53	
		90	71	84	76	63	61	120	94	58	57	146	106	54	54	
		100	75	111	98	66	63	154	119	59	58	184	133	54	54	
AHU 350	3500	80	67	82	75	61	60	122	95	57	56	153	108	54	53	
		90	71	117	106	64	61	168	131	58	57	204	147	54	54	
		100	75	154	136	66	63	215	166	59	58	257	185	54	54	
AHU 500	5000	80	67	140	116	60	58	198	145	55	55	238	163	52	52	
		90	71	193	161	62	60	263	197	56	55	312	220	52	52	
		100	75	249	205	64	61	333	248	57	56	388	273	53	53	
AHU 700	7000	80	67	196	163	60	58	277	203	55	55	334	229	52	52	
		90	71	270	226	62	60	369	276	56	55	436	307	52	52	
		100	75	348	288	64	61	466	347	57	56	543	383	53	53	
AHU 1000	10000	80	67	306	242	59	58	420	299	54	54	498	336	51	51	
		90	71	414	334	61	59	552	404	55	55	643	448	52	52	
		100	75	527	422	63	61	692	506	56	55	796	556	52	52	
AHU 1200	12500	80	67	378	301	59	58	520	372	55	54	617	418	52	51	
		90	71	512	414	62	59	684	502	56	55	798	557	52	52	
		100	75	652	523	64	61	857	629	57	56	989	692	52	52	
AHU 1500	1500	80	67	451	359	59	58	621	445	55	54	737	500	52	52	
		90	71	609	494	62	59	816	600	56	55	954	667	52	52	
		100	75	776	625	64	61	1023	752	57	56	1182	828	53	52	
AHU 1700	17500	80	67	545	410	58	57	744	507	53	53	878	568	50	50	
		90	71	736	564	60	58	977	684	54	54	1133	756	50	50	
		100	75	936	675	62	60	1221	855	55	54	1403	940	50	50	
AHU 2000	20000	80	67	652	501	58	57	875	614	54	53	1024	684	51	51	
		90	71	750	638	62	60	1035	781	56	56	1229	871	53	53	
		100	75	970	813	65	62	1310	983	58	57	1535	1088	53	53	
AHU 2200	22500	80	67	732	540	58	57	983	663	53	52	1152	740	50	50	
		90	71	978	738	60	58	1282	8990	53	53	1480	982	50	50	
		100	75	1239	930	62	60	1600	1111	54	54	1824	1216	50	50	
AHU 2500	25000	80	67	757	602	59	58	1041	745	55	54	1235	836	52	51	
		90	71	1024	828	61	59	1368	1005	56	55	1596	1114	52	52	
		100	75	1304	1047	64	61	1715	1258	57	56	1978	1384	52	52	
AHU 3000	30000	80	67	902	719	59	58	1242	890	55	54	1475	1000	52	52	
		90	71	1219	989	62	59	1632	1201	56	55	1908	1334	52	52	
		100	75	1553	1251	64	61	2046	1504	57	56	2365	1657	53	52	
AHU 3500	35000	80	67	1090	820	58	57	1488	1014	53	53	1756	1136	50	50	
		90	71	1471	1128	60	58	1954	1368	54	54	2266	1512	50	50	
		100	75	1871	1424	62	60	2442	1710	55	54	2806	1880	50	50	
AHU 4000	40000	80	67	1305	1003	58	57	1750	1228	54	53	2048	1369	51	51	
		90	71	1500	1277	62	60	2071	1562	56	56	2458	1743	53	53	
		100	75	1941	1627	65	62	2620	1966	58	57	3070	2176	53	53	
AHU 4500	45000	80	67	1464	1079	58	57	1966	1326	53	52	2304	1480	50	50	
		90	71	1957	1475	60	58	2564	1780	53	53	2960	1964	50	50	
		100	75	2478	1858	62	60	3200	2222	54	54	3648	2423	50	50	

Note:

- Values based on entering chilled water temperature of 45 °F
- EDB = Entering air dry bulb temperature
- EWB = Entering air wet bulb temperature
- LVG = Leaving air temperature
- MBH = 1000 BTU/hr.

Table 5	Chilled Water Rating (14 FPI)														
Model	Nominal CFM	EDB (°F)	EWB (°F)	4 Rows				6 Rows				8 Rows			
				Total Load (MBH)	Sensible Load (MBH)	LVG DB (°F)	LVG WB (°F)	Total Load (MBH)	Sensible Load (MBH)	LVG DB (°F)	LVG WB (°F)	Total Load (MBH)	Sensible Load (MBH)	LVG DB (°F)	LVG WB (°F)
AHU 250	2500	80	67	72	59	58	58	104	73	53	53	125	82	50	50
		90	71	102	83	59	58	139	99	53	53	162	109	50	50
		100	75	132	106	60	59	175	124	54	53	200	136	50	50
AHU 350	3500	80	67	100	82	58	58	146	102	53	53	175	115	50	50
		90	71	141	115	59	59	194	138	53	53	227	153	50	50
		100	75	183	147	60	60	244	174	54	54	280	189	50	50
AHU 500	5000	80	67	177	131	56	55	237	158	51	51	274	175	48	48
		90	71	237	179	57	56	307	211	51	51	346	228	48	48
		100	75	300	226	58	57	380	261	51	51	422	281	48	48
AHU 700	7000	80	67	243	182	56	56	328	220	51	51	380	243	48	48
		90	71	327	249	57	56	425	293	51	51	481	318	48	48
		100	75	415	313	58	57	526	363	52	51	587	391	48	48
AHU 1000	10000	80	67	385	275	55	54	498	327	50	50	564	357	47	47
		90	71	506	371	56	55	363	431	50	50	707	464	47	47
		100	75	633	463	57	56	781	532	50	50	858	568	47	47
AHU 1200	12500	80	67	477	341	55	54	619	407	50	50	701	445	48	48
		90	71	626	460	56	55	791	537	50	50	881	579	47	47
		100	75	785	576	57	56	971	663	51	50	1070	709	47	47
AHU 1500	1500	80	67	569	408	55	54	741	487	50	50	839	532	48	48
		90	71	747	550	56	55	945	642	50	50	1053	693	47	47
		100	75	936	688	57	56	1160	793	51	51	1280	849	47	47
AHU 1700	17500	80	67	689	482	55	54	887	569	50	50	1003	625	47	47
		90	71	924	659	55	55	1155	761	50	50	1280	816	47	47
		100	75	1170	830	56	56	1432	946	50	50	1572	1007	47	47
AHU 2000	20000	80	67	689	482	55	54	887	569	50	50	1003	625	47	47
		90	71	924	659	55	55	1155	761	50	50	1280	816	47	47
		100	75	1170	830	56	56	1432	946	50	50	1572	1007	47	47
AHU 2200	22500	80	67	924	635	54	53	1171	744	49	49	1314	806	49	47
		90	71	1227	827	55	54	1512	990	49	49	1667	1058	47	47
		100	75	1547	1083	56	55	1873	1229	49	49	2042	1304	47	47
AHU 2500	25000	80	67	820	570	54	53	1036	671	49	49	1157	727	47	47
		90	71	1065	763	55	54	1310	879	49	49	1442	941	47	47
		100	75	1321	949	56	55	1599	1081	50	50	1743	1149	47	47
AHU 3000	30000	80	67	924	635	54	53	1171	744	49	49	1314	806	49	47
		90	71	1227	827	55	54	1512	990	49	49	1667	1058	47	47
		100	75	1547	1083	56	55	1873	1229	49	49	2042	1304	47	47
AHU 3500	35000	80	67	953	682	55	54	1238	813	50	50	1402	889	48	48
		90	71	1253	921	56	55	1582	1074	50	50	1761	1157	47	47
		100	75	1570	1152	57	56	1941	1325	51	50	2139	1417	47	47
AHU 4000	40000	80	67	1137	715	55	55	1481	973	50	50	1678	1064	48	48
		90	71	1494	1100	56	55	1889	1284	50	50	2106	1385	47	47
		100	75	1871	1377	57	56	2319	1585	51	51	2559	1697	47	47
AHU 4500	45000	80	67	1378	945	55	54	1775	1138	50	50	2006	1249	47	47
		90	71	1847	1318	55	55	2310	1522	50	50	2560	1632	47	47
		100	75	2339	1659	56	56	2864	1892	50	50	3144	2014	47	47

Note:

- Values based on entering chilled water temperature of 45 °F
- EDB = Entering air dry bulb temperature
- EWB = Entering air wet bulb temperature
- LVG = Leaving air temperature
- MBH = 1000 BTU/hr.

Table 6			Hot Water Rating (8 FPI)							
Model	Nominal CFM	EDB (°F)	1 Rows		2 Rows		3 Rows		4 Rows	
			Capacity (MBH)	LVG DB (°F)	Capacity (MBH)	LVG DB (°F)	Capacity (MBH)	LVG DB (°F)	Capacity (MBH)	LVG DB (°F)
AHU 250	2500	0	126	42	211	73	281	100	330	120
		20	109	58	183	85	245	110	289	128
		40	92	73	155	67	209	119	248	135
		60	76	88	127	108	174	127	207	141
AHU 350	3500	0	175	42	293	72	391	99	461	119
		20	151	57	254	85	341	109	402	127
		40	128	73	215	97	292	118	345	160
		60	105	88	177	108	243	127	288	160
AHU 500	5000	0	262	44	438	76	576	103	673	122
		20	228	60	382	88	504	113	589	130
		40	195	75	326	100	433	122	507	137
		60	161	90	271	111	362	130	425	143
AHU 700	7000	0	536	44	614	76	807	103	942	122
		20	320	60	535	88	706	113	825	130
		40	273	75	457	100	606	122	710	137
		60	226	90	379	111	507	130	596	143
AHU 1000	10000	0	535	45	893	78	1166	104	1356	124
		20	467	60	781	90	1022	114	1190	131
		40	400	76	669	102	880	123	1025	138
		60	333	91	558	113	738	131	862	144
AHU 1200	12500	0	660	44	1104	77	1445	103	1683	122
		20	576	60	965	89	1266	113	1476	130
		40	493	75	827	101	1090	122	1272	137
		60	410	90	690	112	914	131	1070	144
AHU 1500	1500	0	784	44	1315	76	1723	102	2009	122
		20	685	60	1150	89	1510	112	1763	130
		40	587	75	986	101	1300	122	1518	137
		60	488	90	822	112	1090	130	1277	143
AHU 1700	17500	0	926	48	1549	81	2045	107	2356	124
		20	810	62	1356	91	1769	114	2069	128
		40	694	76	1164	101	1548	121	1782	133
		60	579	90	972	111	1303	128	1500	139
AHU 2000	20000	0	1091	46	111	79	2363	106	2739	125
		20	955	61	1593	91	2073	115	2404	132
		40	819	77	1368	103	1786	124	2073	139
		60	684	92	1145	114	1502	133	1746	145
AHU 2200	22500	0	1203	49	2014	82	2643	108	3047	124
		20	1053	63	1764	92	2322	115	2675	129
		40	904	77	1516	102	2004	122	2307	134
		60	755	91	1269	112	1688	129	1943	139
AHU 2500	25000	0	1320	44	2209	77	2890	103	3366	122
		20	1153	60	1931	89	2533	113	2953	130
		40	987	75	1655	101	2180	122	2544	137
		60	821	90	1381	112	1829	131	2140	144
AHU 3000	30000	0	1569	44	2631	76	3446	102	4019	122
		20	1371	60	2300	89	3021	112	3526	130
		40	1174	75	1972	101	2600	122	3037	137
		60	977	90	1645	112	2181	130	2555	143
AHU 3500	35000	0	1852	48	3098	81	4090	107	4712	124
		20	1620	62	2712	91	3592	114	4138	128
		40	1388	76	1228	101	3096	121	3564	133
		60	1158	90	1944	111	2606	128	3000	139
AHU 4000	40000	0	2183	46	3639	79	4726	106	2479	125
		20	1911	61	3187	91	4147	115	4809	132
		40	1639	77	2737	103	3573	124	4147	139
		60	1368	92	2290	114	3004	133	3492	145
AHU 4500	45000	0	2406	49	4028	82	5286	108	6094	124
		20	2106	63	3628	92	4644	115	5350	129
		40	1808	77	3032	102	4008	122	4614	134
		60	1510	91	2538	112	3376	129	3886	139

Note:

- Hot water Entering: 180˚F & Leaving: 160˚F
- EDB = Entering air dry bulb Temperature.
- LVG = Leaving air Temperature.
- MBH = 1000 Btu/hr.

Table 7			Hot Water Rating (14 FPI)							
Model	Nominal CFM	EDB (°F)	1 Rows		2 Rows		3 Rows		4 Rows	
			Capacity (MBH)	LVG DB (°F)	Capacity (MBH)	LVG DB (°F)	Capacity (MBH)	LVG DB (°F)	Capacity (MBH)	LVG DB (°F)
AHU 250	2500	0	176	60	274	97	346	127	390	145
		20	152	74	237	107	302	133	340	149
		40	128	87	201	115	258	139	291	153
		60	105	99	165	123	214	144	243	156
AHU 350	3500	0	245	60	381	97	483	126	544	145
		20	212	73	330	106	420	132	475	149
		40	179	86	280	115	359	138	407	153
		60	146	99	230	123	299	143	340	156
AHU 500	5000	0	368	63	571	102	710	130	793	148
		20	320	77	497	111	621	137	694	152
		40	273	90	424	120	532	142	596	156
		60	225	102	352	128	445	147	500	159
AHU 700	7000	0	516	63	799	102	995	130	1110	148
		20	449	77	696	111	869	137	971	152
		40	382	90	594	120	746	142	834	156
		60	316	102	493	128	624	147	700	159.6
AHU 1000	10000	0	752	64	1165	104	1438	132	1599	149
		20	656	78	1017	113	1259	138	1400	154
		40	561	91	871	122	1082	144	1205	157
		60	466	104	726	130	908	149	1013	161
AHU 1200	12500	0	829	64	1443	103	1786	131	1989	148
		20	811	77	1261	112	1564	138	1742	153
		40	693	91	1080	121	1344	143	1499	157
		60	576	103	900	129	1128	149	1260	160
AHU 1500	1500	0	1106	63	1722	102	2134	130	2379	148
		20	965	77	1504	112	1868	137	2083	152
		40	825	90	1288	121	1606	143	1793	156
		60	686	103	1073	129	1347	148	1507	160
AHU 1700	17500	0	1307	68	2028	106	2531	133	2787	146
		20	1142	80	1773	113	2219	136	2442	148
		40	978	91	1520	120	1911	140	2102	150
		60	814	102	1270	126	1608	144	1769	153
AHU 2000	20000	0	1537	66	2373	106	2910	134	3224	151
		20	1343	79	2076	115	2550	140	2824	155
		40	1151	93	1781	124	2195	146	2432	159
		60	960	105	1489	132	1845	151	2048	162
AHU 2200	22500	0	1699	69	2639	108	3270	134	3601	147
		20	1485	80	2307	114	2868	137	3156	149
		40	1273	92	1908	118	2472	141	2718	151
		60	1063	103	1657	127	2081	145	2289	153
AHU 2500	25000	0	1857	64	2887	103	3573	131	3979	148
		20	1623	77	2522	112	3128	138	3484	153
		40	1388	91	2160	121	2689	143	2998	157
		60	1153	103	1800	129	2256	149	2521	160
AHU 3000	30000	0	2213	63	3444	102	4268	130	4759	148
		20	1931	77	3008	112	3736	137	4167	152
		40	1651	90	2576	121	3212	143	3586	156
		60	1372	103	2147	129	2695	148	3015	160
AHU 3500	35000	0	2614	68	4056	106	5062	133	5574	146
		20	2284	80	3546	113	4438	136	4884	148
		40	1956	91	3040	120	3822	140	4204	150
		60	1628	102	2540	126	3216	144	3538	153
AHU 4000	40000	0	3074	66	4746	106	5821	134	6448	151
		20	2687	79	4152	115	5101	140	5649	155
		40	2302	93	3562	124	4391	146	4865	159
		60	1920	105	2978	132	3690	151	4090	162
AHU 4500	45000	0	3398	69	5278	108	6540	134	7202	147
		20	2970	80	4614	114	5736	137	6312	149
		40	2546	92	3816	118	4944	141	5436	151
		60	2126	103	3314	127	4162	145	4378	153

Note:

- Hot water Entering: 180˚F & Leaving: 160˚F
- EDB = Entering air dry bulb Temperature.
- LVG = Leaving air Temperature.
- MBH = 1000 Btu/hr.

Table 8	Steam Heat Ratings					
Model	Nominal CFM	EDB (°F)	1 Rows		2 Rows	
			Capacity (MBH)	LVG DB (°F)	Capacity (MBH)	LVG DB (°F)
AHU 250	2500	0 20 40 60	184 168 153 136	67.8 82 9634 110.0	326 297 270 240	120.2 129.5 139.5 148.3
AHU 350	3500	0 20 40 60	274 250 227 202	72.2 85.8 99.8 113.0	295 452 410 365	130.3 139 147.9 155.9
AHU 500	5000	0 20 40 60	366 334 303 270	67.5 81.5 95.8 109.6	665 606 551 490	122.5 131.7 141.5 150.1
AHU 700	7000	0 20 40 60	509 464 421 375	67 81 95.4 109.2	923 842 756 680	121.5 130.8 139.5 149.3
AHU 1000	10000	0 20 40 60	726 662 601 535	66.9 81 95.4 109.4	1331 1213 1102 980	122.6 131.8 141.5 150.1
AHU 1200	12500	0 20 40 60	907 826 751 668	66.8 80.9 95.4 109.2	1663 1516 1378 1225	122.5 131.7 141.6 150.3
AHU 1500	1500	0 20 40 60	1093 996 905 805	67.2 81.2 95.6 109.3	1996 1819 1654 1470	122.6 131.7 141.6 150.1
AHU 1700	17500	0 20 40 60	1282 1168 1062 944	67 81 96 109	2332 2126 1932 1718	122.9 132.1 141.8 150.5
AHU 2000	20000	0 20 40 60	1470 1340 1218 1083	67.7 81.7 96.1 109.9	2668 2433 2210 1965	122.9 132.1 141.8 150.5
AHU 2200	22500	0 20 40 60	1562 1497 1657 1473	64 81 107 120	2997 2733 2483 2208	122 132 141 150
AHU 2500	25000	0 20 40 60	1814 1654 1503 1336	66.8 80.9 95.4 109.2	3327 3033 2756 2450	122.6 131.8 141.6 150.3
AHU 3000	30000	0 20 40 60	2186 1993 1811 1610	67.1 81.2 95.6 109.2	3992 3639 3307 2940	122.6 131.8 141.6 150.1
AHU 3500	35000	0 20 40 60	2564 2336 6796 1888	67 81 96 109	4664 4252 3864 3436	122.9 132.1 141.8 150.5
AHU 4000	40000	0 20 40 60	2941 2681 2436 2166	67.7 81.7 96.1 109.9	5337 4865 4421 3930	123 132 141.8 152.5
AHU 4500	45000	0 20 40 60	3124 2994 3314 2946	64 81 107 120	5994 5466 4966 4416	122 132 141 150

Note:

- Values ratings based on steam of pressure 5PSIG.
- EDB = Entering air dry bulb temperature.
- 1000 BTU/hr.

Table 9	D.X Coil Rating (14 FPI)										
Model	Nominal CFM	EDB (°F)	EWB (°F)	4 Rows				6 Rows			
				Total Load (MBH)	Sensible Load (MBH)	LVG DB (°F)	LVG WB (°F)	Total Load (MBH)	Sensible Load (MBH)	LVG DB (°F)	LVG WB (°F)
AHU 250	2500	80	67	89	62	57	55	118	78	51	50
		90	71	102	79	61	58	137	99	54	52
		100	75	117	96	65	60	157	119	56	55
AHU 350	3500	80	67	123	86	57	55	163	109	51	50
		90	71	147	112	60	57	196	140	53	52
		100	75	162	134	65	61	217	166	57	55
AHU 500	5000	80	67	178	125	57	55	237	157	51	50
		90	71	205	159	61	58	274	198	54	52
		100	75	235	193	65	60	315	239	56	55
AHU 700	7000	80	67	250	175	57	55	332	221	51	50
		90	71	288	223	61	58	384	277	54	52
		100	75	329	270	65	60	441	334	56	55
AHU 1000	10000	80	67	354	249	57	55	471	314	51	50
		90	71	408	317	61	58	545	395	54	52
		100	75	467	384	65	61	626	476	56	55
AHU 1200	12500	80	67	434	307	57	55	578	387	51	50
		90	71	500	391	61	58	668	488	54	53
		100	75	572	474	65	61	767	588	57	55
AHU 1500	1500	80	67	513	365	57	55	684	460	52	51
		90	71	591	465	61	58	791	580	54	53
		100	75	676	564	65	61	908	700	57	55
AHU 1700	17500	80	67	583	477	59	57	813	602	53	51
		90	71	666	588	63	60	929	737	55	54
		100	75	726	700	67	64	1069	872	59	67
AHU 2000	20000	80	67	718	503	57	55	953	634	51	50
		90	71	827	639	61	57	1103	797	53	52
		100	75	946	774	65	60	1267	960	56	54
AHU 2200	22500	80	67	756	616	54	53	1054	718	52	51
		90	71	864	760	61	60	1204	951	56	55
		100	75	962	839	66	64	1385	1027	58	57
AHU 2500	25000	80	67	868	615	57	55	1156	775	51	50
		90	71	1000	782	61	58	1337	976	54	53
		100	75	1144	949	65	61	1535	1177	57	55
AHU 3000	30000	80	67	1027	730	57	55	1369	921	52	51
		90	71	1182	930	61	58	1583	1160	54	53
		100	75	1352	1129	65	61	1817	1400	57	55
AHU 3500	35000	80	67	1166	953	59	57	1326	1204	53	51
		90	71	1332	1176	63	60	1858	1474	55	54
		100	75	1452	1400	67	64	2138	1744	59	57
AHU 4000	40000	80	67	1436	1007	57	55	1907	1268	51	50
		90	71	1655	1278	61	57	2207	1594	53	52
		100	75	1893	1549	65	60	2534	1920	56	54
AHU 4500	45000	80	67	1512	1232	54	53	2108	1436	52	51
		90	71	1728	1520	61	60	2408	1902	56	55
		100	75	1924	1678	66	64	2770	2054	58	57

Note:

- Values based in entering chilled water temperature of 45°F
- EDB = Entering air dry bulb temperature
- EWB = Entering air wet bulb temperature
- LVG = Leaving air temperature
- MBH = 1000 BTU / hr.

Table 10	Hot Water Rating , Multi Zone								
Model	Nominal CFM	EDB (°F)	1 Rows <-- 8 FPI --> 2 Rows				3 Rows <-- 14 FPI --> 4 Rows			
			Capacity (MBH)	LVG DB (°F)	Capacity (MBH)	LVG DB (°F)	Capacity (MBH)	LVG DB (°F)	Capacity (MBH)	LVG DB (°F)
AHU 250	2500	0	110	36	188	64	155	53	249	88
		20	95	53	163	78	134	67	216	98
		40	80	69	138	90	113	81	182	108
		60	66	84	113	103	93	95	150	117
AHU 350	3500	0	159	38	270	66	225	54	357	90
		20	138	54	235	80	194	69	309	100
		40	116	70	199	92	164	82	262	110
		60	95	85	164	104	134	96	215	119
AHU 500	5000	0	238	39	402	69	335	57	532	94
		20	205	55	350	82	292	71	463	104
		40	175	71	299	95	248	85	395	114
		60	145	87	249	107	205	98	327	123
AHU 700	7000	0	328	39	560	69	465	56	740	93
		20	286	55	487	82	405	71	644	104
		40	243	71	417	94	345	85	549	113
		60	201	86	345	106	285	98	455	122
AHU 1000	10000	0	478	40	813	70	680	58	1080	96
		20	417	56	711	83	593	72	942	106
		40	357	72	609	96	507	86	808	116
		60	297	87	508	108	421	99	672	124
AHU 1200	12500	0	602	40	1023	71	857	58	1357	96
		20	527	56	895	84	748	73	1185	106
		40	450	72	768	96	639	86	1015	116
		60	375	88	640	108	531	100	846	125
AHU 1500	1500	0	706	39	1204	69	1007	57	1603	94
		20	617	55	1055	83	878	72	1400	105
		40	528	71	902	95	750	85	1198	115
		60	439	87	753	107	624	99	998	124
AHU 1700	17500	0	837	44	1425	75	1193	62	1896	100
		20	732	58	1248	85	1043	75	1657	107
		40	628	73	1070	96	892	88	1420	114
		60	523	87	892	107	744	99	1185	122
AHU 2000	20000	0	968	40	1647	71	1380	59	2189	97
		20	847	57	1442	84	1209	73	1915	107
		40	728	72	1239	97	1035	87	1642	117
		60	607	88	1032	109	864	100	1373	126
AHU 2200	22500	0	1086	44	1846	75	1547	63	2451	88
		20	950	59	1616	86	1352	75	2142	107
		40	814	73	1387	96	1156	87	1836	115
		60	678	84	1156	107	963	99	1532	122
AHU 2500	25000	0	1204	40	2046	71	1714	58	2714	96
		20	1054	56	1790	84	1496	73	2370	106
		40	900	72	1536	96	1278	86	2030	116
		60	750	88	1280	108	1062	100	1692	125
AHU 3000	30000	0	1412	39	2408	69	2014	57	3206	94
		20	1234	55	2110	83	1756	72	2800	105
		40	1056	71	1804	95	1500	85	2396	115
		60	878	87	1506	107	1248	99	1996	124
AHU 3500	35000	0	1674	44	2850	75	2386	62	3792	100
		20	1464	58	2496	85	2086	75	3314	107
		40	1256	73	2140	96	1784	88	2840	114
		60	1046	87	1784	107	1488	99	2370	122
AHU 4000	40000	0	1936	40	3294	71	2760	59	4378	97
		20	1694	57	2884	84	2418	73	3830	107
		40	1456	72	2478	97	2070	87	3284	117
		60	1214	88	2064	109	1728	100	2746	126
AHU 4500	45000	0	2172	44	3692	75	3094	63	4902	88
		20	1900	59	3232	86	2704	75	4284	107
		40	1628	73	2774	96	2312	87	3674	115
		60	1356	84	2312	107	1926	99	3064	122

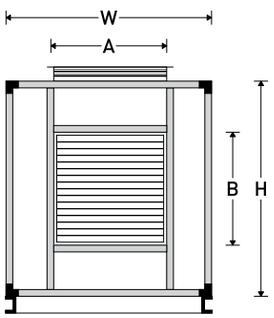
Note:

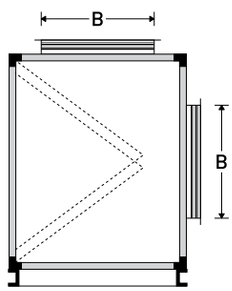
- Hot water Entering: 180˚F & Leaving: 160˚F
- EDB = Entering air dry bulb Temperature.
- LVG = Leaving air Temperature.
- MBH = 1000 Btu/hr.

Table 11	Steam Heating Ratings , Multi Zone					
Model	Nominal CFM	EDB (°F)	1 Rows		2 Rows	
			Capacity (MBH)	LVG DB (°F)	Capacity (MBH)	LVG DB (°F)
AHU 250	2500	0 20 40 60	165 151 137 122	61 75.7 90.7 105.1	293 267 243 216	108.1 118.5 129.5 139.6
AHU 350	3500	0 20 40 60	246 225 204 181	65 79.5 93.7 107.8	445 406 369 328	117.3 127.1 137.1 146.5
AHU 500	5000	0 20 40 60	329 300 272 243	60.7 75.4 90.2 104.8	598 545 495 441	110.3 120.5 131.4 141.2
AHU 700	7000	0 20 40 60	458 417 378 337	60.3 74.9 89.8 104.4	830 757 680 612	109.3 119.7 129.5 140.5
AHU 1000	10000	0 20 40 60	653 595 540 481	60.2 74.9 89.8 104.3	1197 1091 991 882	110.4 120.6 131.4 141.3
AHU 1200	12500	0 20 40 60	816 743 675 601	60.1 74.8 89.8 104.3	1496 1364 1240 1102	110.3 120.6 131..4 141.3
AHU 1500	1500	0 20 40 60	983 896 814 724	60.4 75 90 104.5	1796 1637 1488 1323	110.3 120.5 131.4 141.3
AHU 1700	17500	0 20 40 60	1153 1051 955 849	60 75 90 104	2099 1913 1739 1546	110 120 131 141
AHU 2000	20000	0 20 40 60	1323 1206 1096 974	60.9 75.5 90.5 104.9	2401 2189 1989 1768	110.6 120.9 131.6 141.4
AHU 2200	22500	0 20 40 60	1478 1347 1224 1088	60 75 90 104	2698 2459 2235 1987	110 120 131 141
AHU 2500	25000	0 20 40 60	1632 1488 1352 1202	60.1 74.8 89.8 104.3	2994 2729 2480 2205	110.3 120.6 131.4 141.3
AHU 3000	30000	0 20 40 60	1967 1793 1629 1449	60.5 75.1 90 104.5	3592 3275 2976 2646	110.3 120.6 131.4 141.3
AHU 3500	35000	0 20 40 60	2306 2102 1910 1698	60 75 90 104	4198 3826 3478 3092	110 120 131 141
AHU 4000	40000	0 20 40 60	2646 2412 2192 1949	60.9 75.5 90.5 104.9	4803 4378 3978 3537	110.6 120.8 131.6 141.5
AHU 4500	45000	0 20 40 60	2956 2694 2448 2176	60..9 75.5 90.5 104.9	5396 4918 4470 3974	110.6 120.8 131.6 141.5

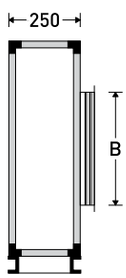
Note:
- Values ratings based on steam of pressure 5PSIG.
- EDB = Entering air dry bulb temperature.
- MBH = 1000 BTU /hr.

Table 12	Dimensions Coils & Filters								
Model	Nominal CFM	Coils				Filters Face Area			
		No of coil × No of circuits	Face HGT mm	Face LGT mm	Face Area ft²	Flat Type ft²	V Type ft²	Z Type ft²	W Type ft²
AHU 250	2500	1 × 16	600	790	5	5	8.5	10	12
AHU 350	3500	1 × 22	825	790	7.5	7.5	12	14	18
AHU 500	5000	1 × 20	750	1240	10	10	17	20	25
AHU 700	7000	1 × 28	1050	1240	14	14	23	27	34
AHU 1000	10000	1 × 28	1050	1740	20	20	33	39	50
AHU 1200	12500	2 × 18	1350	1740					
AHU 1500	15000	2 × 21	1575	1740	30	30	50	60	75
AHU 1700	17500	2 × 22	1650	1990					
AHU 2000	20000	2 × 22	1650	2240	45	45	73	87	117
AHU 2200	22500	2 × 23	1725	2390					
AHU 2500	25000	4 × 18	1350	2 × 1740	50	50	65	85	114
AHU 3000	30000	4 × 21	1575	2 × 1740	60	60	75	98	133
AHU 3500	35000	4 × 22	1650	2 × 1990					
AHU 4000	40000	4 × 22	1650	2 × 2240	80	80	100	130	176
AHU 4500	45000	4 × 23	1725	2 × 2390					





W-Z-V TYPE FILTERS



FLAT TYPE FILTERS

Table 13	Dampers Dimension				
Model	A	B	BB	H	W
AHU 250	700	200	400	820	1000
AHU 350	800	200	400	920	1100
AHU 500	1000	300	300	1120	1500
AHU 700	1200	400	800	1320	1500
AHU 1000	1300	400	800	1400	2000
AHU 1200	1300	400	800	1600	2000
AHU 1500	1700	500	1000	1900	2000
AHU 1700	1800	500	1000	1900	2250
AHU 2000	2000	500	1000	1980	2400
AHU 2200	2000	500	1000	2180	2400
AHU 2500	2 x 1250	400	800	1780	3200
AHU 3000	2 x 1700	500	1000	1780	4000
AHU 3500	2 x 180	500	1000	1880	4200
AHU 4000	2 x 1900	500	1000	2000	4500
AHU 4500	2 x 2000	500	1000	2100	5000

BB is according to 50% fresh air & 50% return air
If 100% fresh air & 100% return air is required, dampers size will be according to BB

Water Pressure Reduction in Tubes
(Feet Water)

Table 14

Model	Water Velocity Feet Per Sec. 1 Row											
	0.5	1	1.5	2	2.5	3	3.5	4	5	6	7	8
AHU 250, 350	0.11	0.29	0.53	0.8	1.13	1.44	1.82	2.22	3.04	4	4.95	6.06
AHU 500, 700	0.14	0.36	0.65	0.95	1.35	1.75	2.2	2.7	3.7	4.75	5.9	7.3
AHU 1000, 1200, 1500, 2500, 3000	0.16	0.42	0.75	1.02	1.6	2.08	2.62	3.16	4.38	5.73	7.17	8.85
AHU 1700, 3500	0.17	0.45	0.8	1.2	1.7	2.25	2.8	3.4	4.7	6.2	7.7	9.25
AHU 2000, 4000	0.2	0.49	0.88	1.3	1.85	2.43	3.03	3.67	5.1	6.68	8.36	10.32
AHU 2200, 4500	0.18	0.5	0.9	1.35	1.9	2.5	3.15	3.8	5.3	6.9	8.7	10.7

Cont. Table 14

Model	Water Velocity Feet Per Sec. 2 Row											
	0.5	1	1.5	2	2.5	3	3.5	4	5	6	7	8
AHU 250, 350	0.13	0.34	0.62	0.92	1.31	1.7	2.14	2.61	3.58	4.68	5.82	7.12
AHU 500, 700	0.15	0.41	0.75	1.1	1.56	2.04	2.55	3.12	4.3	5.57	6.9	8.54
AHU 1000, 1200, 1500, 2500, 3000	0.18	0.49	0.88	1.29	1.85	2.4	2.95	3.66	5.13	6.7	8.38	10.35
AHU 1700, 3500	0.2	0.53	0.95	1.42	2.01	2.63	3.3	4	5.55	7.25	9.5	11.2
AHU 2000, 4000	0.21	0.57	1.02	1.51	2.05	2.83	3.54	4.28	5.97	7.81	9.78	12.07
AHU 2200, 4500	0.21	0.58	1.05	1.56	2.25	2.95	3.7	4.45	6.2	8.81	10.2	12.06

Cont. Table 14

Model	Water Velocity Feet Per Sec. 3 Row											
	0.5	1	1.5	2	2.5	3	3.5	4	5	6	7	8
AHU 250, 350	0.17	0.45	0.82	1.23	1.74	2.26	2.86	3.52	4.82	6.3	7.85	9.66
AHU 500, 700	0.21	0.55	1	1.48	2.13	2.8	3.48	4.3	5.9	7.7	9.65	11.95
AHU 1000, 1200, 1500, 2500, 3000	0.24	0.67	1.16	1.8	2.54	3.33	4.21	5.15	7.15	9.37	11.7	14.15
AHU 1700, 3500	0.26	0.73	1.3	1.95	2.75	3.6	4.55	5.6	7.8	10.2	12.7	15.75
AHU 2000, 4000	0.28	0.79	1.4	2.07	2.98	3.9	4.93	6.05	8.4	11.05	13.8	16.7
AHU 2200, 4500	0.29	0.85	1.45	2.15	3.1	4.1	5.15	6.3	8.75	11.5	14.4	17.85

Cont. Table 14

Model	Water Velocity Feet Per Sec. 4 Row											
	0.5	1	1.5	2	2.5	3	3.5	4	5	6	7	8
AHU 250, 350	0.21	0.56	1.02	1.51	2.17	2.83	3.57	4.42	6.05	7.9	9.92	12.2
AHU 500, 700	0.26	0.7	1.25	1.87	2.7	3.5	4.4	5.45	7.45	9.8	12.25	15.2
AHU 1000, 1200, 1500, 2500, 3000	0.29	0.85	1.51	2.23	3.21	4.22	5.36	6.6	9.15	12	15	18.63
AHU 1700, 3500	0.32	0.93	1.65	2.45	3.5	4.6	5.8	7.2	10	13.1	16.4	20.3
AHU 2000, 4000	0.35	1.01	1.78	2.62	3.81	4.98	6.32	7.76	10.83	14.24	17.83	22.09
AHU 2200, 4500	0.36	1.06	1.85	2.72	3.96	5.22	6.6	8.1	11.3	14.85	18.6	23.1

Table 14

Model	Water Velocity Feet Per Sec. 6 Row											
	0.5	1	1.5	2	2.5	3	3.5	4	5	6	7	8
AHU 250, 350	0.29	0.8	1.44	2.13	3.08	4.03	5.05	6.2	8.54	11.28	14.07	17.35
AHU 500, 700	0.36	0.98	1.8	2.65	3.83	5	6.3	7.77	10.7	14.14	17.78	21.93
AHU 1000, 1200, 1500, 2500, 3000	0.43	1.18	2.19	3.2	4.7	6.11	7.73	8.8	13.21	17.4	22.9	27.04
AHU 1700, 3500	0.48	1.3	2.4	3.5	5.1	7.65	8.4	10.35	14.4	19	24	30
AHU 2000, 4000	0.52	1.39	2.56	3.78	5.53	7.25	9.15	11.26	15.66	20.7	26.11	32.2
AHU 2200, 4500	0.54	1.45	2.7	3.95	5.8	7.6	9.65	11.8	16.5	21.7	27.44	33.75

Cont. Table 14

Model	Water Velocity Feet Per Sec. 8 Row											
	0.5	1	1.5	2	2.5	3	3.5	4	5	6	7	8
AHU 250, 350	0.38	1.04	1.86	2.73	3.97	5.23	6.53	7.98	11.03	14.65	18.22	22.5
AHU 500, 700	0.46	1.23	2.28	3.41	4.98	6.57	8.22	10.1	13.96	18.48	23.05	28.6
AHU 1000, 1200, 1500, 2500, 3000	0.57	1.51	2.82	4.18	6.1	8	10.1	12.4	17.37	22.81	28.85	35.4
AHU 1700, 3500	0.64	1.64	3.1	4.55	6.65	8.7	11	13.55	18.9	24.9	31.5	38.8
AHU 2000, 4000	0.69	1.78	3.35	4.95	7.25	9.52	12	14.76	20.5	27.16	34.4	42.31
AHU 2200, 4500	0.71	1.85	3.5	5.2	7.65	10	12.7	15.5	21.6	28.6	36.3	44.4

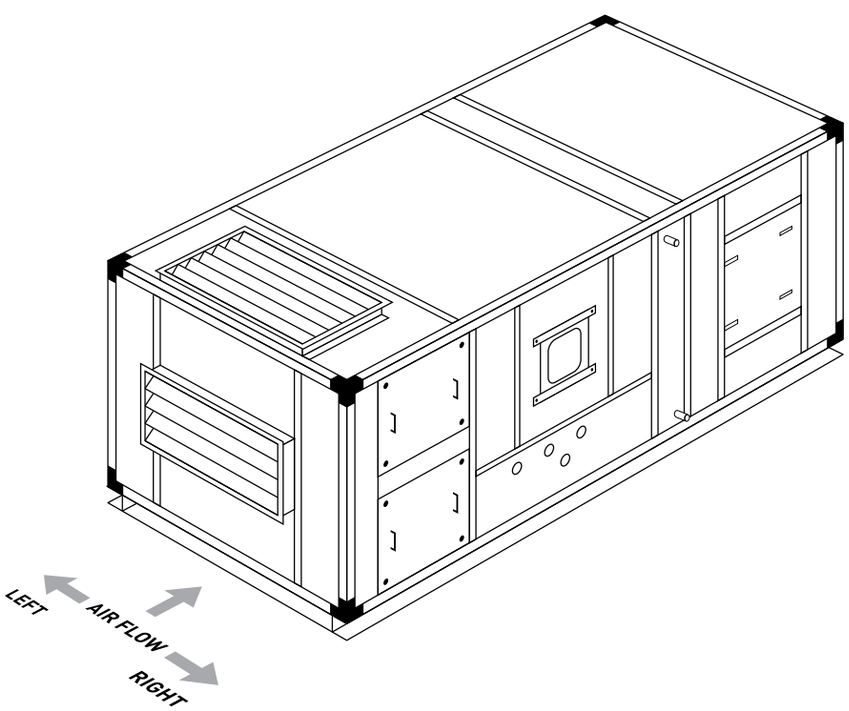
Coil Water Side Pressure Drop Correction Factor Temperature Gradient

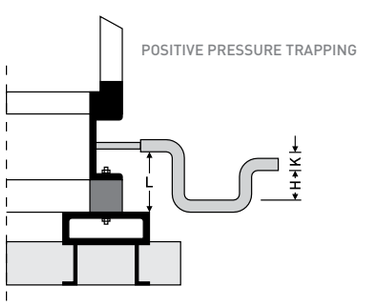
Cont. Table 14

Average Water Temperature ° F	40	50	60	80	100	120	140	150	160	180	200	220
Correction Factor	1.04	1	0.96	0.9	0.86	0.83	0.8	0.78	0.77	0.76	0.74	0.73

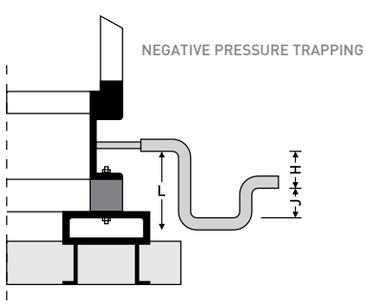
-Actual water side PD = PD (Table 5) × CF (Table 5 cont.)

Table 15	Chilled & Hot water & Steam coil Connection										
Model	Chilled Water			Hot Water				Steam			
								Supply		Condenser	
	4 Rows	6 Rows	8 Rows	1 Rows	2 Rows	3 Rows	4 Rows	1 Rows	2 Rows	1 Rows	2 Rows
AHU 250	1 ¼"	1 ½"	1 ½"	1"	1"	1 ¼"	1 ¼"	1 ½"	1 ½"	1 ¼"	1 ¼"
AHU 350	1 ½"	2 "	2 "	1 ¼"	1 ¼"	1 ½"	1 ½"	1 ½"	1 ½"	1 ¼"	1 ¼"
AHU 500	1 ½"	2 "	2 "	1 ¼"	1 ¼"	1 ½"	1 ½"	2 "	2 "	1 ½"	1 ½"
AHU 700	2 "	2 "	2 ½"	1 ½"	1 ½"	2 "	2 "	2 "	2 "	1 ½"	1 ½"
AHU 1000	2 "	2 ½ "	2 ½"	1 ½"	1 ½"	2 "	2 "	2 "	2 "	1 ½"	1 ½"
AHU 1200	2*2"	2*2 "	2*2 ½"	2*2 ½"	2*2 ½"	2*2"	2*2"	2*2"	2*2"	2*2 ½"	2*2 ½"
AHU 1500	2*2"	2*2 "	2*2 ½"	2*2 ½"	2*2 ½"	2*2"	2*2"	2*2"	2*2"	2*2 ½"	2*2 ½"
AHU 1700	2*2 ½"	2*2 ½"	2*2 ½"	2*2 ½"	2*2 ½"	2*2"	2*2 ½"	2*2"	2*2"	2*2 ½"	2*2 ½"
AHU 2000	2*2 ½"	2*2 ½"	2*2 ½"	2*2 ½"	2*2 ½"	2*2"	2*2 ½"	2*2"	2*2"	2*2 ½"	2*2 ½"
AHU 2200	2*2 ½"	2*2 ½"	2*2 ½"	2*2 ½"	2*2 ½"	2*2"	2*2 ½"	2*2"	2*2"	2*2 ½"	2*2 ½"
AHU 2500	4*2"	4*2 "	4*2 ½"	4*2 ½"	4*2 ½"	4*2"	4*2"	4*2"	4*2"	4*2 ½"	4*2 ½"
AHU 3000	4*2"	4*2 "	4*2 ½"	4*2 ½"	4*2 ½"	4*2"	4*2"	4*2"	4*2"	4*2 ½"	4*2 ½"
AHU 3500	4*2 ½"	4*2 ½"	4*2 ½"	4*2 ½"	4*2 ½"	4*2"	4*2 ½"	4*2"	4*2"	4*2 ½"	4*2 ½"
AHU 4000	4*2 ½"	4*2 ½"	4*2 ½"	4*2 ½"	4*2 ½"	4*2"	4*2 ½"	4*2"	4*2"	4*2 ½"	4*2 ½"
AHU 4500	4*2 ½"	4*2 ½"	4*2 ½"	4*2 ½"	4*2 ½"	4*2"	4*2 ½"	4*2"	4*2"	4*2 ½"	4*2 ½"





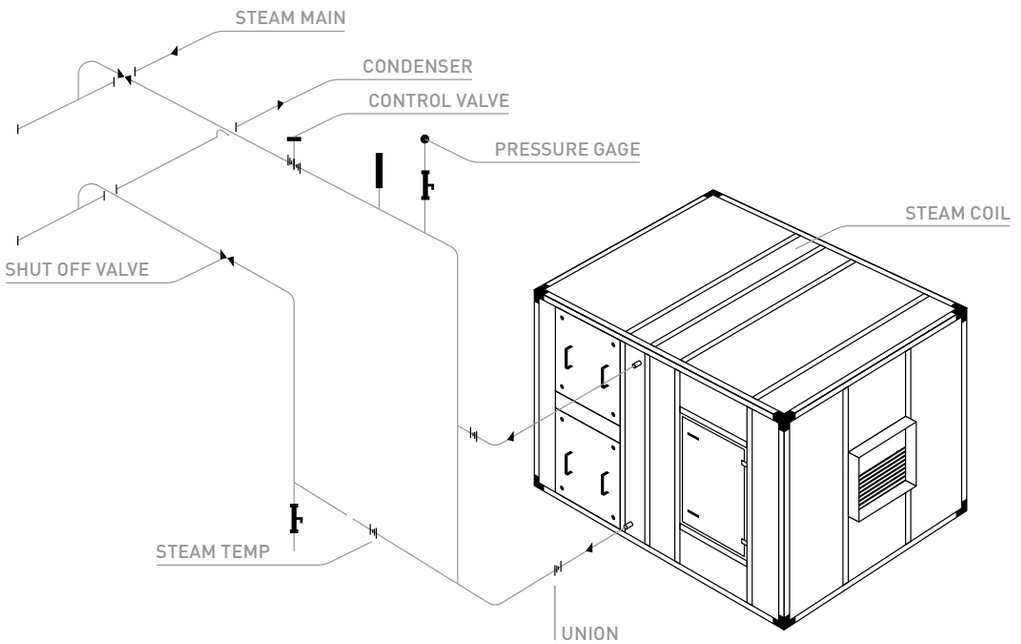
K = MIN. ½"
H = ½" PLUS MAXIMUM
TOTAL STATIC PRESSURE



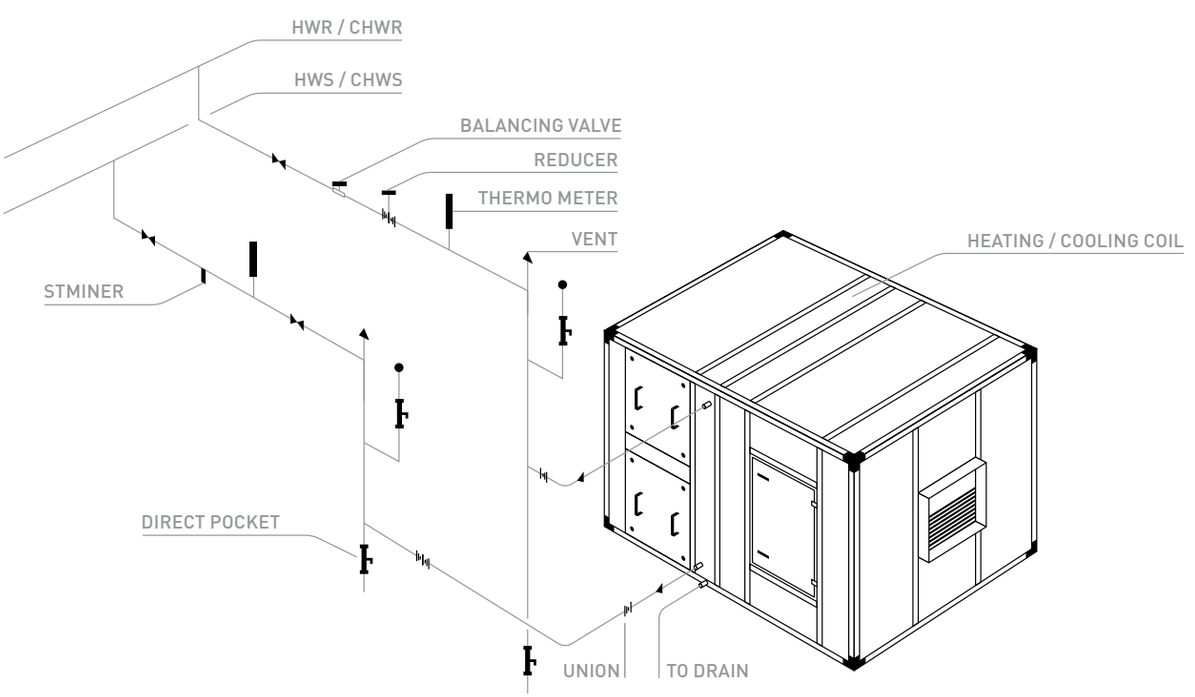
K = (1" FOR EACH 1" OF MAXIMUM
NEGATIVE STATIC PRESSURE)
J = HALF OF H
L = H + J + PIPE DIAMETER + INSULATION

Drain Pan Trapping

* Right Handed Connection Are Shown



Suggested Coil Connection Details for Steam Coils



Suggested Coil Connection Details for Heating and Cooling Coils

Table 16	Air Filter Pressure Drop (in.w.g)									
Filters	Face Velocity FPM									
	300	350	400	450	500	550	600	650	700	800
Cleanable	0.037	0.050	0.065	0.081	0.099	0.120	0.156	0.182	0.235	0.325

Table 17	Coil Face Velocity									
Fin Per Inch	Rows Deep	Face Velocity FPM								
		300		400		500		600	700	800
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Dry	Dry
8	1	0.05	0.07	0.07	0.1	0.10	0.14	0.14	0.19	0.22
	2	0.09	0.14	0.15	0.2	0.22	0.29	0.3	0.39	0.48
	3	0.11	0.2	0.16	0.31	0.28	0.44	0.39	0.5	0.62
	4	0.15	0.25	0.24	0.4	0.35	0.58	0.48	0.61	0.77
	6	0.24	0.39	0.34	0.61	0.52	0.85	0.71	0.92	1.15
	8	0.30	0.5	0.47	0.82	0.71	1.05	0.95	1.18	1.46

Cont. Table 17	PD Correction Factor		
	Coil Fpi		
8	10	12	14
1	1.16	1.32	1.45

Note:
In order to determine air-side coil pressure drop for cases where the number of fins per inch are greater than 8 Fpi, multiply the values by the corresponding correction factor given in the table above.

AIR SIDE PRESSURE REDUCTION ACCESSORIES (IN.W.G)

Table 18	(At 500 FPM Velocity)								
Model	Diffuser	Air Washer		Face & By pass	Damper	Mixing Box without Filter	Electrical Heater	Eliminator	Back Draft Damper
		Class 4	Class 6,8						
250 -1200	0.03	0.22	0.4	0.21	0.05	0.06	0.02	0.1	0.2
1500 - 4500	0.04	0.25	0.45	0.25					

Table 19	Velocity Correction Factor							
Coil Face Velocity	350	400	450	500	550	600	700	800
Cooling Coil	0.8	0.88	0.94	1.0	1.05	1.11	1.19	1.28
Heating Coil	0.86	0.92	0.96	1.0	1.03	1.06	1.11	1.15

Table 20	Velocity Correction Factor		
No. Of Rows	Fin Per Inch		
	8	10	12
4	1	1.1	1.19
6	1	1.08	1.15
8	1	1.06	1.1

Note: In order to determine capacity of coils with 10 or 12 Fpi, multiply the capacity Relative to 8 Fpi by the corresponding correction factor given in the table 16.

Table 21	Correction Factor For Ethylene Glycol Mixture		
Mixture (by Weight)		Freezing Point	Correction Factor For Cooling
Water	Ethylene Glycol		
100	0	0	1
90	10	-4	1.02
85	15	-6.1	1.03
80	20	-9	1.05
75	25	-12	1.07
70	30	45.6	1.09
65	35	49.4	1.11
60	40	-24	1.14
55	45	29.4	1.17
50	50	36.1	1.2
45	55	-45	1.23

Flow Rate = GPM * Correction Factor (Table 18)

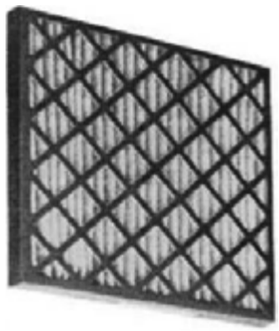
Table 22	Steam Correction Factor								
Pressure PSIG	2	5	10	15	20	30	40	50	60
Correction Factor	0.95	1	1.07	1.14	1.19	1.28	1.35	1.42	1.48

Table 23	Hot Water Correction Factor			
Entering Water Temperature °F	160	180	200	220
Correction Factor	0.75	1	1.25	1.5

Table 24	Chilled Water Correction Factor			
Entering Water Temperature °F	42	44	45	46
Correction Factor	1.09	1.04	1	0.97

1. Aluminum Washable

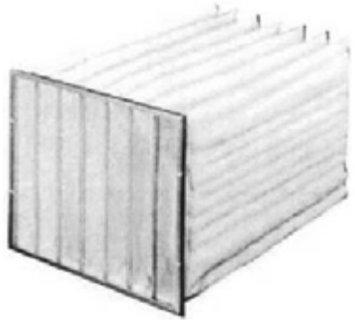
High capacity, low resistance, permanent metal filters, which can be Cleaned in hot water with detergent. They can be used for air cleanliness Required 65-70% arrestance or as an economical alternate to disposable Type pre – filter of high efficiency filter.



EU Class	2
Arrestance (%)	65-80

2. Panel Filter (Disposable)

Heavy duty disposable panel filters giving primary protection to the Conditioned space or protect more expensive secondary filters. They are available in synthetic fiber pleated media consist of continuous Filament fiber glass of progressive density.



EU Class	3	4	5
Arrestance (%)	80-90	90-95	-
Dust Spot Efficiency (%)	20-25	25-40	40-60

3. Bag Filter

When high performance air filtration long service life and high dust Holding capacity required in air handling unit, then extended surface Pocket filters are selected. Filters are available in various efficiency depths, And number of pockets. Dust holding capacity is maximized because dirt is Evenly loaded throughout the entire depth of the filter.

EU Class	6	7	8	9
Dust Spot Efficiency (%)	60-80	80-90	90-95	95-99

4. Hepa Filters

Hepa filter are used to remove airborne biological contaminants in hospital Critical area. Pharmaceutical processing industries as well as to meet exact Requirements of the laboratories and precision manufacturing and micro Electronic industries. Filters are available in 99.97 or 99.99 % efficiency With plywood or galvanized steel casing. Hepa filters are installed on specially Designed knife edge type seal framing system with pressure tight lock to Prevent air by pass.

EU Class	11	12	13	14
Dust Spot Efficiency (%)	99.9-99.97	99.97-99.99	99.99-99.999	99.999-99.9995

Azar Nasim air washers are designed & manufactured in three basic classes.

Class 4:
A compact & economical single spray nozzle bank air washer specially designed for effective humidifying and air washing purposes.

Class 6:
A single spray nozzle bank unit for medium capacity applications, the ideal air washer for most types evaporative Cooling & air washing tasks.

Class 8:
Highly efficient heavy duty units with two spray nozzle banks used whenever the utmost in heat transfer humidification or air cleaning is required.

Casings and water basins are made of galvanized steel sheets. Basins are 300 mm deep for classes 4 & 6, 400 mm deep for class 8.

Moisture eliminators installed side by side in close proximity of each other preventing the water droplets From entering the fan section. They also present a large surface area against which water droplets & dust Particles first impinge before ending up in the basin.

Centrifugal spray nozzles, contain no cores, vanes of obstructions of any kind and all inside surface are Smooth. Nozzles have removable caps which can be taken off for cleaning purposes.

Brass flooding nozzles are installed on separate headers extending across the air washer. They deliver a Solid flat stream of water on to the eliminator surface in order to wash off the dust particles & deposits.

An access door with glass inspection window is available on all models.

Make – up water connection & an automatic float valve which controls the water level in the basin are Provided.

Quick fill connection to which the fresh water supply may be connected is furnished for rapid filling of the Basin.

Evaporative Cooling Efficiency (E) / Class 4

Table A					
Air Velocity	450	475	500	525	550
E	0.594	0.572	0.555	0.536	0.519

Evaporative Cooling Efficiency (E) / Class 6 & 8

Table B											
P.F	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.0
E	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.95	1.0

Air Washer Performance Factors (P.F)

Table C												
Model	250		350		500		700		1000		1200	
	C 6	C 8	C 6	C 8	C 6	C 8	C 6	C 8	C 6	C 8	C 6	C 8
P.F	0.525	0.815	0.525	0.815	0.548	0.821	0.548	0.821	0.548	0.821	0.548	0.821

Cont. Table C												
Model	1500		1700		2000		2200		2500		3000	
	C 6	C 8	C 6	C 8	C 6	C 8	C 6	C 8	C 6	C 8	C 6	C 8
P.F	0.571	0.854	0.571	0.854	0.571	0.854	0.571	0.854	0.548	0.821	0.571	0.854

Cont. Table C						
Model	3500		4000		4500	
	C 6	C 8	C 6	C 8	C 6	C 8
P.F	0.571	0.854	0.571	0.854	0.571	0.854

Given: Entering air DB temperature = 95 °F
Entering air WB temperature = 63 °F
Sensible cooling load = 85 MBH
Design air flow rate = 10000 CFM
Room DB temperature = 77 °F

Determine the required air washer model,
Q = 1.085 × CFM × (D.B Room, - D.B Lvg.)

$$\text{D.B Lvg. = D.B Room} = 77 - \frac{85000}{1.085 \times 1000} = \mathbf{69.16\ F}$$

Considering the required air flow rate in CFM & the unit available nominal air flow rate, air handling unit Model AHU–1000 is chosen.
Evaporative cooling efficiency (E) is determined as,

$$E = \frac{\text{D.B. Ent - D.B. Lvg}}{\text{D.B. Ent - W.B. Ent}} = \frac{95 - 69.16}{95-63} = \mathbf{0.8}$$

The coil face area for model 1000 is 20ft² therefore.

$$\text{F.V} = \frac{10000}{20} = \mathbf{500\ FPM}$$

Considering the air velocity & the values in table (A) the (E) value for Class 4 air washer is equal to 0.555 Which is less than the calculated value therefore Class 4 air washer dose not fulfill the requirement. In This case since the (E) value is known, the (P.F) value from table (B) is determined as being equal to 0.75 Now, considering the unit model AHU – 1000, the (P.F) value & table (C) the (P.F) value for Class 6 air Washer is less than the value calculated therefore; Class 8 washer fulfills therequirement. We also notice that the (P.F) value given is 0.821, the actual (E) value is 0.856 (Table B) the Lvg. Air DB temperature is given as.
DB Lvg = DB Ent – E × (D.B Ent – WB Ent) = 95 – 0.821 × (95 – 63) = 68.7 °F
Therefore, the actual air washer cooling capacity is given as.

Q = 1.085 × CFM × (D.B Room – DB Lvg) = 1.085 × 10000 × (77 – 68.7) = 90055 BTU/hr. ~ 90 MBH
Entering the metric chart with the leaving air DB & WB temperatures of 68.7 °F & 63 °F Respectively, the relative humidity of the air is determined to be 73%.

Note:
Abbreviations Ent & Lvg. notes air Entering & Leaving air washer.

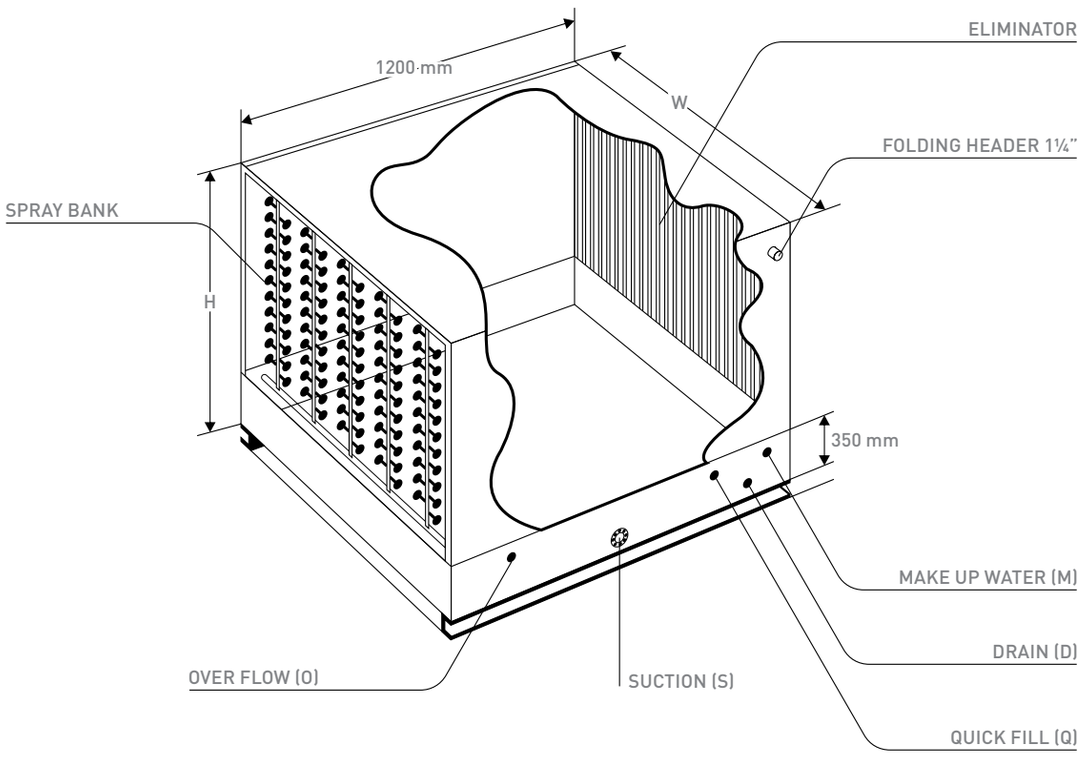


Table 25	Engineering Data														
Model	Nominal CFM	Face Area ft²	GPM	Nozzle Head	Pump Head	Weight (Kg)		Dimensions (mm)		Connections (inch)					
						Net.	Oper.	W	H	D	O	S	H	M	Q
AHU 250	2500	5	11	55	59	250	510	1000	1170	1	1	1 ½	1 ½	¾	¾
AHU 350	3500	7	15	55	60	300	560	1100	1320	1	1	1 ½	1 ½	¾	¾
AHU 500	5000	10	24	55	60	350	730	1500	1470	1	1	1 ½	1 ½	¾	¾
AHU 700	7000	15	35	55	61	400	780	1500	1670	1	1	2	2	¾	¾
AHU 1000	10000	20	44	55	62	500	1025	2000	1750	1	1	2	2	¾	¾
AHU 1200	12500	25	59	55	62	550	1075	2000	1950	1	1	2	2	¾	¾
AHU 1500	15000	30	63	55	63	600	1125	2000	2250	1	1	2 ½	3	¾	¾
AHU 1700	17500	35	70	55	64	650	1250	2250	2250	1	1	2 ½	3	¾	¾
AHU 2000	20000	40	79	55	64	700	1360	2400	2330	1	1	3	3	¾	¾
AHU 2200	22500	45	97	55	64	800	1550	2400	2530	1	1	3	3	¾	¾
AHU 2500	25000	50	119	55	62	1100	2150	3200	2130	2*1	2*1	2*2	2*2	¾	¾
AHU 3000	30000	60	126	55	63	1200	2250	4000	2130	2*1	2*1	2*2 ½	2*3	¾	¾
AHU 3500	35000	70	140	55	64	1300	2500	4200	2230	2*1	2*1	2*3	2*3	¾	¾
AHU 4000	40000	80	158	55	64	1400	2720	4500	2350	2*1	2*1	2*3	2*3	¾	¾
AHU 4500	45000	88	194	55	64	1600	3100	5000	2450	2*1	2*1	2*3	2*3	¾	¾

Note:
1. Nozzle head and pump head in feet of water.
2. Roughing in dimensions and specifications.

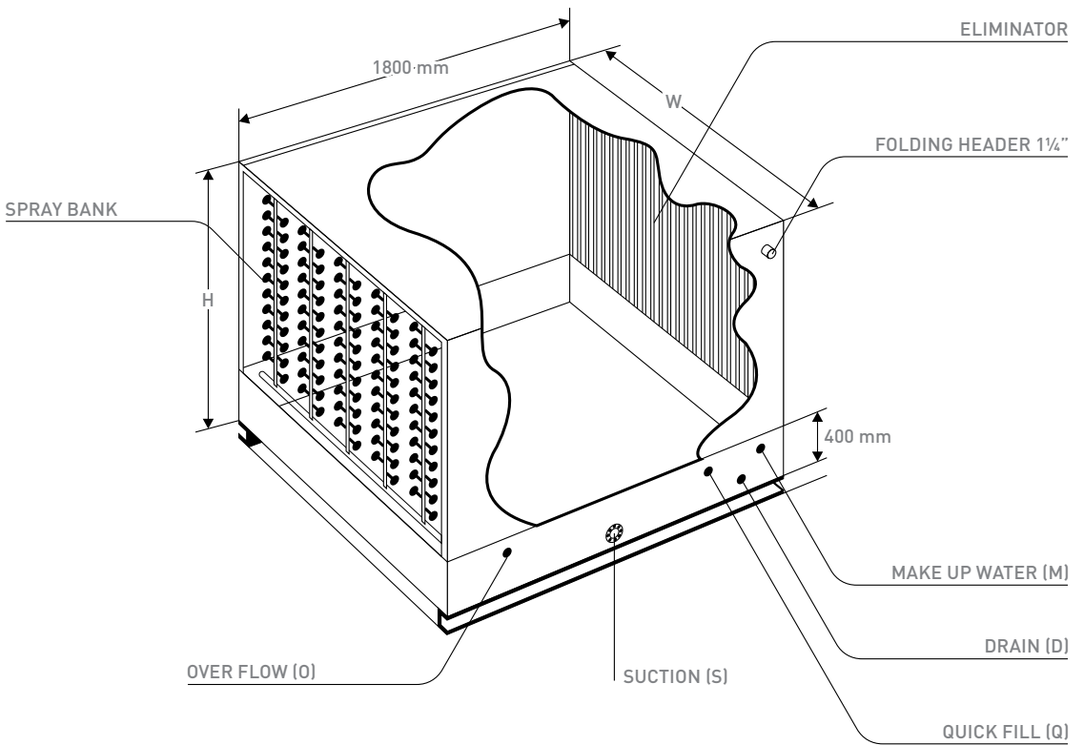


Table 26 — **Engineering Data**

Model	Nominal CFM	Face Area ft²	GPM	Nozzle Head	Pump Head	Weight (Kg)		Dimensions (mm)		Connections (inch)					
						Net.	Oper.	W	H	D	O	S	H	M	Q
AHU 250	2500	5	15	55	59	450	950	1000	1220	1	1	2	1 ½	¾	¾
AHU 350	3500	7	22	55	60	500	1000	1100	1370	1	1	2	1 ½	¾	¾
AHU 500	5000	10	35	55	60	550	1280	1500	1520	1	1	2	1 ½	¾	¾
AHU 700	7000	15	46	55	61	600	1330	1500	1720	1	1	2	2	¾	1
AHU 1000	10000	20	62	55	62	720	1700	2000	1800	1	1	2 ½	2	1	1
AHU 1200	12500	25	79	55	62	825	1800	2000	2000	1 ½	1 ½	3	2	1	1
AHU 1500	15000	30	95	55	63	900	1900	2000	2300	1 ½	1 ½	3	3	1	1
AHU 1700	17500	35	101	55	64	980	2100	2250	2300	1 ½	1 ½	3	3	1	1
AHU 2000	20000	40	119	55	64	1050	2300	2400	2380	1 ½	1 ½	2*2½	3	1	1
AHU 2200	22500	45	143	55	64	1200	2600	2400	2580	1 ½	1 ½	2*2½	3	1	1
AHU 2500	25000	50	158	55	62	1650	3600	3200	2180	2*1½	2*1½	2*3	2*3	1	1
AHU 3000	30000	60	190	55	63	1800	3800	4000	2180	2*1½	2*1½	2*3	2*3	1	1
AHU 3500	35000	70	202	55	64	1960	4200	4200	2280	2*1½	2*1½	2*3	2*3	1	1
AHU 4000	40000	80	238	55	64	2100	4600	4500	2400	2*1½	2*1½	2*3	2*3	1	1
AHU 4500	45000	88	286	55	64	2400	5200	5000	2500	2*1½	2*1½	2*3	2*3	1	1

Note:
1. Nozzle head and pump head in feet of water.
2. Roughing in dimensions and specifications.

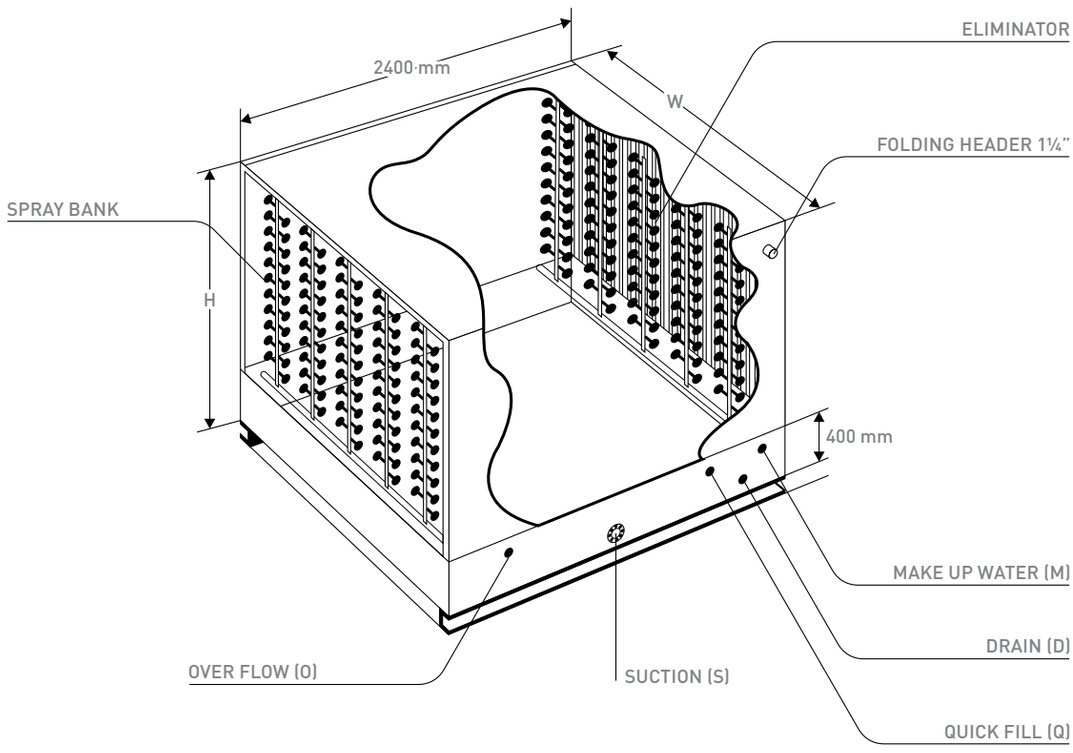


Table 27	Engineering Data														
Model	Nominal CFM	Face Area ft²	GPM	Nozzle Head	Pump Head	Weight (Kg)		Dimensions (mm)		Connections (inch)					
						Net.	Oper.	W	H	D	O	S	H	M	Q
AHU 250	2500	5	22	55	59	600	1500	1000	1220	2	2	2	2 ½	¾	¾
AHU 350	3500	7	30	55	60	650	1550	1100	1370	2	2	2	2 ½	¾	¾
AHU 500	5000	10	48	55	60	720	2050	1500	1520	2	2	2 ½	2 ½	¾	1
AHU 700	7000	15	70	55	61	840	2150	1500	1720	2	2	2 ½	2*2	¾	1
AHU 1000	10000	20	97	55	62	950	2750	2000	1800	2	2	3	2*2	1	1
AHU 1200	12500	25	119	55	62	1050	2850	2000	2000	2	2	3	2*3	1	1
AHU 1500	15000	30	127	55	63	1200	3000	2000	2300	2	2	4	2*3	1	1
AHU 1700	17500	35	143	55	64	1375	3400	2250	2300	2	2	4	2*3	1	1
AHU 2000	20000	40	158	55	64	1450	3750	2400	2380	2	2	4	2*3	1	1
AHU 2200	22500	45	191	55	64	1650	4300	2400	2580	2	2	4	2*3	1	1
AHU 2500	25000	50	238	55	62	2100	5700	3200	2180	2*2	2*2	2*3	4*3	1	1
AHU 3000	30000	60	254	55	63	2400	6000	4000	2180	2*2	2*2	2*4	4*3	1	1
AHU 3500	35000	70	286	55	64	2750	6800	4200	2280	2*2	2*2	2*4	4*3	1	1
AHU 4000	40000	80	316	55	64	2900	7500	4500	2400	2*2	2*2	2*4	4*3	1	1
AHU 4500	45000	88	382	55	64	3300	8600	5000	2500	2*2	2*2	2*4	4*3	1	1

Note:
1. Nozzle head and pump head in feet of water.
2. Roughing in dimensions and specifications.

Spray Nozzle Humidifier

Table 28

Model	Nominal CFM	Absorbed Moisture		Header Size
		ΔW=5	ΔW=10	
AHU 250	2500	8	15	1
AHU 350	3500	12	22	1
AHU 500	5000	16	31	1
AHU 700	7000	23	44	1 ¼
AHU 1000	10000	33	62	1 ¼
AHU 1200	12500	42	78	1 ¼
AHU 1500	1500	50	94	1 ¼
AHU 1700	17500	58	125	2
AHU 2000	20000	66	110	2
AHU 2200	22500	75	156	2*1 ¼
AHU 2500	25000	83	140	2*1 ¼
AHU 3000	30000	100	188	2*1 ¼
AHU 3500	35000	116	220	2*2
AHU 4000	40000	132	250	2*2
AHU 4500	45000	150	280	2*2

Electrical Pan Humidifier

Table 28

Model	Nominal CFM	Absorbed Moisture	KW
AHU 250	2500	12	4
AHU 350	3500	18	6
AHU 500	5000	24	8
AHU 700	7000	33	10
AHU 1000	10000	49	16
AHU 1250	12500	60	20
AHU 1500	1500	71	24
AHU 1750	17500	83	28
AHU 2000	20000	95	32
AHU 2250	22500	106	36
AHU 2500	25000	120	40
AHU 3000	30000	142	48
AHU 3500	35000	116	56
AHU 4000	40000	190	64
AHU 4500	45000	212	72

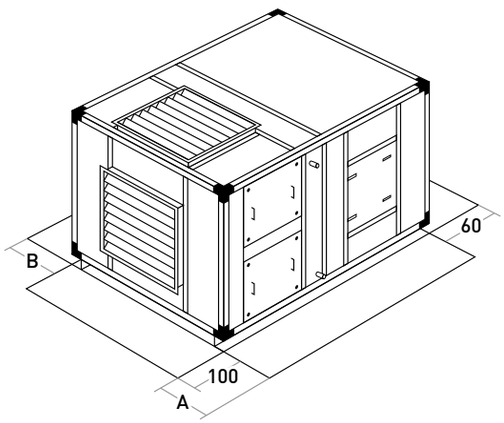
Note:
- Δ W: Moisture difference between air after & before humidifier (Grain / Lb.(of dry air))
- Drain size = 0.5 inch

Table 29

Model	Nominal CFM	Steam Capacity (Lb. /hr.)					
		ΔW=10	ΔW=10	ΔW=10	ΔW=10	ΔW=10	ΔW=10
AHU 250	2500	13	32	46	64	97	129
AHU 350	3500	18	45	64	89	135	180
AHU 500	5000	26	64	92	127	193	257
AHU 700	7000	36	89	128	178	271	361
AHU 1000	10000	52	128	183	255	387	515
AHU 1200	12500	65	160	230	318	481	645
AHU 1500	1500	79	192	275	382	581	773
AHU 1700	17500	92	223	320	445	677	900
AHU 2000	20000	105	256	367	510	775	1030
AHU 2200	22500	118	288	412	573	870	1158
AHU 2500	25000	130	320	460	636	962	1290
AHU 3000	30000	158	384	550	764	1162	1546
AHU 3500	35000	184	246	640	890	1354	1800
AHU 4000	40000	210	512	734	1020	1550	2060
AHU 4500	45000	236	576	824	1146	1740	2316

Note:
- Δ W: Moisture difference between air after & before humidifier (Grain / Lb.(of dry air))
- Steam humidifier rating at 5 PSI pressure.

Single Zone Horizontal



Air Washer

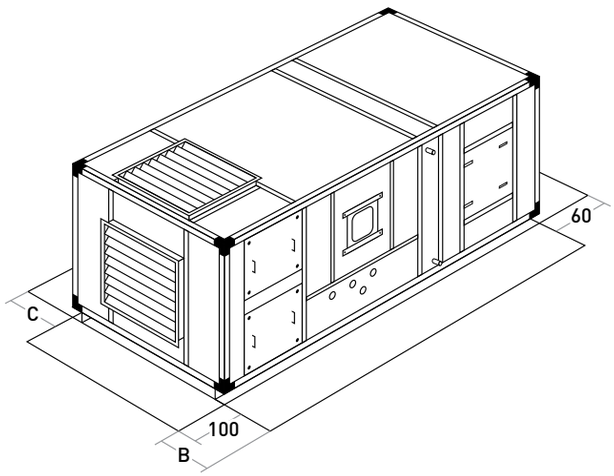


Table 30	Dampers Dimension														
Model	AHU 250	AHU 350	AHU 500	AHU 700	AHU 1000	AHU 1200	AHU 1500	AHU 1700	AHU 2000	AHU 2200	AHU 2500	AHU 3000	AHU 3500	AHU 4000	AHU 4500
A	70	70	80	80	100	100	100	100	120	120	210	210	235	260	275
B	100	100	100	100	100	100	100	100	120	120	210	210	235	260	275
C	110	110	160	160	210	210	210	210	260	275	210	210	235	260	275

Multi - Zone

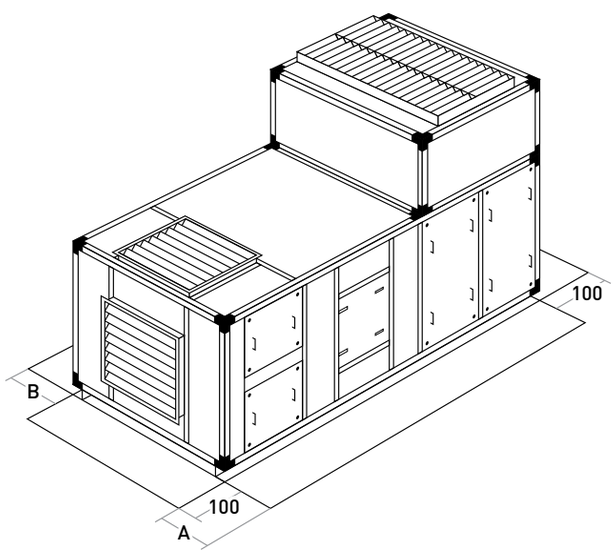


Table 31	Dampers Dimension														
Pos / Model	AHU 250	AHU 350	AHU 500	AHU 700	AHU 1000	AHU 1200	AHU 1500	AHU 1700	AHU 2000	AHU 2200	AHU 2500	AHU 3000	AHU 3500	AHU 4000	AHU 4500
A	70	70	80	80	100	100	100	100	120	120	210	210	235	260	275
B	110	110	160	160	210	210	210	210	260	275	210	210	235	260	275

Note:

- All Dimensions in mm

Table 32

Air Wet Bulb Temp.°F	Altitude (ft.)					
	1	1111	2111	3111	4111	5111
	Enthalpy (BTU / Lb.)					
35	13.0	13.2	13.3	13.5	13.7	13.9
36	13.4	13.5	13.8	14.0	14.2	14.5
37	13.9	14.0	14.3	14.4	14.7	14.8
38	14.2	14.5	14.7	15.0	15.1	15.3
39	14.8	15.0	15.2	15.4	15.6	15.9
40	15.2	15.4	15.7	15.9	16.2	16.4
41	15.7	15.9	16.1	16.4	16.6	16.8
42	16.2	16.4	16.6	16.9	17.2	17.4
43	16.6	16.9	17.1	17.4	17.6	18.0
44	17.2	17.4	17.6	17.9	18.2	18.5
45	17.7	17.9	18.2	18.4	18.7	19.0
46	18.2	18.4	18.7	19.0	19.3	19.6
47	18.7	18.9	19.3	19.5	19.8	20.2
48	19.2	19.5	19.8	20.0	20.4	20.8
49	19.7	20.0	20.4	20.6	21.0	21.3
50	20.3	20.6	20.9	21.2	21.6	22.3
51	20.9	21.2	21.5	21.8	22.2	22.6
52	21.4	21.7	22.1	22.5	22.8	23.2
53	22.0	22.4	22.7	23.1	23.5	24.0
54	22.6	23.0	23.4	23.8	24.1	24.6
55	23.2	23.6	24.0	24.4	24.8	25.3
56	23.8	24.2	24.6	25.0	25.5	25.9
57	24.4	24.8	25.3	25.8	26.2	26.7
58	25.2	25.5	25.9	26.4	26.9	27.4
59	25.8	26.2	26.7	27.2	27.6	28.2
60	26.5	26.9	27.4	27.8	28.4	28.9
61	27.2	27.6	28.1	28.6	29.2	29.7
62	27.9	28.3	28.9	29.4	29.9	30.5
63	28.5	29.0	29.6	30.2	30.7	31.4
64	29.3	29.8	30.3	31.0	31.6	32.2
65	30.1	30.6	31.2	31.7	32.3	33.0
66	30.8	31.4	32.0	32.6	33.3	33.9
67	31.6	32.2	32.8	33.5	34.1	34.8
68	32.4	33.0	33.7	34.3	35.0	35.8
69	33.2	33.9	34.5	35.3	35.9	36.7
70	34.0	34.7	35.4	36.1	36.9	37.6
71	34.9	35.6	36.3	37.0	37.9	38.6
72	35.8	36.5	37.3	38.0	38.8	39.7
73	36.7	37.5	38.2	39.0	39.9	40.7
74	37.6	38.4	39.2	40.0	40.9	41.8
75	38.6	39.4	40.2	41.0	42.0	42.9
76	39.6	40.3	41.2	42.1	43.0	44.0
77	40.6	41.4	42.3	43.2	42.2	45.2
78	41.5	42.5	43.4	44.3	45.3	46.4
79	42.6	43.5	44.5	45.5	46.5	47.5
80	43.7	44.6	45.6	46.6	47.6	48.8
81	44.8	45.8	46.7	47.8	48.8	50.0
82	45.9	46.9	48.0	49.0	50.3	51.4
83	47.0	48.1	49.2	50.3	51.5	52.8
84	48.2	49.3	50.4	51.6	52.9	54.2
85	49.4	50.3	51.7	53.0	54.2	55.6

CONDENCER

AzarNasim
HVAC SYSTEMS

Features

General
Azar Nasim Air cooled Condensers are offered in 12 models with refrigeration capacity range of 18.6 to 2017 MBH, designed to accommodate a wide range of applications in the A/C industry.

Casing
Proper thickness galvanized steel sheets are used in the structure of casing panels and mounting legs formed from heavy steel sheets which are joined by bolts offer maximum rigidity and facilitate repairing.

Coils
Condenser coils consist of seamless cooper tubes mechanically expanded into die formed aluminum or copper fins with 10, 12, 14 FPI spacing. Coils are available in single and multi-circuits.

Fans
Directly driven axial fans, deliver the required air flow rate at minimum sound levels. All fans are equipped with fan guard for maximum protection. Fan operation sequencing is performed based on the liquid refrigerant's pressure leaving the condenser.

Motors
Totally enclosed air cooled (air over body) electric motors equipped with permanently lubricated bearings, an IP-55 protection, winding insulation class of (F) plus thermal protection and B rise construction are mounted in vertical position. The motors are suitable for operation.

Electrical Panel
Consists of a drip proof panel enclosing all electric components such as contactors, over load protections and ...

Testing
Condenser coils have passed the leakage test 450 psig after production and the entire condenser unit has tested at 350 psig working pressure after completion.

Helpful Hints

Maximum allowable condensing temperature for R-22 & R 407 C : 135 °F
Optimum condensing temperature for R-22 & R 407 C : 120 °F
TD: Condensing temperature – Ambient dry bulb temperature.
THR = [System cooling capacity] + [Compressor motor power input x 3413].
When compressor motor power in the formula above is not known use values from table 8 in the following relationship:
THR = [System cooling capacity] x [Heat of compression factor]

Example 1

Given:
System cooling capacity: 210000 BTU/Hr.
Condensing temperature: 120 °F
Ambient air temperature: 100 °F
Compressor power input: 18.2 Kw
Design altitude: 2000 Ft
Coil fin per inch: 14 FPI
Fin material: Aluminum

Select matching air cooled condenser
Determine Total Refrigeration:
THR = 210000 + (18.2 x 3413) = 272117 BTU/Hr.
From Table 2 for altitude adjustment factor (@ 2000 Ft) AF = 1.05
Adjusted THR = (1.05) (272117) = 285723 BTU/Hr.
TD (Design temperature difference) = (120 –100) =20 °F
From table (4) and TD of 20 °F. ANC 250 with plate fins offers 273000 BTY/Hr. which fulfills the above required THR.

Example 2

Given:
System Total Heat Rejection (THR): 350000 BTU/Hr.
Condensing temperature: 120 °F
Ambient air temperature: 100 °F
Altitude: 4000 Ft
Coil fin per inch: 10 FPI
Fin material: Copper
Refrigerant: R 22

Select matching air cooled condenser
TD: Cond Temp - Ambient Temp = 120-100 = 20 °F
Total Heat Rejection Requirement = THR x Correction Factor (Table 10) / Correction Factor (Table 9) = 350000 x 1.10/085 = 452941 BTU/Hr.
= 452.941 MBH from Table (10) and T.D of 20 °F, ANC-450 offers.

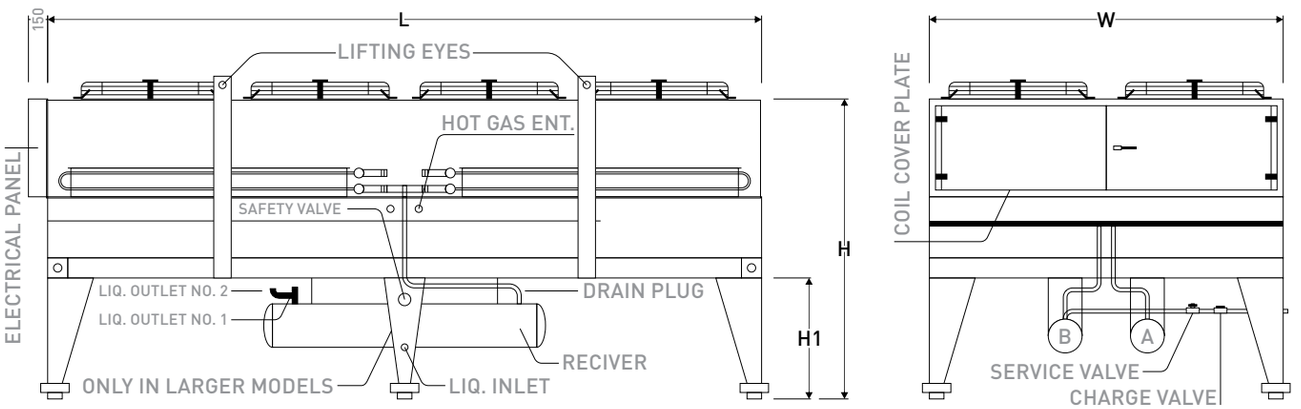


Table 1	Dimensions											
Model	Anc 050	Anc 060	Anc 120	Anc 180	Anc 250	Anc 350	Anc 450	Anc 550	Anc 700	Anc 850	Anc 1000	Anc 1200
L	900	1300	1500	1950	2500	2500	3000	3000	4300	5300	6300	6300
W	830	1000	1200	1210	1450	1950	1950	2400	2400	2400	2400	2400
H	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
H_1	600	600	600	600	600	600	600	600	600	600	600	600

Note: 1. All dimensions in mm. 2. Given (K) & (L) valves are the minimum allowable.

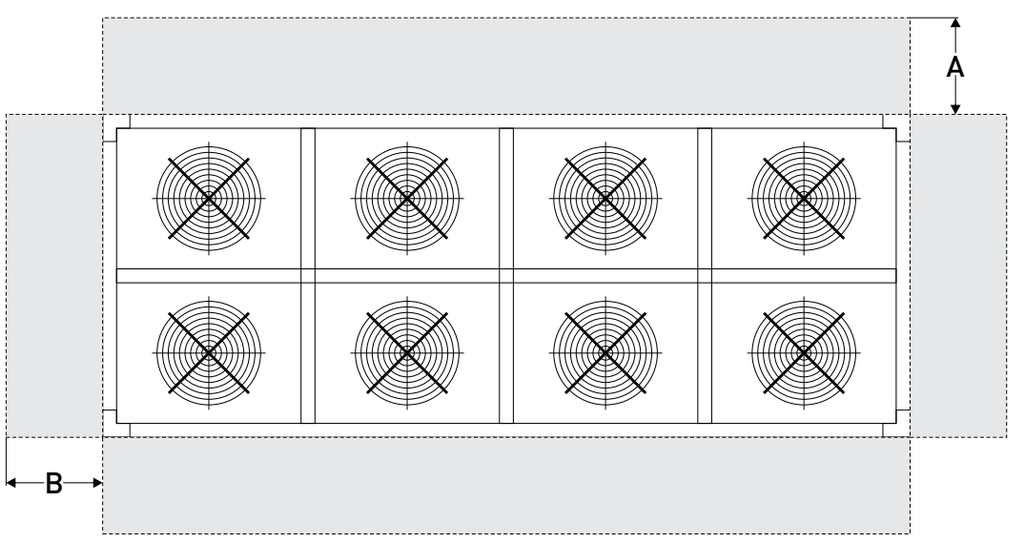
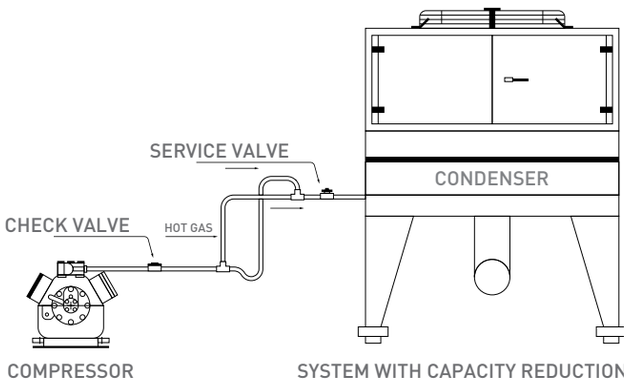
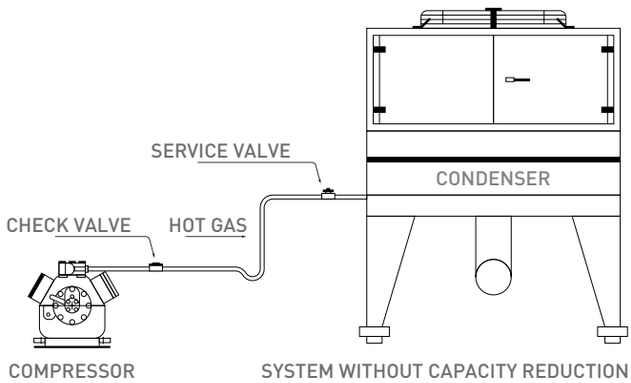
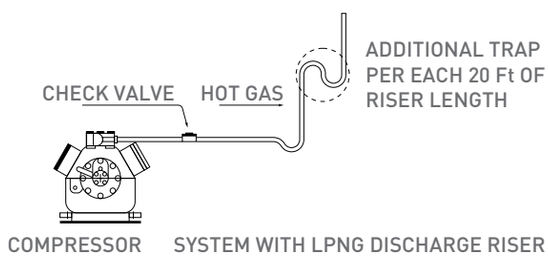


Table 2	Dimensions											
Model	Anc 050	Anc 060	Anc 120	Anc 180	Anc 250	Anc 350	Anc 450	Anc 550	Anc 700	Anc 850	Anc 1000	Anc 1200
A	1200	1400	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
B	1100	1100	1100	1300	1300	1300	1300	1300	1300	1300	1300	1300







Note:

1. All horizontal piping segments must be sloped 1/2 In. per each 10 Ft. of Length in the direction of flow.
2. For proper oil return back to compressor. Install air cooled condenser a minimum of (1m) above the compressor.

Table 3 -Recommended Refrigerant Line Sizes O.D. (inch)

Evaporator Cooling Capacity	Inlet Discharge Line Equivalent Length Ft.				Outlet Liquid Line Equivalent Length Ft.			
Btu/Hr.	50	100	150	200	50	100	150	200
18 000	5/8	5/8	5/8	7/8	3/8	3/8	1/2	1/2
24 000	5/8	7/8	7/8	7/8	3/8	1/2	1/2	1/2
36 000	7/8	7/8	7/8	7/8	1/2	1/2	1/2	1/2
48 000	7/8	7/8	7/8	1 1/8	1/2	5/8	5/8	5/8
60 000	7/8	1 1/8	1 1/8	1 1/8	1/2	5/8	5/8	5/8
75 000	7/8	1 1/8	1 1/8	1 1/8	1/2	5/8	5/8	5/8
100 000	1 1/8	1 3/8	1 3/8	1 3/8	5/8	7/8	7/8	7/8
150 000	1 1/8	1 3/8	1 3/8	1 3/8	7/8	7/8	7/8	7/8
200 000	1 3/8	1 5/8	1 5/8	1 5/8	7/8	7/8	1 1/8	1 1/8
300 000	1 1/3	1 5/8	1 5/8	2 1/8	1 1/8	1 1/8	1 1/8	1 1/8
400 000	1 5/8	2 1/8	2 1/8	2 1/8	1 1/8	1 1/8	1 3/8	1 3/8
500 000	2 1/8	2 1/8	2 1/8	2 1/8	1 1/8	1 3/8	1 3/8	1 3/8
600 000	2 1/8	2 1/8	2 1/8	2 5/8	1 3/8	1 3/8	1 3/8	1 5/8
750 000	2 1/8	2 5/8	2 5/8	2 5/8	1 5/8	1 5/8	1 5/8	1 5/8

Note:

1. Table values are applicable for condensing temperatures of 80 to 135 °F.
2. Given sizes are nominal and may be modified with design condition and the physical characteristics compressors used.

Total Refrigeration for R-22 [MBH]

Table 4	Aluminum Fin				
Model	TD [°F]				
	10	15	20	25	30
Anc 050	18	29	40	51	62
Anc 060	37	59	81	105	130
Anc 120	67	109	153	200	248
Anc 180	76	120	168	218	271
Anc 250	122	195	273	352	434
Anc 350	149	235	327	426	525
Anc 450	193	309	431	558	690
Anc 550	209	379	529	685	846
Anc 700	309	492	687	893	1193
Anc 850	405	646	902	1167	1440
Anc 1000	497	794	1108	1430	1760
Anc 1200	575	910	1261	1622	1990

Table 5	Copper Fin				
Model	TD [°F]				
	10	15	20	25	30
Anc 050	19	29	40	51	63
Anc 060	37	60	83	107	133
Anc 120	69	111	156	205	254
Anc 180	77	123	171	222	276
Anc 250	124	198	277	358	442
Anc 350	151	239	333	432	536
Anc 450	197	313	438	567	702
Anc 550	241	385	538	698	861
Anc 700	314	500	699	908	1123
Anc 850	411	658	918	1188	1465
Anc 1000	504	808	1127	1456	1793
Anc 1200	583	923	1279	1645	2018

Note:

- MBH = 1000 BTU/hr.
- Above given values are based on sea level altitude and 12 Fins per Inch coils. For different Altitude and coil FPI (10, 12, 14), multiply THR value by the appropriate correction factor in Table 10 and divide by correction factor in table 9.

Total Rejection for R-407C [MBH]

Table 6	Aluminum Fin				
Model	TD [°F]				
	10	15	20	25	30
Anc 050	19	28	38	49	60
Anc 060	35	56	79	103	127
Anc 120	64	105	149	195	244
Anc 180	74	117	165	215	266
Anc 250	118	191	267	348	429
Anc 350	142	227	318	414	514
Anc 450	187	299	420	547	678
Anc 550	247	368	518	673	834
Anc 700	298	477	672	875	1085
Anc 850	391	630	885	1150	1422
Anc 1000	482	777	1091	1414	1743
Anc 1200	560	893	1242	1602	1971

Table 7	Copper Fin				
Model	TD [°F]				
	10	15	20	25	30
Anc 050	19	28	39	50	61
Anc 060	36	57	80	105	130
Anc 120	65	107	153	200	249
Anc 180	74	119	166	218	271
Anc 250	120	193	273	353	437
Anc 350	144	231	324	421	525
Anc 450	190	303	427	556	690
Anc 550	233	375	526	685	848
Anc 700	302	485	684	891	1106
Anc 850	397	641	901	1171	1448
Anc 1000	489	792	1111	1440	1775
Anc 1200	567	905	1260	1626	1999

Note:

- MBH = 1000 BTU/Hr.
- Above given values are based on sea level altitude and 12 Fins per Inch coils. For different Altitude and coil FPI (10, 12, 14), multiply THR value by the appropriate correction factor in Table 10 and divide by correction factor in Table 4.

(Hermetic and Semi-Hermetic)

Table 8

Section Temp. °F	CONDENSING TEMP. [°F]					
	90	100	110	120	130	140
-10	1.40	1.46	1.49	1.57	1.64	1.68
0	1.36	1.42	1.44	1.51	1.54	1.62
10	1.32	1.34	1.38	1.43	1.49	1.53
20	1.26	1.30	1.31	1.39	1.42	1.49
30	1.21	1.24	1.30	1.33	1.38	1.44
40	1.19	1.21	1.25	1.27	1.32	1.35
45	1.16	1.20	1.22	1.25	1.30	1.33
50	1.14	1.18	1.20	1.23	1.28	1.30

Coil fin per inch correction factor

Table 9

No. of FPI	Correction Factor
10	0.9
12	1
14	1.08

Altitude Adjustment factor

Table 10

Altitude Ft.	0	1000	2000	3000	4000	5000	6000
Adjustment Factor	1.00	1.03	1.05	1.07	1.10	1.12	1.15

Table 11

Model	Propeller Fan				Coil		Refrigerant R-22		No. of Circuits	Unit Weight Kg
	No.	Diam. Inch	RPM	Total CFM	Rows Deep	Total Face Area Sq.Ft	Charge Kg	Pump down Capacity Kg		
Anc 050	1	20	950	3400	3	7	3	9	1	150
Anc 060	1	26	950	7200	3	12	5	15	1	230
Anc 120	2	26	950	14400	3	18	7	22	1	300
Anc 180	2	26	950	14400	3	24	9	32	1	380
Anc 250	3	26	950	21600	3	36	13	47	2 , 1	540
Anc 350	4	26	950	28800	3	48	18	61	2 , 1	800
Anc 450	5	26	950	36000	3	60	22	73	2 , 1	1030
Anc 550	6	26	950	43200	3	72	27	93	2 , 1	1190
Anc 700	8	26	950	57600	3	96	35	123	2 , 1	1680
Anc 850	10	26	950	72000	3	121	44	152	2 , 1	2000
Anc 1000	12	26	950	86400	3	144	53	187	2 , 1	2350
Anc 1200	12	26	950	84000	4	144	70	245	2 , 1	2690

Note:
System total operating charge = Chiller or packaged unit operating charge + air cooled condenser operating charge + refrigerator Line operating charge (table 13)

Engineering Data

Table 12

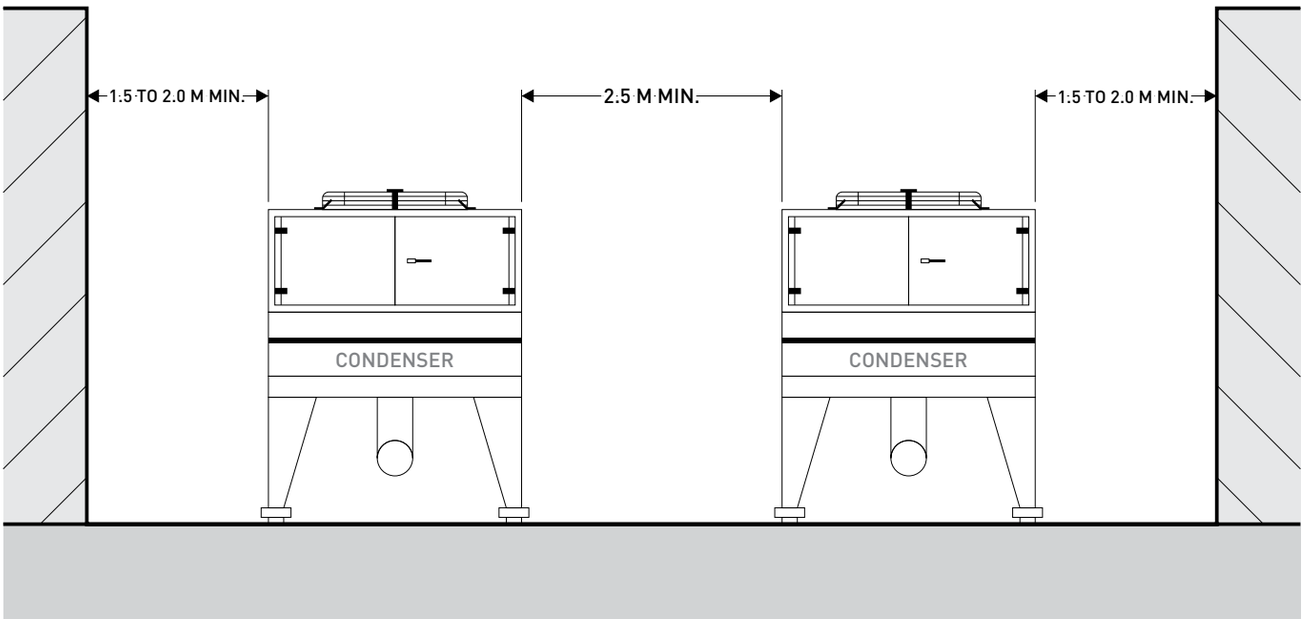
Model	Propeller Fan			Refrigerant R-22			
	No.	Diam. Inch	Total CFM	Rows Deep	Total Face Area Sq.Ft	Charge Kg	Pump down Capacity Kg
Anc 050	1	3/4	1.8	0.55	1.8	6.0	1 x 4
Anc 060	1	1	2.25	1.08	2.25	7.42	1 x 4
Anc 120	2	1	2.25	2.16	4.5	14.85	1.5 x 4
Anc 180	2	1	2.25	2.16	4.5	14.85	1.5 x 4
Anc 250	3	1	2.25	3.24	6.75	22.27	1.5 x 4
Anc 350	4	1	2.25	4.32	9	29.7	2.5 x 4
Anc 450	5	1	2.25	5.4	11.25	37.12	2.5 x 4
Anc 550	6	1	2.25	6.48	13.5	44.55	4 x 4
Anc 700	8	1	2.25	8.64	18	59.4	6 x 4
Anc 850	10	1	2.25	10.8	22.5	74.25	10 x 4
Anc 1000	12	1	2.25	12.96	27	89.1	10 x 4
Anc 1200	12	1	2.25	12.96	27	89.1	10 x 4

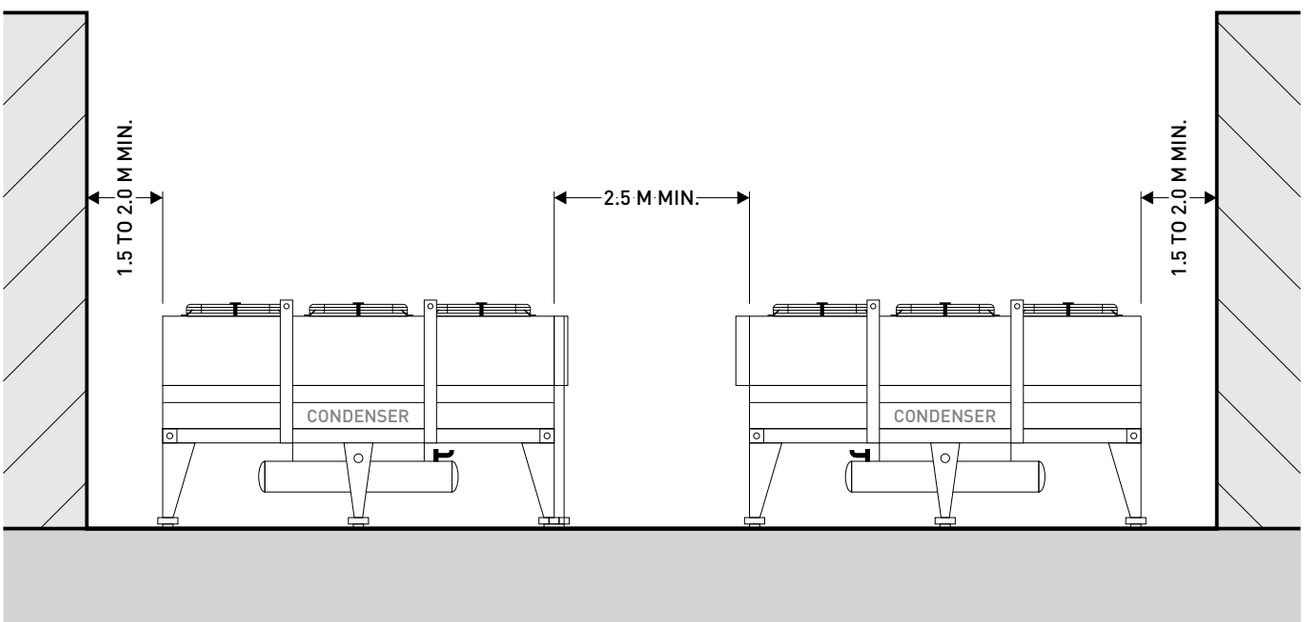
Weight of Refrigerant in copper line Kg per 100 Ft

Table 13

Line Size O.D (In)	Loqid -100°F	Hot Gas -120°F
3/8	1.75	0.10
1/2	3.24	0.17
5/8	5.24	0.28
7/8	10.90	0.57
1/8 1	18.55	0.97
3/8 1	28.23	1.48
5/8 1	40.00	2.10
1/8 2	69.55	3.65
5/8 2	107.27	5.64
1/8 3	152.73	8.05
5/8 3	207.27	10.91
1/8 4	269.10	14.14

Note:
Recommended wire sizes are applicable for distances up 50 meters and maximum ambient temperature of 50C





Note:

- Do not place units near hot air or steam exhaust.
- Place units so that condenser air is not recirculate.
- All types of shading or over hang must be located at least (4M) above the air cooled condenser.

Note:

Note:

ZENT

AzarNasim
HVAC SYSTEMS

Introduction

"Zent" is an air conditioning device which can provide the relatively summer conditioned air by passing fresh air through wet chaff pads.
In winter a combination of returned indoor air and fresh air, after Passing through a washable aluminum filter, first would be cleaned and then pass over a hot water Heating Coil (or electric or steam coil) and warms. In winter conditioned warm air humidity may Increase by different alternatives.

Zent Room
"Zent" would place in a covered area where could be called "Zent Room". The most appropriate Place for the "zent Room" is the center of the building that provides the possibility of entrance of the Fresh air through a window and entrance of the returned air through a damper, to "zent Room".
"Zent Room" ought to contain enough space for supply channels and its floor has to be isolated against water And have drainage, and its better that the walls are acoustic.

"Azar Nasim Zents" Advantages:

1. **Variety**
   Vertical and horizontal models are produced, occupy minimum space.

2. **Fan Controller**
   Usage of speed control, decrease the electric consumption cost and uniform working of unit.

3. **Elimination of radiators and pipe lines**
   Decorativeness, save space , decrease repair costs.

4. **Adjustable Dampers**
   Changing the summer system to the winter system and vise versa in the simplest way and the possibility Of humidifying the winters hot air.

5. **Washable Aluminum Filters**
   Clean air; increase the efficiency of heating Coil and long lasting unit.

6. **Coil is placed inside "Zent"**
   Less heating loss, more safety

7. **Basin Fiberglass Cover**
   Long lasting life and elimination of bacteria.

8. **Very easy Service**
   No needs of professional repairman

9. **Fan**
   Statically and dynamically balanced fan, low noise and more relaxation

AzarNasim H.V.A.C SYSTEMS

Technical Specifications Of Cooling & Heating Zent

Model	Type	Capacity		Chaff		Fan Diameter	Dimensions of Output Span	Electromotor profile			Total static Pressure	Dimensions			Connections		Approximate Weight	
		CFM	Btu/hr	Level	Water evaporation	Ø	A*B	Power	RPM	phase	Ht	Length	Width	Height	Hot water	Flutter	without water	
				m	Lit/hr	In	cm	HP		V	mm-H O_2	cm			Inch		Kg	
15-50	A	1500	50000	1.15	6.5	12	34.5 × 40	1/2	900	Single phase	19	90	70	190	1	3/8	180	290
20-70		2000	70000		8.7			3/4			21						182	292
27-75		2700	75000		11.7			3/4			23						185	295
32-85	B	3200	85000	1.6	13	15	40 × 37.5	3/4		220	19	110	85	210	1	3/8	220	320
45-140		4500	140000		19.3			1 1/2			23						225	325
60-160		6000	160000		25.8			3			20						230	330
70-190	C	7000	190000	3	30	20	63 × 63	3			20	172	120	255	1 1/4	1/2	460	660
80-230		8000	230000		34.5			3			25						465	665
90-280		9000	280000		38.5			4			27						470	670
100-320	D	10000	320000	3.5	43	22	67.5 × 67.5	5 1/2		Three phase	30	172	120	270	1 1/2	1/2	545	785
120-360		12000	360000		52			5 1/2			31						550	790
140-400		14000	400000		56			7 1/2			35						555	795
160-440	E	16000	440000	4.7	65	25	80 × 80	2/1 7	1400	380	35	300	140	195	1 1/2	1/2	645	960
175-470		17500	470000		70			10			40						655	970
190-500		19000	500000		75			10			42						660	975
200-570	F	20000	570000	5.2	80	28	87 × 87	15			40	330	150	215	1 1/2	3/4	790	1200
215-600		21500	600000		85			15			45						792	1202
200-700		23000	700000		90			15			50						796	1205
240-730	G	24000	730000	6.2	95	30	94 × 87	15			50	360	150	231	1 1/2	3/4	900	1400
250-750		25000	750000		100			15			55						905	1405
260-800		26000	800000		105			20			60						915	1415

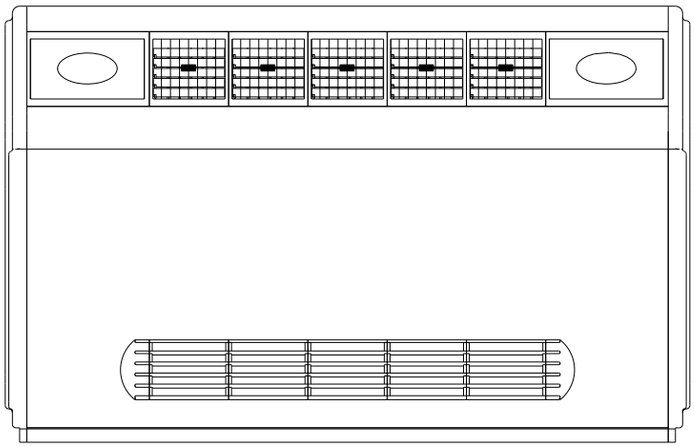
Note:

FAN COIL

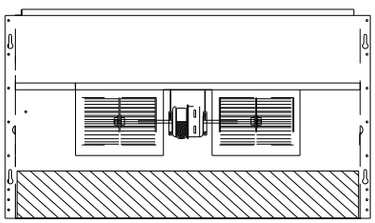
AzarNasim
HVAC SYSTEMS

Coil fin per inch correction factor

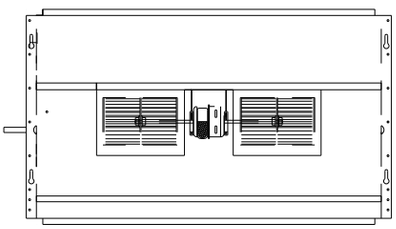
Floor mounted (TDFF)
Wall mounted (TDFW)
Ceiling mounted (TDFC)



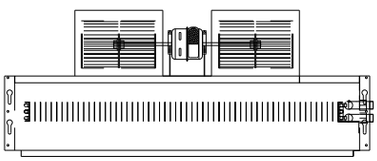
Ceiling Mounted Concealed Fan Coil



Model U
TCFU

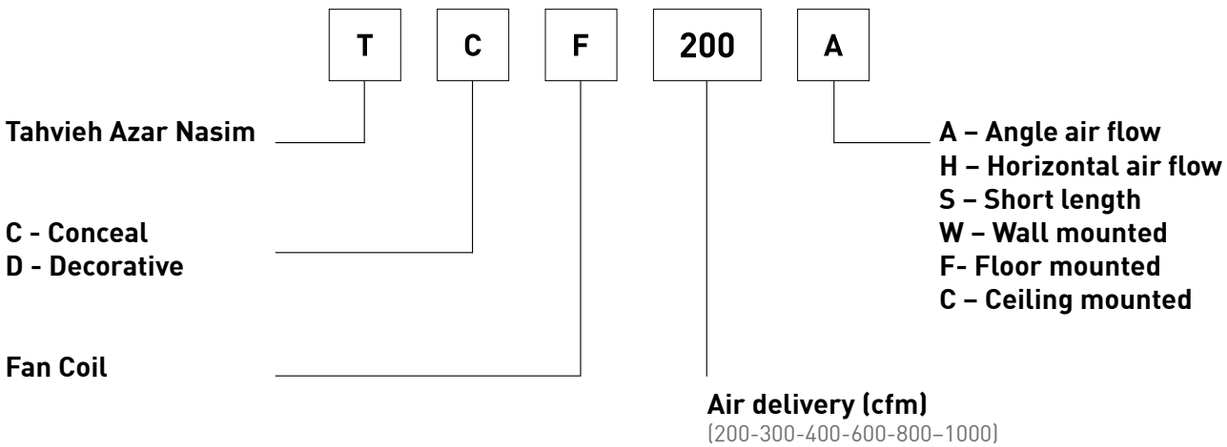


Model L
TCFL



Model H
TCFH

Ceiling Mounted Compact Concealed Fan Coil
Nomenclature



Tahvieh Azar Nasim Company pioneers in air conditioning system productions and industrial processes in Iran. Decorative Fan Coil Units with unique design and structure is one of the products of this company.

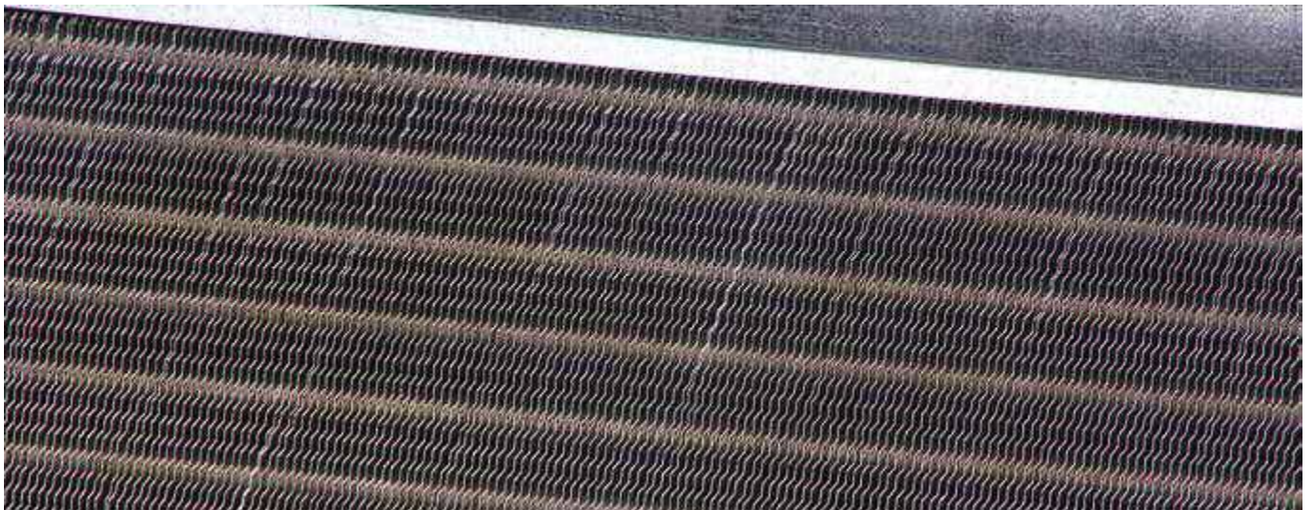
General Description:
Azar Nasim fan coil units are steeped decorative type in different capacities from 200 cfm to 1000 cfm and manufacture in three kinds:

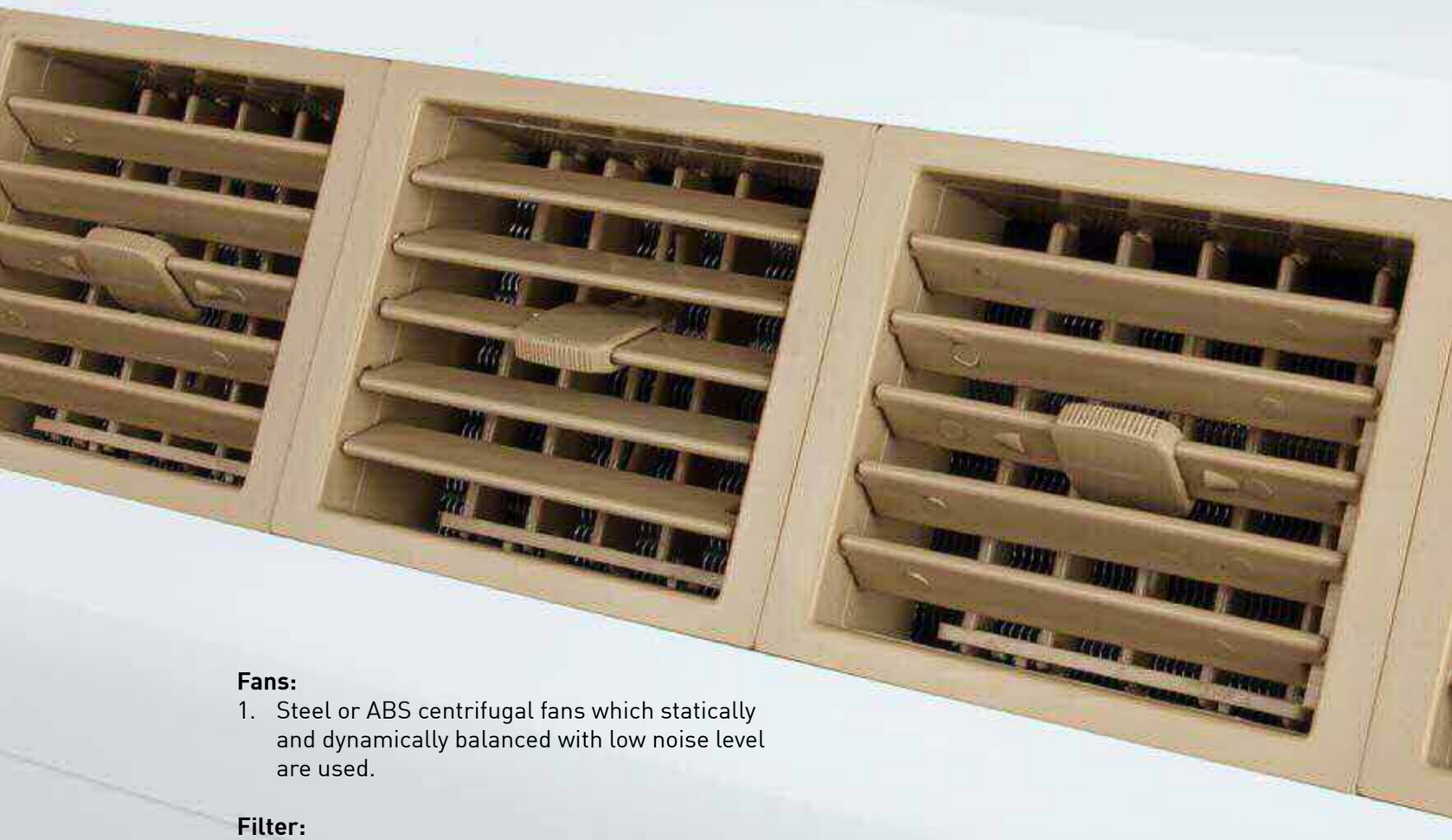
1. Ceiling fan coil unit without cabin
2. Floor mounted fan coil units decorative (with cabin)
3. Ceiling mounted fan coil units decorative (with cabin)

A. Outlet air is adjustable in four directions.
B. Main structure of the units is made of Aluminum profiles.
C. Sides and air outlets are made of ABS.
D. Front panel of the unit is made of mild steel sheets and coated with electrostatic powder paint.
E. All internal sheets and condensate try are hot dip galvanized coated with aero flex insulator.

Coils:
1. Three rows coils (8 tubes in each row) from copper Tubes with diameters of 3/8" and aluminum fins With spacing of 12 FPI is standard part of all Azar Nasim fan coil units. All the coils are Degreased, washed and tested up to 200 Psi.

Electro motors:
1. Fan coil units electromotor are single phase 4speeds, with heat relay to protect the electro motor winding against over loading.





Fans:

1. Steel or ABS centrifugal fans which statically and dynamically balanced with low noise level are used.

Filter:

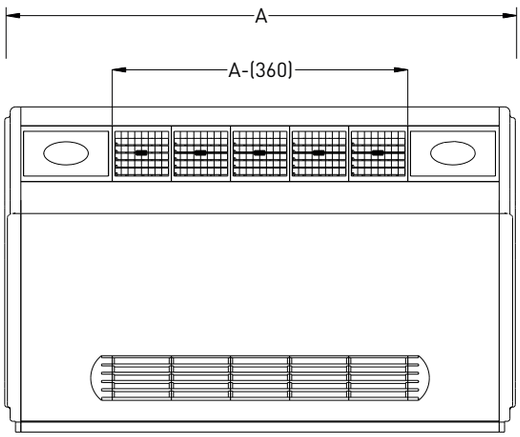
1. Air filter is mounted at air inlet with ABS frame and easily cleanable.

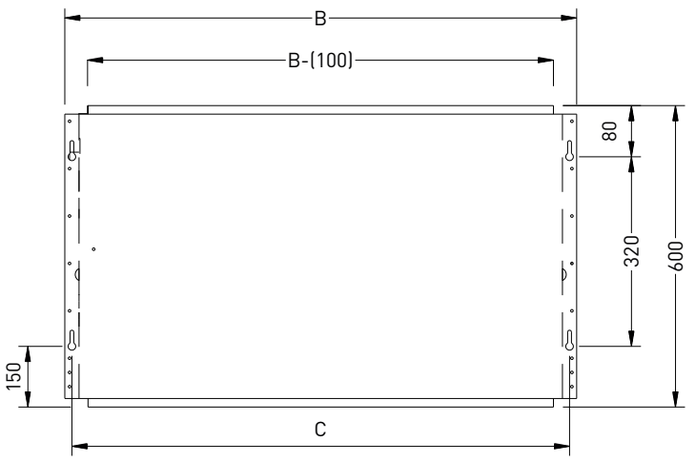
Key Board:

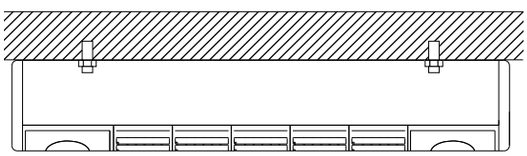
1. Electric key board with OFF chassis and 4 speed touch keys (Night mode, 1-2-and 3) is mounted on fan coil units. Remote control can be provided on client's request.

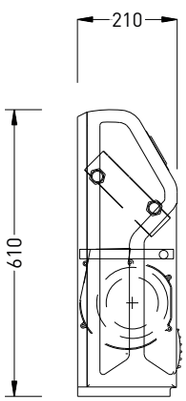
Intelligent Systems:

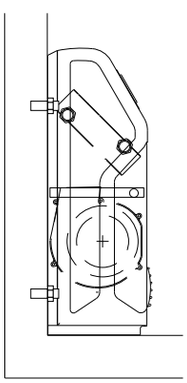
1. This system installed on the fan coil units to protect energy wasting. In case of failure of Chiller, Boiler, or circulation pump or air trap in the coil, intelligent system automatically off the fan coil until the problem is solved.



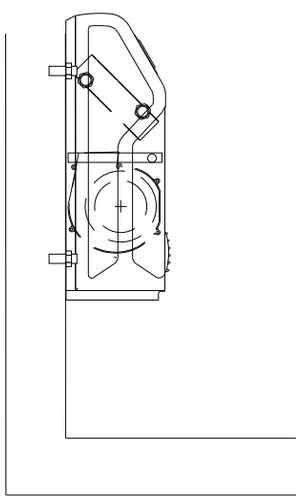






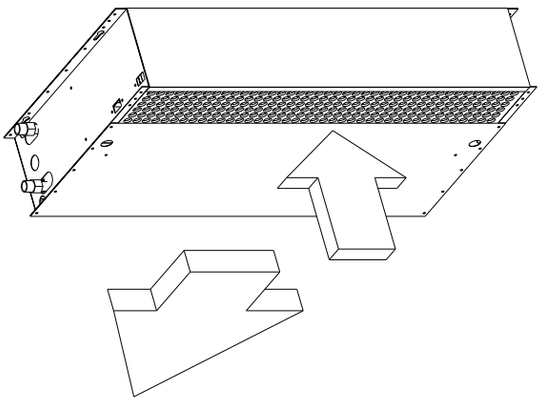


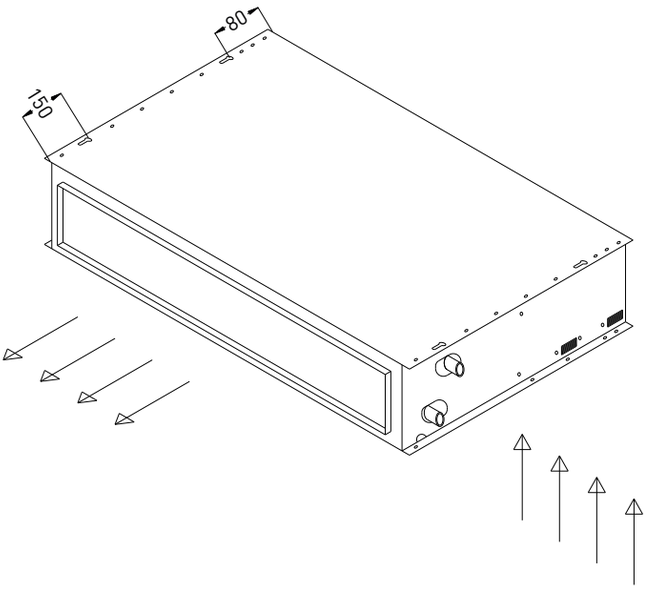
Floor mounted

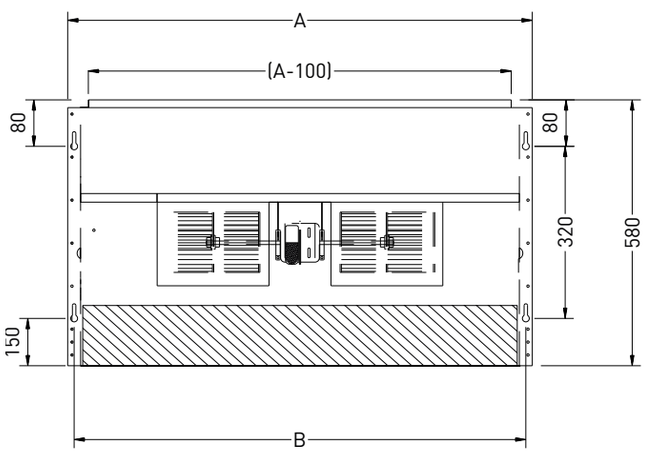


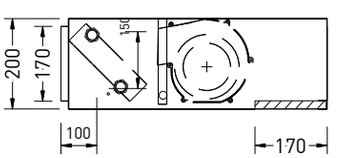
Wall mounted

Table 1	Exposed Decorative Fan Coil Dimensions					
Model	200	300	400	600	800	1000
A (mm)	864	990	1116	1240	1620	1995
B (mm)	562	687	812	937	1312	1687
C (mm)	540	665	790	920	1290	1667









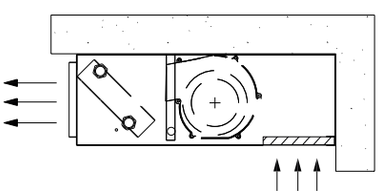
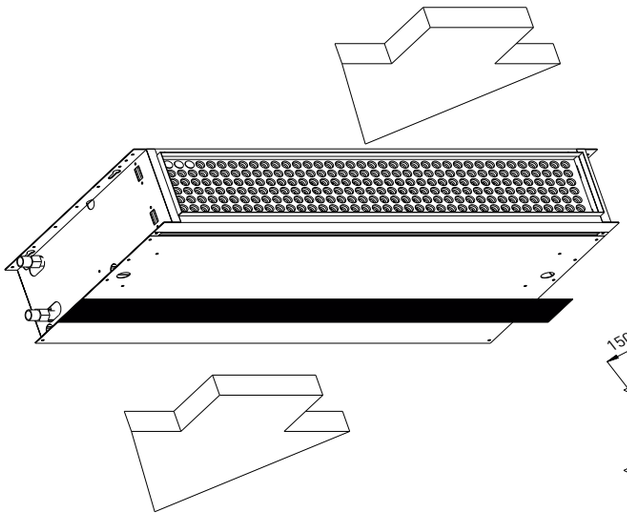
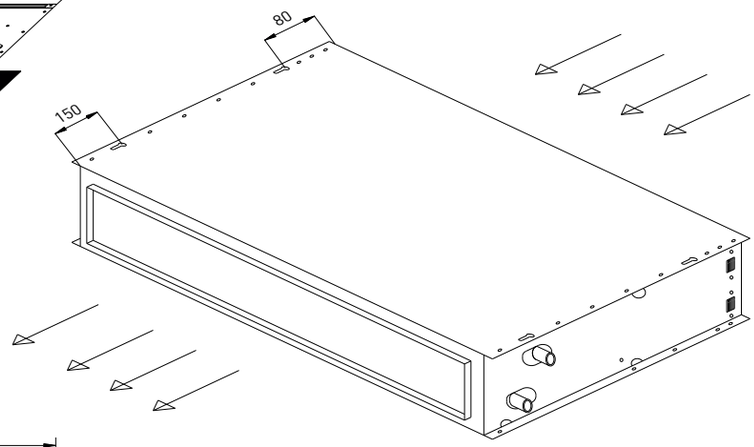
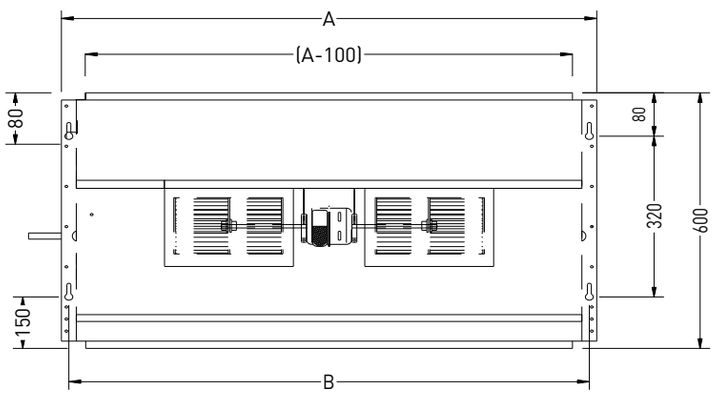
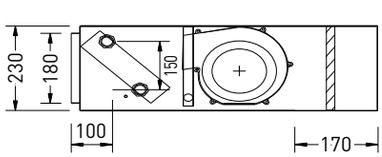


Table 2	Ceiling Mounted Concealed Fan Coil Dimensions					
Model	200	300	400	600	800	1000
A (mm)	562	687	812	937	1312	1687
B (mm)	540	665	790	920	1290	1667









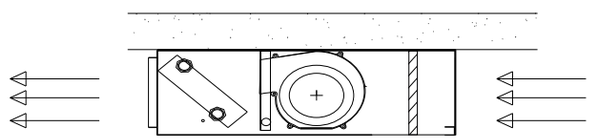
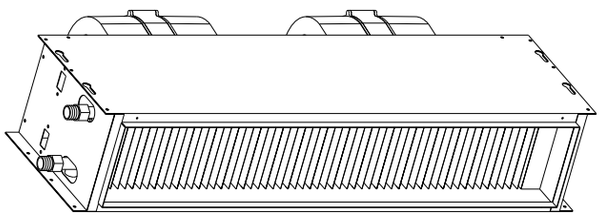
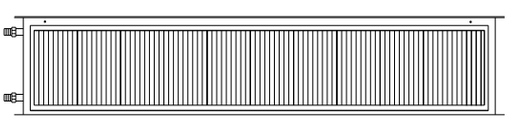
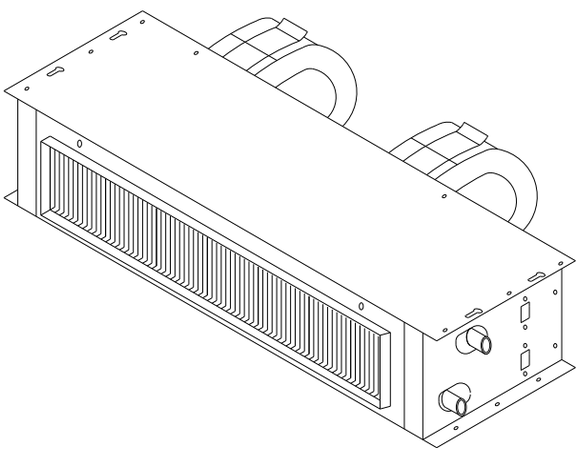
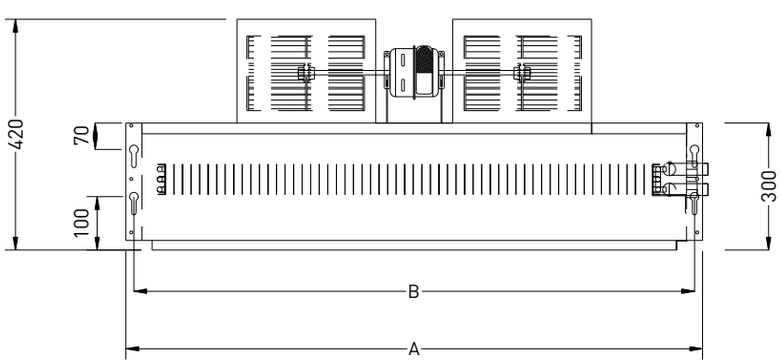


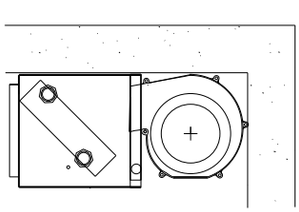
Table 3	Ceiling Mounted Concealed Fan Coil Dimensions					
Model	200	300	400	600	800	1000
A (mm)	562	687	812	937	1312	1687
B (mm)	540	665	790	920	1290	1667











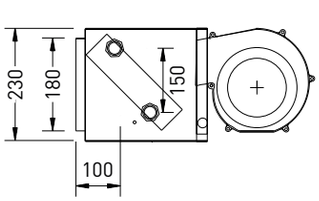


Table 4	Ceiling Mounted Concealed Fan Coil Dimensions					
Model	200	300	400	600	800	1000
A (mm)	610	720	940	1050	1380	1600
B (mm)	562	687	812	937	1312	1687

Table 5	Physical Specifications					
Description	Unit Size					
	200	300	400	600	800	1000
Nomainal Air Flow Rate (Cfm)	200	300	400	600	800	1000
*Unit Weight (Kg)	21	24	27	30	45	54
Number of Motors	1	1	1	1	2	2
Nominal Power (W)	25	25	45	45	2×45	2×45
Total Rated Amps	0.4	0.4	0.65	0.65	1.05	1.3
Coil Face Area (Ft)	0.97	40	1.63	1.92	2.51	3.17
Tube Size	3/8" O.D.					
No of Rows	3					
No of Fins/Inch	12					

*Unit weights giving are for exposed models. For concealed reduce values by approximately35%

Table 6	Nominal Performance Data					
Model	Air Flow (Cfm)	Cooling			Heating	
		Total Cap. (Btu/Hr)	Sensible Cap. (Btu/Hr)	Water Flow (Gpm)	Capacity (Btu/Hr)	Water Flow (Gpm)
TCFA-200	200	9200	6250	2.0	21800	2.5
TCFA-300	300	11800	8700	2.5	30750	3.5
TCFA-400	400	15400	12250	3.5	38750	4.0
TCFA-600	600	19700	14750	4.0	48250	5.0
TCFA-800	800	24400	18250	5.0	62750	6.5
TCFA-1000	1000	30500	23250	6.5	75000	7.5

Note:

1. Capacities are based on high fan speed.
2. Cooling capacities are based on entering water at 45 F and entering air at 80 F D.B., 67 F W.B.
3. Heating capacities are based on entering air at 70 F D.B. entering and leaving water at 180 F and 160 F respectively.

Table 7

Model	Entering water temperature (°F)	GPM	Pressure Downfall (F.T.W.G)	Entering air temperature (°F)					
				63 WB	75 DB.	65 WB.	77DB	67WB.	80DB
				Sensible (BTU/hr.)	Total (BTU/hr.)	Sensible (BTU/hr.)	Total (BTU/hr.)	Sensible (BTU/hr.)	Total (BTU/hr.)
200	42	1.5	2.2	6000	7600	6200	8450	6500	9400
		2	3.6	6500	8200	6700	9250	7000	10400
		2.5	5.4	7000	8800	7200	9800	7500	11000
	44	1.5	2.2	5500	6800	5700	7700	6000	8700
		2	3.6	6000	7600	6200	8450	6500	9400
		2.5	5.4	6500	8200	6700	9100	7000	10000
	46	1.5	2.2	4500	6200	5000	7000	5500	8000
		2	3.6	5000	6600	5500	7500	6000	8600
		2.5	5.4	5500	7300	6000	8300	6500	9400
300	42	2	4.4	8000	9800	8400	10900	9000	12000
		2.5	6.5	8500	10800	8700	11900	9500	13100
		3	9	9000	11200	9400	12350	10000	13700
	44	2	4.4	7500	8900	8000	9900	8500	11000
		2.5	6.5	8000	9600	8500	10700	9000	12000
		3	9	8500	10100	9000	11350	9500	12800
	46	2	4.4	6500	7900	7200	8900	8000	10000
		2.5	6.5	7000	8600	7700	9700	8500	11000
		3	9	7500	9000	8200	10200	9000	11600
400	42	2.5	6.5	10500	12900	11000	14200	11500	15800
		3	9	11000	13500	11500	15000	12000	16600
		3.5	11.5	11500	14200	12000	15700	12500	17400
	44	2.5	6.5	10000	11600	10700	13000	11500	14400
		3	9	10500	12200	11200	13700	12000	15400
		3.5	11.5	11000	12800	11700	14350	12500	16000
	46	2.5	6.5	9000	10400	9700	11800	11000	13400
		3	9	9500	10900	10400	12400	11500	14000
		3.5	11.5	10000	11400	10900	13000	12000	14800
600	42	3.5	5.2	13000	17000	14200	18900	15500	21000
		4	6.3	13500	17900	14700	19800	16000	21900
		4.5	4.2	14000	18600	15200	20600	16500	22800
	44	3.5	4.2	12500	15400	13500	17300	14500	19400
		4	5.2	13000	16200	14000	18200	15000	20400
		4.5	6.3	13500	16800	14400	18850	15500	21000
	46	3.5	4.2	11500	13700	12700	15650	14000	17800
		4	5.2	12000	14400	13200	16500	14500	18800
		4.5	6.3	12500	15000	13700	17200	15000	19600
800	42	4.5	7.6	17500	21600	19000	24000	20500	26400
		5	9.4	18000	22300	19500	24600	21000	27200
		5.5	11	18500	22800	20000	25300	21500	28000
	44	4.5	7.6	17000	19800	17500	22000	18000	24400
		5	9.4	17500	20400	18000	22650	18500	25200
		5.5	11	18000	20900	18400	23300	19000	26000
	46	4.5	7.6	15000	17400	16200	20000	17500	22600
		5	9.4	15500	18400	16700	20800	18000	23400
		5.5	11	16000	18800	17200	21300	18500	24100
1000	42	6	7	21000	27300	23000	30100	25000	33200
		6.5	8	21500	27900	23500	30800	25500	34000
		7	9	22500	28400	24200	31300	26000	34600
	44	6	7	20500	25000	21700	28000	23000	31000
		6.5	8	21000	25400	22200	28500	23500	31800
		7	9	22000	25800	22900	28800	24000	32200
	46	6	7	18500	22400	20400	25400	22500	28800
		6.5	8	19000	22800	20900	25850	23000	29200
		7	9	19500	23300	21400	26500	23500	30000

Note:

1. Capacities are based on high fan speed.
2. For unit capacities at med. or low speed, multiply table values by the given correction factor.

MOTOR SPEED	CORRECTION FACTOR
MEDIUM	0.90
LOW	0.80

Table 8

Model	Entering water temperature (°F)	GPM	Pressure Downfall (F.T.W.G)	Entering air temperature (°F)		
				68 DB.	70DB	72DB
				Total (BTU/hr.)	Total (BTU/hr.)	Total (BTU/hr.)
200	140	2.5	3.6	14000	12700	11500
		3	5.4	14500	13200	12000
		2	7.3	15000	13700	12500
	160	2.5	3.6	18000	17200	16500
		3	5.4	18500	17700	17000
		2	7.3	19000	18200	17500
	180	2.5	3.6	22000	21200	20500
		3	5.4	22500	21700	21000
		3	7.3	23000	22000	21500
300	140	3.5	9	19500	18700	18000
		4	11.4	20000	19200	18500
		3	15	20500	19700	19000
	160	3.5	9	25500	24500	23500
		4	11.4	26000	25000	24000
		3	15	26500	25500	24500
	180	3.5	9	31500	30200	29000
		4	11.4	32000	30700	29500
		3.5	15	32500	31200	30000
400	140	4	11.5	24500	23700	23000
		4.5	15	25000	24200	23500
		3.5	18	25500	24700	24000
	160	4	11.5	32500	31500	30500
		4.5	15	33000	32000	31000
		3.5	18	33500	32500	31500
	180	4	11.5	39000	38200	37500
		4.5	15	39500	38700	38000
		4.5	18	40000	39200	38500
600	140	5	6.3	31500	30200	29000
		5.5	7.5	32000	30700	29500
		4.5	9	32500	31200	30000
	160	5	6.3	40000	39000	38000
		5.5	7.5	40500	39500	38500
		4.5	9	41000	40000	39000
	180	5	6.3	48500	47700	47000
		5.5	7.5	49000	48200	47500
		6	9	49500	48700	48000
800	140	6.5	12.6	41000	39700	38500
		7	14.5	41500	40200	39000
		<5	16.2	42000	40700	39500
	160	6.5	12.6	52000	51000	50000
		7	14.5	52500	51500	50500
		6	16.2	53000	52000	51000
	180	6.5	12.6	63500	62200	61000
		7	14.5	64000	62700	61500
		7.5	16.2	64500	63200	62000
1000	140	8	10	49500	48200	47000
		8.5	11.5	50000	48700	47500
		7.5	12.8	50500	49200	48000
	160	8	10	62500	61200	60000
		8.5	11.5	63000	61700	60500
		7.5	12.8	63500	62200	61000
	180	8	10	76000	75000	74000
		8.5	11.5	76500	75500	74500
			12.8	77000	76000	75000

Note:

1. Capacities are based on high fan speed.
2. For unit capacities at med. or low speed, multiply table values by the given correction factor.

MOTOR SPEED	CORRECTION FACTOR
MEDIUM	0.90
LOW	0.80

Note:

DUCTED FAN COIL

AzarNasim
HVAC SYSTEMS

FEATURES & BENERITS

AZAR NASIM ducted fan-coil units are designed to deliver reliable conditioned air in a wide range of capacities. With delivery rates of 800 to 3000 CFM these units can meet the air conditioning demands of a variety of multi room applications such as apartments, office buildings, hotels and hospitals. For cooling applications, units are Available with capacities ranging from 20 to 100 K Btu/hr. and for heating units with capacities of 60 to 200 K Btu/hr. at standard conditions (80°F DB, 67°F WB) can be utilized . With 3 different models and seven basic, sizes in each model along with the choice of Vertical or horizontal types. The wide selection range offers considerable design versatility.

EASE OF INSTALLATION & MAINTENANCE
Horizontal models can be used in cabinet (Exposed) or furred-in (Concealed) applications. Vertical models are built only in exposed free standing models. The low high dimension associated with the horizontal types facilitates easy installation within double ceilings or concealed locations.

Supply air duct collar simplifies field connection to new or existing supply ductwork. Mounting Brackets on each side of the unit allow swift suspension from the ceiling. All wiring and piping connections are located at accessible locations on the unit. Removable bottom panels permit full width access to the mixing box and blower units. Motor-blower unit can be removed in order to expose the entering face of the coil for cleaning purposes. The following design features are incorporated in the construction of AZAR NASIM ducted Fan-coil units.

CABINET
All cabinets are constructed of 1.25 mm galvanized steel sheet with additional paint coating. Panels are insulated with 10 mm polyethylene insulation panel.

FILTERS
Standard filter is removable 1" aluminum mesh washable filter.

CONDENSATE DRAIN PAN
Condensate drain pan is constructed of heavy gauge galvanized sheet metal with the underside Insulated by 3 mm Polyethylene foam. The condensate drain outlet is 3/4 inch O.D. copper tube, Brazed into the condensate drain pan.

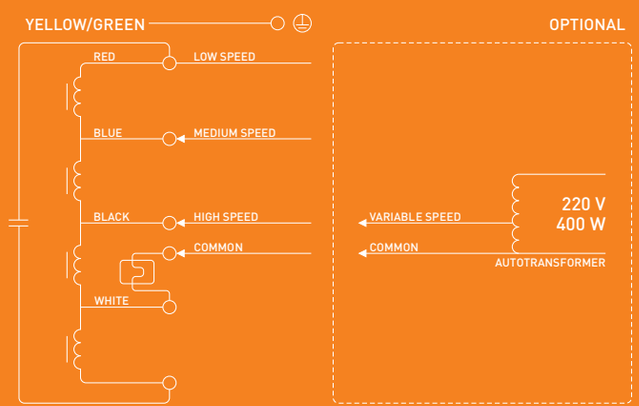
COILS
Coils are constructed of 5/8 inch O.D. copper tubes with waffled and rippled edge aluminum or copper fins mechanically bonded to the tubes. All coils are leak tested under water with 325 Psig air in accordance with ANSI/ASHRAE 15 Safety Code for Mechanical Refrigeration.

The coils for hot water applications are identical to chilled water coils available in 4 or 6 rows. All DX coils are evacuated and backfilled with 5 Psig dry nitrogen prior to shipment. Electrical coils could also be mounted on any unit. They shall be protected against overheating.

FANS
The fans are direct driven, centrifugal, forward curved, double width wheels. (DWDI) Fans of The units have three speeds level adjusting: Low, Medium and High.

MOTORS

Motors are three speeds, 4 poles, single phase-50 cycles- 220 V with external rotor-motor. All motors are equipped with thermal overload protection. Motors are split phase type with a capacitor. They possess four connection wires: one in common and three connection wires for three different speeds. If there is a need for more than three different speeds, an autotransformer can be used. (Transformer or any other device should make no change in the shape of the electrical sinus wave.) The following wiring diagram can be used.



PACKING

Units finally shall be wrapped up with plastic tissue, fastened with polyethylene belts and place don wooden palette, although they should be stored in an indoor storage.

+ All components in AZAR NASIM Ducted Fan-coils are selected of reliable and recognized international brand names or designed and constructed and checked under the standard of the air-conditioning and refrigeration industry.

+ The units are manufactured under Azar Nasim's own Quality Assurance System and also Azar Nasim Standard Engineering Specification (SES).

+ For any special applications please consult Azar Nasim's Sale Office.

Table 1 -PHYSICAL DATA
Physical Data and Sound Ratings

Model	Nominal CFM	Coil					Blower & motor					Sound Ratings (dB) (Sound Pressure Level at 1m)		
		Face area (ft²)		Finned Length (mm)		Tube High	No. ×	Blower Type	Motor (each)					
		Water	DX	Water	DX				(Watt)	RPM	(Ampere*)	Low	Medium	High
DF 800	800	2.05	1.64	500	400	10	1 ×	9/7	350	450~1425	0·85~3·2	56	60	64
DF 1000	1000	2.45	2.05	600	500	10	1 ×	9/9	350	450~1425	0·85~3·2	51	57	60
DF 1200	1200	2.87	2.87	700	700	10	2 ×	9/7	350	450~1425	0·85~3·2	59	63	67
DF 1400	1400	3.27	2.87	800	700	10	2 ×	9/7	350	450~1425	0·85~3·2	59	63	67
DF 1600	1600	3.68	3.28	900	800	10	2 ×	9/7	350	450~1425	0·85~3·2	59	63	67
DF 1800	1800	4.30	3.90	1050	950	10	2 ×	9/9	350	450~1425	0·85~3·2	54	60	63
DF 2000	2000	4.91	4.51	1200	1100	10	2 ×	9/9	350	450~1425	0·85~3·2	54	60	63

* Electrical motor consumption is in the range of 0.85 to 3.2 amps when its rotational speed changes respectively from 450 to 1425 rpm. Any selection should be based on maximum electrical current i.e. 3.2 amp.

Table 2 -UNIT AIR FLOW
CFM with 4 Row Coils

Model	Model	Low		Medium						High	
		External Pressure		External Pressure (inch H20)						External Pres. Drop	
		0.0	0.5	0.0	0.1	0.2	0.3	0.4	0.5	0.0	0.5
DF 800	8 FPI	650	600	1030	1010	990	970	940	910	1300	1150
	14 FPI	630	580	1000	975	955	930	900	870	1250	1050
DF 1000	8 FPI	750	650	1150	1140	1130	1110	1080	1050	1550	1350
	14 FPI	730	630	1130	1120	1100	1070	1040	1000	1450	1250
DF 1200	8 FPI	1260	1120	1880	1825	1775	1725	1670	1580	2200	1850
	14 FPI	1240	1080	1750	1700	1650	1570	1490	1400	2000	1650
DF 1400	8 FPI	1270	1150	1950	1920	1870	1810	1760	1700	2400	2050
	14 FPI	1260	1120	1860	1810	1750	1700	1640	1550	2200	1800
DF 1600	8 FPI	1280	1170	2020	1980	1930	1890	1830	1770	2550	2150
	14 FPI	1270	1150	1940	1890	1840	1790	1730	1680	2350	2000
DF 1800	8 FPI	1450	1260	2280	2240	2200	2160	2090	2020	2900	2500
	14 FPI	1420	1230	2210	2170	2110	2050	1990	1880	2750	2300
DF 2000	8 FPI	1470	1300	2300	2280	2250	2210	2170	2100	3050	2700
	14 FPI	1450	1270	2270	2230	2200	2140	2080	2020	2900	2450

Fans have three speeds level adjusting's: Low, Medium and High.
CFM has been calculated under wet condition of the coil at sea level condition

Cont. Table 2 -UNIT AIR FLOW
CFM with 6 Row Coils

Model	Model	Low		Medium						High	
		External Pressure		External Pressure (inch H20)						External Pres. Drop	
		0.0	0.5	0.0	0.1	0.2	0.3	0.4	0.5	0.0	0.5
DF 800	8 FPI	640	580	1000	885	910	940	965	860	1230	1030
	14 FPI	630	550	930	830	860	880	910	800	1110	920
DF 1000	8 FPI	720	630	1130	1030	1060	1090	1110	1000	1430	1200
	14 FPI	700	600	1100	960	1000	1030	1060	900	1380	1070
DF 1200	8 FPI	1230	1050	1730	1450	1530	1600	1680	1370	2020	1600
	14 FPI	1170	1000	1530	1270	1340	1400	1470	1200	1720	1300
DF 1400	8 FPI	1250	1100	1830	1600	1680	1730	1780	1500	2190	1770
	14 FPI	1220	1050	1700	1410	1490	1560	1620	1340	1920	1540
DF 1600	8 FPI	1270	1130	1920	1700	1760	1810	1870	1630	2330	1937
	14 FPI	1250	1100	1780	1550	1620	1690	1740	1470	2100	1700
DF 1800	8 FPI	1400	1220	2200	1940	2020	2080	2140	1840	2700	2200
	14 FPI	1370	1170	2050	1770	1840	1920	2000	1650	2400	1860
DF 2000	8 FPI	1450	1250	2250	2050	2110	2180	2210	1980	2870	2400
	14 FPI	1400	1220	2170	1910	2000	2050	2110	1810	2600	2150

Example (General)

Unit Selection Procedure:

1. Determining exact unit airflow: Enter Table 2 on page 4. Select the nearest Model.
2. Calculate the face velocity, FV using the face area, FA from Table 1 on page 4:

$$FV = \frac{CFM}{FA}$$

3. Determine the appropriate correction factors. (Table 7, 8, 9 and 10), (Figures 1, 2 and 3 on page 12), (Interpolation is allowed when Needed.)
4. Correct the specified total capacity.

$$Q = \frac{\text{Required Total or Sensible Load}}{\text{Correction Factors}}$$

5. Enter the tables of ratings with Q (Tables 3, 4, 5 and 6 on pages 7~11) and check out for the Selected model. (Repeat steps 1 to 5 to find the suitable unit.)
6. Find the actual ratings (Net real working capacity in the location and conditions of the project.)

$$Q_{actual} = \text{Table Ratings} \times \text{Correction Factors}$$

(There is one exception: C_5 Is always applied to both Total and Sensible load but when C_5 is used only for correcting the wet bulb temperature (not water temp. or evaporating temp.), it is applied only to Total load.)

7. A - Determining water flow rate (GPM)
   B - Determining leaving air dry bulb (LDB)
   C - Determining leaving air enthalpy (H_2)
   (By having H_1 from Table 11 on page15)
   D - Determining leaving air wet bulb temp. (LWB)

$$\text{A - Water GPM} = \frac{Q_T}{500 \times \Delta T}$$

B - $Q_S = 1.08\ (CFM)\ (EDB - LDB)$
C - $Q_T = 4.5\ (CFM)\ (H_1 - H_2)$
D - Interpolating in Table 11 (by having H_2) for leaving air wet bulb temp. (LWB)

Example 1

Summer System Requirement

Given:
Air Flow Rate ..... **1000 CFM**
External Static Pressure ..... **0.3"**
Total / Sensible Load ..... **27 /19 kBtu/hr**
Altitude of Installation **1250m**
Entering Air Temperature (EAT) ... **80°F DB/ 70°F WB**
Evaporating Temperature..... **45/55°F**

Solution:

1. Table 2 on page 4: Based on airflow, selecting Model DF 1000: 4 Rows, 8 FPI: Air flow = 1110 CFM

(Selection is based on "Medium" condition in order to account for additional capacity.)

2. $FV = \frac{CFM}{FA} = \frac{1110\ CFM}{2.45\ ft.^2} = 453\ FPM$

3. Correction factors:
(T.7 P.11) Total load correction factor = CT = 1.06
(T.7 P.11) Sensible load correction factor = C_S= 1.07
(T.8 P.11) Altitude correction factor = C_2 = 0.95
(T.9 P.11) Fin material correction factor = C_3 = 1.0
(T.10 P.11) Refrigerant correction factor = C_4 = 1.0
(F.1 P.12) Air wet bulb correction factor = C_5 = 1.15

4. Correcting the required load

$$QT = \frac{\text{Total Load}}{CT \times C_2 \times C_5} = \frac{27\ KBtu/hr.}{1.06 \times 0.95 \times 1.15} = 23.3\ kBtu/hr.$$

$$Q_S = \frac{\text{Selection Load}}{C_S \times C_2} = \frac{19\ KBtu/hr.}{1.07 \times 0.95} = 18.7\ kBtu/hr.$$

(For correcting the wet bulb temp. Only. Is applied just to total load.)

5. Entering the table 3 on page 7
Model DF 1000: 80°F DB/ 67°F WB, 4 rows, 8 FPI:
QT : 26.2 kBtu/hr. → 23.3 kBtu/hr. (required)
QS : 21.0 kBtu/hr. → 18.7 kBtu/hr. (required)

So SDF-10 (4 rows, 8FPI, and half Cir.) is approved.

6. Actual ratings:
Total: QT = 26.2 ×1.06× 1.15 × 0.95 = 30.3 kBtu/hr.
Sensible: Qs = 21.0 × 1.07 × 0.95 = 21.3 kBtu/hr.

7. A - Water flow GPM = $\frac{30300}{500 \times 10} = 6.1GPM$

B - LDB = 80- $\frac{21300}{1.08 \times 1110} = 62.2\ ^\circ F$

C - H2 = 36.9 - $\frac{30300}{4.5 \times 1110} = 30.8$ Btu/lb.

D - On Table 11 on pages 15 by H2 and Altitude of 1250m

LWB = 63.1 °F

(Because of the correction factor approximations, the exact temperature sometimes is obtained a little different. The LWB is about 62°F in this case.)

Example 2

Summer System Requirement

Given:

Air Flow Rate ..... 1600 CFM
External Static Pressure ..... 0.2"
Total / Sensible Load ..... 42 /31 kBtu/hr
Altitude of Installation 1250m
Entering Air Temperature (EAT) ... 80°F DB/ 67°F WB
Evaporating Temperature..... 50°F

Solution:

1. Table 2 on page 4: Based on airflow, selecting Model DF 1200: 4 Rows, 14 FPI: Air flow = 1650 CFM

(Selection is based on "Medium" condition in order to account for additional capacity.)

2. $FV = \frac{CFM}{FA} = \frac{1650\ CFM}{2.87\ ft.^2} = 575\ FPM$

3. Correction factors:

(T.7 P.11) Total load correction factor = $C_T = 1.19$
(T.7 P.11) Sensible load correction factor = $C_S = 1.25$
(T.8 P.11) Altitude correction factor = $C_2 = 0.95$
(T.9 P.11) Fin material correction factor = $C_3 = 1.0$
(T.10 P.11) Refrigerant correction factor = $C_4 = 1.0$
(F.3 P.12) Evaporating Temp. corr. Fac. = $C_5 = 0.85$

4. Correcting the required load

$$QT = \frac{\text{Total Load}}{C_T \times C_2 \times C_5} = \frac{27\ KBtu/hr.}{1.19 \times 0.95 \times 1.85} = 43.7\ kBtu/hr.$$

$$Q_S = \frac{\text{Selection Load}}{C_S \times C_2 \times C_5} = \frac{31\ KBtu/hr.}{1.07 \times 0.95} = 30.7\ kBtu/hr.$$

5. Entering the table 3 on page 7
   Model DF 1200: 80°F DB/67°F WB, 4 rows, 14 FPI:
   QT : 36.0 kBtu/hr. ← 43.7 kBtu/hr. (required)
   QS : 27.3 kBtu/hr. ← 30.7 kBtu/hr. (required)
   So SDF-12 (4 rows, 14FPI and Half Cir. failed.)

Repeating steps 1 to 5:
   For SDF-12 (6 rows, 8FPI and half Cir.):
   QT: 37.3 kBtu/hr. ← 44.4 kBtu/hr. (required)
   QS: 28.9 kBtu/hr. → 31.5 kBtu/hr. (required)

So SDF-12 (6 rows, 8FPI and half Cir.) failed.
   SDF-12 (6 rows, 14FPI and half Cir.) failed.
   SDF-14 (4 rows, 14FPI and half Cir.) failed.
   SDF-14 (6 rows, 8FPI and half Cir.) failed.
   QT : 48.7 kBtu/hr. → 45.2 kBtu/hr. (required)
   QS : 36.7 kBtu/hr. → 32.3 kBtu/hr. (required)

SDF-14 (6 rows, 14FPI and half Cir.) is approved.

   (The actual air flow is 1560 cfm at Medium rotational speed of the fan.)

6. Actual ratings for SDF-14 (6 rows, 14FPI & half Cir.):

   $Q_T = 48.7 \times 1.15 \times 0.85 \times 0.95 = 45.2\ kBtu/hr.$
   $Q_S = 36.7 \times 1.19 \times 0.85 \times 0.95 = 35.3\ kBtu/hr.$

7. A - Water flow GPM $= \frac{45200}{500 \times 10} = 9.0 GPM$

   B - LDB $= 80 - \frac{35.3 \times 1000}{1.08 \times 1560} = 59.0\ °F$

   C - H2 $= 34.13 - \frac{45.2 \times 1000}{4.5 \times 1560} = 27.7$ Btu/lb.

   D - On Table 11 by H2 and Altitude of 1250m

   LWB = 59.1 °F

(Because of the correction factor approximations, the exact temperature somet imes is obtained a little different. The LWB is about 59°F in this case.)

Example 3

Winter System Requirement (Hot water Coil)

Given:

Air Flow Rate ..... **1800 CFM**
External Static Pressure ..... **0.3"**
Total / Sensible Load ..... **160 kBtu/hr**
Altitude of Installation **0m**
Entering Air Temperature (EAT) ..... **80°F DB**
Evaporating Temperature..... **180/160°F**

Solution:

1. Table 2 on page 4: Based on airflow, selecting Model DF 1600:

   4 Rows, 14 FPI: Air flow = 1790 CFM (Selection is based on "Medium" condi t ion in order to account For additional capacity.)

2. $FV = \frac{CFM}{FA} = \frac{1650\ CFM}{2.87\ ft.^2} = 575\ FPM$

3. Correction factors:

(T.7 P.11) Total load correction factor = $C_T = 1.07$
(T.8 P.11) Altitude correction factor = $C_2 = 1.0$
(T.9 P.11) Fin material correction factor = $C_3 = 1.0$

4. Correcting the required load

$$QT = \frac{\text{Total Load}}{C_T \times C_2 \times C_5} = \frac{160\ KBtu/hr}{1.07 \times 1.0 \times 1.0} = 149.5\ kBtu/hr.$$

5. Entering the table 5 on page 10

   Model DF 1600: 80°F DB, 4 rows, 14 FPI:
   QT : 149.8 kBtu/hr. → 149.5 kBtu/hr. (required)

So SDF-16 (4 rows, 14FPI & Half Cir. is approved.

6. Actual ratings for SDF-16 (4 rows, 14FPI & half Cir.):

   $Q_T = 149.8 \times 1.07 \times 1.0 \times 1.0 = 160.3\ kBtu/hr.$

7. $A - \text{Water flow GPM} = \frac{160300}{500 \times 20} = 16.0 GPM$

$$B - LDB = 80 - \frac{160300}{1.08 \times 1790} = 162.9\ ^\circ F$$

CHILLED WATER COOLING COIL RATINGS
(EWT 45°F, LWT 55°F)

Table 3

Model	Nominal Air CFM	Entering Dry Bulb Temp. (°F)	Entering Wet Bulb Temp. (°F)	Spacing	Circuit	4 Rows				6 Rows			
						Total Cooling Capacity (kBtu/hr)	Sensible Cooling Capacity (kBtu/hr)	Water Flow (GPM)	Water Pressure Drop Ft H^2O	Total Cooling Capacity (kBtu/hr)	Sensible Cooling Capacity (kBtu/hr)	Water Flow (GPM)	Water Pressure Drop Ft H^2O
DF 800	800	75	63	8 FPI	Half	13.9	13.9	2.8	0.25	19.7	17.1	4.0	0.6
				14 FPI	Half	17.3	16.4	3.5	0.4	24.3	19.5	4.9	0.9
		80	67	8 FPI	Half	19.5[1]	16.3	3.9	0.5	28.9	20.8	5.8	1.3
				14 FPI	Half	25.0	19.5	5.0	0.7	34.4	23.6	6.9	1.7
DF 1000	1000	75	63	8 FPI	Half	18.0[2]	18.0	3.6	0.4	25.5	21.7	5.1	1.1
				14 FPI	Half	23.0	21.0	4.6	0.6	31.5	24.8	6.3	1.6
		80	67	8 FPI	Half	26.2	21.0	5.2	0.8	37.5	26.6	7.5	2.1
				14 FPI	Half	33.2	25.1	6.6	1.2	44.6	30.1	8.9	2.9
DF 1200	1200	75	63	8 FPI	Full	17.8	17.8	3.6	0.08	25.3	23.9	5.1	0.2
					Half	22.0	21.2	4.4	0.6	31.7	26.5	6.3	1.7
				14 FPI	Full	22.2	22.2	4.4	0.1	31.6	27.2	6.3	0.3
					Half	28.9	25.7	5.8	1.0	39.1	30.4	7.8	2.4
		80	67	8 FPI	Full	23.5	22.2	4.7	0.1	36.8	28.6	7.4	0.4
					Half	33.4	25.8	6.7	1.3	46.6	32.5	9.3	3.3
				14 FPI	Full	30.2	26.5	6.0	0.2	45.1	32.7	9.0	0.5
					Half	42.0	31.0	8.4	2.0	55.2	36.8	11.0	4.5
DF 1400	1400	75	63	8 FPI	Full	21.8	21.8	4.4	0.1	31.0	28.5	6.2	0.3
					Half	26.5	25.0	5.3	0.9	37.8	31.3	7.6	2.4
				14 FPI	Full	27.2	27.2	5.4	0.2	38.5	32.5	7.7	0.4
					Half	35.1	35.1	7.0	1.5	46.5	35.8	9.3	3.5
		80	67	8 FPI	Full	29.1	26.4	5.8	0.2	45.1	34.2	9.0	0.5
					Half	40.4	30.6	8.1	2.0	55.4	38.3	11.1	4.8
				14 FPI	Full	37.8	31.8	7.6	0.3	54.8	39.0	11.0	0.8
					Half	51.2	37.0	10.2	3.0	66.1	43.7	13.2	6.6
DF 1600	1600	75	63	8 FPI	Full	25.9	25.9	5.2	0.2	36.8[3]	33.1	7.4	0.4
					Half	31.0	28.9	6.2	1.3	44.9	36.4	9.0	3.4
				14 FPI	Full	32.3	32.3	6.5	0.2	45.5	37.7	9.1	0.6
					Half	41.2	35.3	8.2	2.1	54.2	41.4	10.8	4.8
		80	67	8 FPI	Full	35.1[4]	30.8	7.0	0.3	53.9	40.0	10.8	0.8
					Half	47.5	35.5	9.5	2.7	64.6	44.3	12.9	6.6
				14 FPI	Full	45.4	37.3	9.1	0.4	65.2	45.6	13.1	1.1
					Half	60.3	42.9	12.1	4.5	77.0	50.6	15.4	9.1
DF 1800	1800	75	63	8 FPI	Full	31.0	31.0	6.2	0.2	43.8	38.3	8.8	0.6
					Half	37.3	34.4	7.9	2.1	52.8	41.9	10.6	4.9
				14 FPI	Full	38.8	36.8	7.8	0.4	54.3	43.8	10.9	0.9
					Half	48.9	40.8	9.8	3.1	63.5	47.7	12.7	6.9
		80	67	8 FPI	Full	43.7	36.3	8.7	0.4	64.3	46.5	12.9	1.2
					Half	56.3	41.2	11.3	4.0	75.3	51.0	15.1	9.4
				14 FPI	Full	56.0	43.8	11.2	0.7	77.2	52.9	15.4	1.6
					Half	71.3	49.8	14.2	6.1	89.4	58.1	17.9	12.8
DF 2000	2000	75	63	8 FPI	Full	36.1	36.1	7.2	0.3	50.9	43.4	10.2	0.8
					Half	44.5	38.6	8.9	2.8	60.7	47.5	12.1	6.8
				14 FPI	Full	45.9	42.0	9.2	0.5	62.9	49.8	12.6	1.2
					Half	56.4	46.3	11.3	4.2	72.9	54.0	14.6	9.4
		80	67	8 FPI	Full	52.4	41.9	10.5	0.6	75.1	53.2	15.0	1.6
					Half	65.3	47.0	13.1	5.5	85.7	57.6	17.1	12.6
				14 FPI	Full	66.3	50.2	13.2	1.0	89.2	60.3	17.8	2.2
					Half	82.4	56.6	16.5	8.4	101.4	65.5	20.3	17.1

+ Shaded regions show that water velocity or air face velocity is out of standard ARI 410 & 440 limits. (1~8 FPS) (200~800 fpm) 1 2 3 4: Under this condition, if the actual airflow is more than respectively 900, 1300, 2000 and 2200 CFM, then the velocity will be in the range of valid (ARI) Velocities + All the ratings are calculated at altitude 0 (Sea Lev

Table 4

Model	Nominal Air CFM	Entering Dry Bulb Temp. (°F)	Entering Wet Bulb Temp. (°F)	Spacing	4 Rows			6 Rows		
					Total Cooling Capacity (kBtu/hr)	Sensible Cooling Capacity (kBtu/hr)	Leaving Air Dry Bulb Temp. (°F)	Total Cooling Capacity (kBtu/hr)	Sensible Cooling Capacity (kBtu/hr)	Leaving Air Dry Bulb Temp. (°F)
DF 800	800	75	63	8 FPI	12.9	11.8	61.3	15.9	13.8	59.0
				14 FPI	15.6	13.9	58.9	19.2	16.3	56.2
		80	67	8 FPI	17.3	14.5	63.3	21.1	16.9	60.4
				14 FPI	20.6	16.2	61.3	25.0	18.9	58.1
DF 1000	1000	75	63	8 FPI	16.6	15.6	60.6	20.3	18.2	58.1
				14 FPI	19.8	18.2	58.1	24.2	21.3	55.3
		80	67	8 FPI	22.5	18.9	62.5	27.1	22.1	59.6
				14 FPI	26.6	21.0	60.5	32.1	24.5	57.3
DF 1200	1200	75	63	8 FPI	22.4	20.7	59.0	27.7	24.5	56.1
				14 FPI	26.5	23.5	56.9	32.9	27.8	53.6
		80	67	8 FPI	30.6	24.8	60.8	37.3	28.9	57.7
				14 FPI	36.0	27.3	59.0	43.8	31.8	55.5
DF 1400	1400	75	63	8 FPI	24.7	23.4	59.5	30.9	27.5	56.8
				14 FPI	29.6	27.1	57.1	37.0	31.9	53.9
		80	67	8 FPI	33.9	28.4	61.2	41.0	33.1	58.1
				14 FPI	40.3	31.5	59.2	48.7	36.7	55.7
DF 1600	1600	75	63	8 FPI	29.5	27.7	59.0	36.9	32.6	56.1
				14 FPI	35.2	31.8	56.6	44.1	37.4	53.3
		80	67	8 FPI	40.5	33.3	60.7	51.0	39.8	56.9
				14 FPI	48.0	37·0	58.6	60.5	44.2	54.4
DF 1800	1800	75	63	8 FPI	35.5	32.6	58.2	44.4	38.3	55.3
				14 FPI	41.9	36.8	56.1	52.3	43.2	52.8
		80	67	8 FPI	48.2	38.7	60.1	60.1	46.0	56.3
				14 FPI	57.1	42.9	57.9	71.2	50.9	53.8
DF 2000	2000	75	63	8 FPI	42.9	38.3	57.3	53.6	45.0	54.2
				14 FPI	50.5	42.8	55.2	63.1	50.3	51.7
		80	67	8 FPI	57.9	45.1	59.1	72.3	53.1	55.4
				14 FPI	68.5	49.9	56.9	85.6	58.8	52.8

+ All the ratings are calculated at altitude 0 (Sea Level) with Aluminums fins (corrugated plate fins) and based on ARI standard 410. For other Altitudes or Fin Material please refer to Correction Factor Tables.

HOT WATER COIL RATINGS

(same cooling coils with hot water ratings)(EWT 180°F, LWT 160°F)

Table 5

Model	Nominal Air CFM	Entering Dry Bulb Temp. (°F)	Spacing	Circuit	4 Rows				6 Rows			
					Total Heating Capacity (kBtu/hr)	Leaving Air Dry Bulb Temp. (°F)	Water Flow (GPM)	Water Pressure Drop Ft H^2O	Total Cooling Capacity (kBtu/hr)	Leaving Air Dry Bulb Temp. (°F)	Water Flow (GPM)	Water Pressure Drop Ft H^2O
DF 800	800	50	8 FPI	Half	82.7	145.1	8·5	1.48	97.6	162.3	10.0	2.7
			14 FPI	Half	98.8	163.6	10.2	2.0	108.0	174.2	11.1	3.3
		60	8 FPI	Half	75.6	146.9	7·8	1.3	89.6	163.0	9·2	2.3
			14 FPI	Half	90.5	164.1	9·3	1.7	99.4	174.3	10.2	2.8
		70	8 FPI	Half	68.5	148.8	7·0	1.1	81.5	163.7	8·4	2.0
			14 FPI	Half	82.2	164.6	8·5	1.5	90.7	174.3	9·3	2.4
		80	8 FPI	Half	61.3	150.6	6·3	0.9	73.4	164.5	7·6	1.6
			14 FPI	Half	73.9	165.0	7·6	1.2	82.0	174.3	8·4	2.0
DF 1000	1000	50	8 FPI	Half	103.1	144.9	10.6	2.3	121.8	162.1	12.5	4.3
			14 FPI	Half	123.6	163.8	12.7	3.2	135.1	174.3	13.9	5.2
		60	8 FPI	Half	94.4	146.9	9·7	2.0	111.8	162.9	11.5	3.7
			14 FPI	Half	113.4	164.3	11.7	2.8	124.3	174.4	12.8	4.5
		70	8 FPI	Half	85.6	148.8	8·8	1.7	101.8	163.7	10.5	3.1
			14 FPI	Half	103.1	164.9	11	2.3	113.5	174.4	11.7	3.8
		80	8 FPI	Half	76.8	150.7	7·9	1.4	91.8	164.4	9·4	2.6
			14 FPI	Half	92.8	165.4	9·5	1.9	102.7	174.5	10.6	3.2
DF 1200	1200	50	8 FPI	Full	118.5	140.8	12.2	0.6	142.4	159.2	14.6	1.0
				Half	123.8	144.9	12.7	3.4	146.0	161.9	15.0	6.3
			14 FPI	Full	143.2	159.8	14.7	0.8	159.5	172.3	16.4	1.2
				Half	148.7	164.0	15.3	4.7	162.2	174.4	16.7	7.6
		60	8 FPI	Full	108.1	142.8	11.1	0.5	130.5	160.0	13.4	0.9
				Half	113.3	146.9	11.6	2.9	134.1	162.8	13.8	5.4
			14 FPI	Full	130.9	160.4	13.5	0.7	146.5	172.3	15.1	1.1
				Half	136.4	164.6	14.0	4.1	149.3	174.4	15.3	6.6
		70	8 FPI	Full	97.6	144.9	10.0	0.4	118.5	160.9	12.2	0.7
				Half	102.8	148.8	10.6	2.4	122.1	163.6	12.5	4.6
			14 FPI	Full	118.6	160.9	12.2	0.6	133.5	172.3	13.7	0.9
				Half	124.1	165.1	12.8	3.4	136.3	174.5	14.0	5.6
		80	8 FPI	Full	87.2	146.9	9·0	0.3	106.5	161.7	11.0	0.6
				Half	92.3	150.8	9·5	2.0	110.1	164.4	11.3	3.8
			14 FPI	Full	106.3	161.5	10.9	0.5	120.4	172.3	12.4	0.8
				Half	111.8	165.7	11.5	2.8	123.4	174.6	12.7	4.7
DF 1400	1400	50	8 FPI	Full	138.8	141.2	14.3	0.8	166.5	159.4	17.1	1.4
				Half	144.4	144.9	14.8	4.7	170.3	161.9	17.5	8.8
			14 FPI	Full	168.0	160.4	17.3	1.1	186.5	172.6	19.2	1.7
				Half	173.7	164.1	17.8	6.6	189.4	174.4	19.5	10·6
		60	8 FPI	Full	126.7	143.3	13.0	0.7	152.6	160.3	15.7	1.2
				Half	132.2	146.9	13.6	4.0	156.4	162.8	16.1	7.5
			14 FPI	Full	153.7	161.0	15.8	0.9	171.4	172.6	17.6	1.5
				Half	159.4	164.7	16.4	5.6	174.3	174.5	17.9	9.2
		70	8 FPI	Full	114.6	145.3	11.8	0.5	138.7	161.2	14.3	1.0
				Half	120.1	148.9	12.3	3.4	142.5	163.6	14.6	6.4
			14 FPI	Full	139.4	161.6	14.3	0.8	156.3	172.7	16.1	1.3
				Half	145.1	165.3	14.9	4.8	159.2	174.6	16.4	7.8
		80	8 FPI	Full	102.5	147.4	10.5	0.4	124.8	162.0	12.8	0.8
				Half	107.9	150.9	11.1	2.8	128.6	164.5	13.2	5.3
			14 FPI	Full	125.0	162.1	12.8	0.6	141.1	172.7	14.5	1.0
				Half	130.7	165.9	13.4	3.9	144.1	174.7	14.8	6.5

+ All the ratings are calculated at altitude 0 (Sea Level) with Aluminum fins (corrugated plate fins) and based on ARI standard 410.
+ For other Altitudes or Fin Materials please refer to Correction Factor Tables.

Table 5

Model	Nominal Air CFM	Entering Dry Bulb Temp. (°F)	Spacing	Circuit	4 Rows				6 Rows			
					Total Heating Capacity (kBtu/hr)	Leaving Air Dry Bulb Temp. (°F)	Water Flow (GPM)	Water Pressure Drop Ft H²O	Total Cooling Capacity (kBtu/hr)	Leaving Air Dry Bulb Temp. (°F)	Water Flow (GPM)	Water Pressure Drop Ft H²O
DF 1600	1200	50	8 FPI	Full	159.3	141.6	16.4	1.0	190.7	159.6	19.6	1.9
				Half	165.0	144.9	17.0	6.3	194.6	161.9	20.0	11.7
			14 FPI	Full	192.8	160.9	19.8	1.5	213.6	172.8	21.9	2.3
				Half	198.7	164.3	20.4	8.8	216.5	174.5	22.2	14.2
		60	8 FPI	Full	145.5	143.6	14.6	0.9	174.8	160.5	18.0	1.6
				Half	151.2	146.9	15.5	5.4	178.7	162.8	18.4	10.1
			14 FPI	Full	176.5	161.5	18.1	1.2	196.3	172.9	20.2	2.0
				Half	182.4	164.9	18.7	7.5	199.3	174.6	20.5	12.3
		70	8 FPI	Full	131.7	145.7	13.5	0.7	159.0	161.4	16.3	1.4
				Half	137.3	149.0	14.1	4.5	162.9	163.6	16.7	8.5
			14 FPI	Full	160.2	162.1	16.5	1.0	179.0	172.9	18.4	1.7
				Half	166.1	165.5	17.1	6.4	182.1	174.7	18.7	10.4
		80	8 FPI	Full	117.9	147.8	12.1	0.6	143.1	162.3	14.7	1.1
				Half	123.4	151.0	12.7	3.7	147.0	164.5	15.1	7.1
			14 FPI	Full	143.8	162.7	14.8	0.9	161.7	173.0	16.6	1.4
				Half	149.8	166.1	15.4	5.3	164.9	174.8	16.9	8.7
DF 1800	1800	50	8 FPI	Full	182.9	143.5	18.8	1.4	217.2	161.0	22.3	2.5
				Half	188.6	146.4	19.4	8.5	22.1	163.0	22.7	15.8
			14 FPI	Full	220.2	162.5	22.6	1.9	242.0	173.7	24.9	3.1
				Half	225.9	165.5	23.2	11.8	244.7	175.1	25.1	19.1
		60	8 FPI	Full	167.2	145.5	17.2	1.2	199.2	161.9	20.5	2.2
				Half	172.9	148.4	17.8	7.3	203.1	163.8	20.9	13.6
			14 FPI	Full	201.8	163.1	20.7	1.7	222.6	173.7	22.9	2.6
				Half	207.5	166.1	21.3	10.1	225.4	175.2	23.2	16.4
		70	8 FPI	Full	151.5	147.4	15.6	1.0	181.3	162.7	18.6	1.8
				Half	157.1	150.3	16.1	6.1	185.2	164.6	19.0	11.5
			14 FPI	Full	183.3	163.7	18.8	1.4	203.1	173.8	20.9	2.2
				Half	189.1	166.6	19.4	8.6	206.0	175.3	21.2	14.0
		80	8 FPI	Full	135.8	149.4	14.0	0.8	163.4	163.5	16.8	1.5
				Half	141.1	152.2	14.5	5.1	167.2	165.4	17.2	9.6
			14 FPI	Full	164.8	164.3	16.9	1.2	183.6	173.8	18.9	1.9
				Half	170.6	167.2	17.5	7.1	186.6	175.4	19.2	11.7
DF 2000	2000	50	8 FPI	Full	206.4	144.9	21.2	1.8	243.6	162.1	25.0	3.3
				Half	212.1	147.6	21.8	11.2	247.4	163.8	25.4	20.7
			14 FPI	Full	247.4	163.8	25.4	2.5	270.2	174.3	27.8	4.0
				Half	253.0	166.4	26.0	15.4	272.9	175.5	28.0	24.7
		60	8 FPI	Full	188.8	146.9	19.4	1.6	223.6	162.9	23.0	2.8
				Half	194.5	149.4	20.0	9.6	227.4	164.6	23.4	17.8
			14 FPI	Full	226.8	164.3	23.3	2.2	248.6	174.4	25.5	3.4
				Half	232.4	166.9	23.9	13.2	251.3	175.6	25.8	21.3
		70	8 FPI	Full	171.2	148.8	17.6	1.3	203.6	163.7	20.9	2.4
				Half	176.8	151.3	18.2	8.1	207.4	165.4	21.3	15.1
			14 FPI	Full	206.5	164.9	21.2	1.8	227.0	174.4	23.3	2.9
				Half	211.9	167.5	21.8	11.2	229.8	175.7	23.6	18.1
		80	8 FPI	Full	153.7	150.7	15.8	1·1	183.6	164.4	18.9	2.0
				Half	159.2	153.2	16.4	6.7	187.3	166.2	19.2	12.5
			14 FPI	Full	185.6	165.4	19.1	1.5	205.4	174.5	21.1	2.4
				Half	191.3	168.0	19.7	9.3	208.2	175.8	21.4	15.2

+ All the ratings are calculated at altitude 0 (Sea Level) with Aluminium fins (corrugated plate fins) and based on ARI standard 410. For other Altitudes or Fin Materials please refer to Correction Factor Tables.

Table 6	ELECTRICAL COIL														
Model	Nominal Air CFM	Air Temperature Rise* (ΔT)													
		5°F					10°F					20°F				
		Heating Capacity (kW)	Phase	Line Curr. (Amp.)	No. of Contr. Steps	No. and Cap. (kw) of Elem.	Heating Capacity (kW)	Phase	Line Curr. (Amp.)	No. of Contr. Steps	No. and Cap. (kw) of Elem.	Heating Capacity (kW)	Phase	Line Curr. (Amp.)	No. of Contr. Steps	No. and Cap. (kw) of Elem.
DF 800	800	1.5	1	7	1	1×1.5	3.0	1	14	2	2×1.5	5.5	1	25	3	2+2+1.5
DF 1000	1000	1.5	1	7	1	1×1.5	3.0	1	14	2	2×1.5	7.0	1	32	3	3+2+2
DF 1200	1200	2.0	1	9	1	1×2	4.0	1	18	2	2+2	8.0	1	36	3	3+3+2
DF 1400	1400	2.0	1	9	1	1×2	5.0	1	23	2	2+3	9.0	1/3	41/24	3	3×3
DF 1600	1600	3.0	1	14	2	2×1.5	5.0	1	23	2	2+3	10.5	1	48	3	3×3+1.5
DF 1800	1800	3.0	1	14	2	2×1.5	6.0	1/3	27/16	3	3×2	12.0	1/3	55/32	3	3×4
DF 2000	2000	3.0	1	14	2	2×1.5	7.0	1	32	3	2+2+3	13.5	1	61	3	3×4+1.5

* air temperature leaving the electrical coil = entering air temperature (before the coil) + ΔT (5 / 10 / 20 °F
+ Azar Nasim does not provide any control device for electrical heater except air flow switch.

Table 7	COIL FACE VELOCITY CORRECTION FACTOR												
Model	Correction type	Face Velocity (FPM)											
		300	350	375	400	425	450	475	500	525	550	600	650
DF 800	Total	0.82	0.94	0.98	1.01	1.05	1.08	1.12	1.15	1.18	1.20	1.26	1.32
	Sensible	0.83	0.92	0.97	1.01	1.05	1.10	1.15	1.19	1.23	1.27	1.34	1.42
DF 1000	Total	0.83	0.92	0.96	0.99	1.03	1.06	1.09	1.13	1.16	1.19	1.24	1.30
	Sensible	0.80	0.90	0.94	0.99	1.04	1.07	1.12	1.16	1.20	1.23	1.31	1.38
DF 1200	Total	0.81	0.90	0.93	0.97	1.01	1.04	1.07	1.10	1.13	1.16	1.22	1.28
	Sensible	0.78	0.88	0.92	0.97	1.01	1.05	1.09	1.13	1.17	1.21	1.28	1.35
DF 1400	Total	0.80	0.88	0.92	0.96	1.00	1.03	1.06	1.09	1.13	1.16	1.22	1.27
	Sensible	0.77	0.87	0.91	0.96	1.00	1.04	1.08	1.12	1.16	1.20	1.26	1.33
DF 1600	Total	0.79	0.88	0.91	0.95	0.99	1.03	1.06	1.09	1.12	1.15	1.21	1.27
	Sensible	0.77	0.86	0.90	0.94	0.99	1.03	1.07	1.10	1.14	1.18	1.25	1.32
DF 1800	Total	0.81	0.90	0.94	0.98	1.01	1.05	1.09	1.12	1.16	1.18	1.25	1.30
	Sensible	0.79	0.88	0.93	0.97	1.01	1.06	1.10	1.14	1.18	1.21	1.29	1.36
DF 2000	Total	0.82	0.91	0.95	0.99	1.04	1.07	1.11	1.14	1.17	1.21	1.27	1.33
	Sensible	0.80	0.90	0.94	0.99	1.02	1.08	1.12	1.16	1.20	1.24	1.31	1.39

Use these correction factors as multipliers to the capacity ratings offered in the tables.

$$\text{Real Capacity KBtu/hr.} = \left[\text{Table Ratings KBtu/hr.}\right] \times C1 \times C2 \times C3 \times C4 \times C5$$

Table Ratings: Capacity from Tables 3 ~ 6 (pages 7~11)
C1: (CTor CS) Coil Face Velocity Correction Factor from Table 7 (page 11)
C2: (CA) Altitude Correction Factor from Table 8 (page 11)
C3: Fin Material Correction Factor from Table 9 (page 11)
C4: Refrigerant Correction Factor from Table 10 (page 11)
C5: (CWB) Air Wet Bulb or Entering Water or Evaporating FACTOR (C3) Temperature Correction Factor from figures 1~3 (page 12) or
+ Divide your required capacity by these correction factors before you go through the tables.

Table 8 ALTITUDE CORRCTION FACTOR (C2)		
ft	m	Capacity Factor
0	0	1
2500	760	0.97
5000	1500	0.94
7500	2300	0.91
10000	3050	0.88

Table 9 FIN MATERIAL CORRECTION FACTOR (C3)	
Fin Material	Correction Factor
Al	1
Cu	1.05

Table 10 REFRIGERANT CORRECTION FACTOR (C4)	
Refrigerant (Dx Coil)	Correction Factor
R22	1
R134a	0.88
R407c	0.99

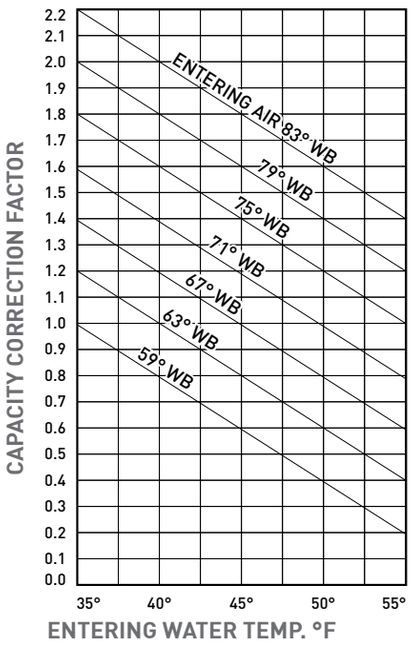


FIGURE 1. CHILLED WATER COIL
CORRECTION FACTOR

Corrected load = load from table 3*correction factor from figure 1
All correction factors are Based on 80/67°F entering dry and wet bulb temp.

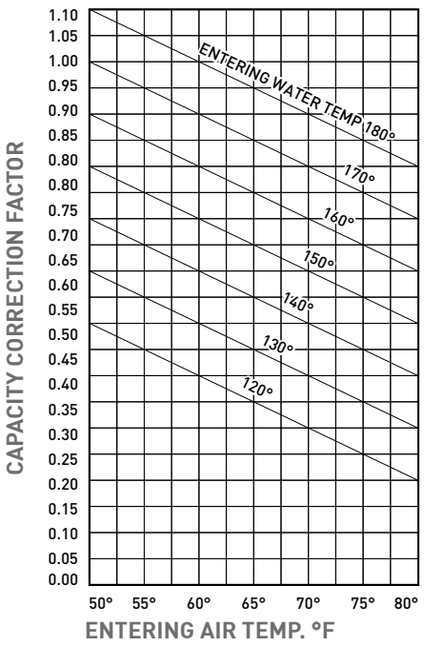


FIGURE 2. HOT WATER COIL
CORRECTION FACTOR

Corrected load = load from table 5*correction factor from figure 2
All correction factors are based on entering air dry bulb = 60°F and entering water = 180°F

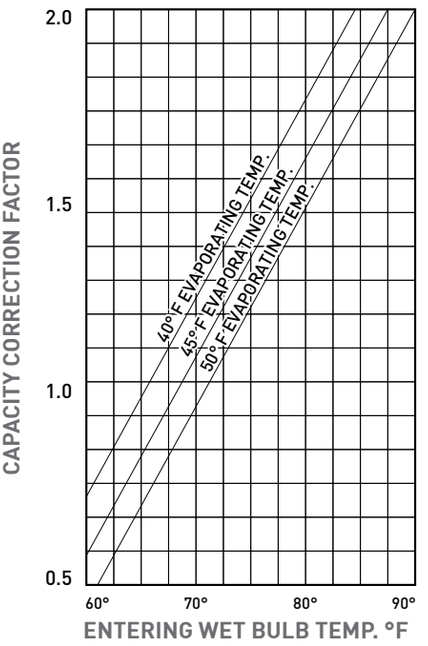


FIGURE 3. DX COIL
CORRECTION FACTOR

Corrected load = load from table 4*correction factor from figure 3
All correction factors are based on 80/67 Entering dry and wet bulb temp. at 45°F Evaporating temp.

CONTROL FEATURES

There are different ways of controlling fan coils:

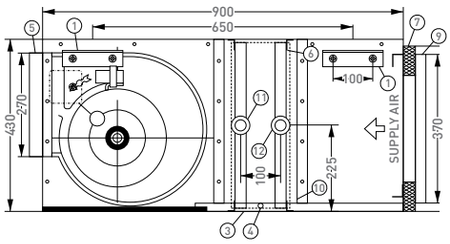
1. Fan Speed Control a) Manual →
The units are provided with a manual three- fan speed control. (Unit or wall mounted)

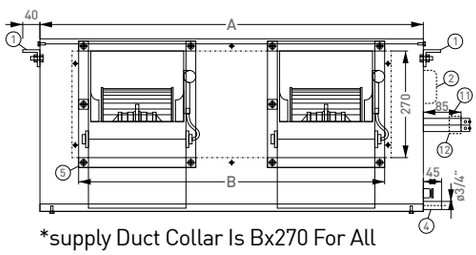
2. Water Control Valves a) Manual →
By having hand-operated valves installed in the supply or return water circuit, each unit could be isolated from the whole water system. (Not included)

B - Automatic
The fans could be switched ON/OFF while has been set to one of the three different working condition (Low, Medium or High) by a single-stage thermostat. (Not included) A Four-stage thermostat (including OFF) could also control the fan speed automatically. (Not included)

B - Automatic
Valves could be either solenoid or motor operated. Two or Three way valves also could be used. (Not included) Thermostat could control a solenoid valve or also two-way or Three-way water Valve to set the suitable flow rate of water. (Not included)

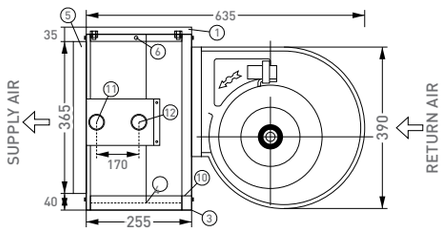
3. Electrical Coil Safety Temperature Control
An optional control device could turn off the electrical coil if its temperature rises above a defined limit.(Not included)

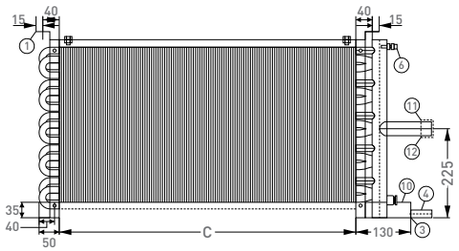




*supply Duct Collar Is Bx270 For All Horizontal Models.

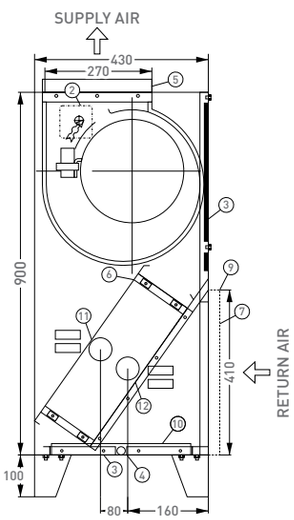
FIGURE 4. EXPOSED HORIZENTAL MODELS



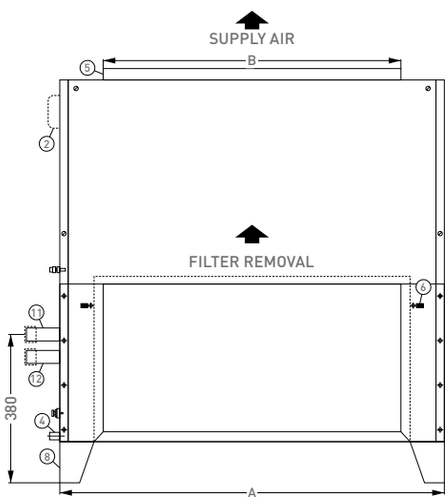


*supply Duct Collar Is Cx365 For All Concealed Horizontal Models.

FIGURE 5. CONCEALED HORIZENTAL MODELS



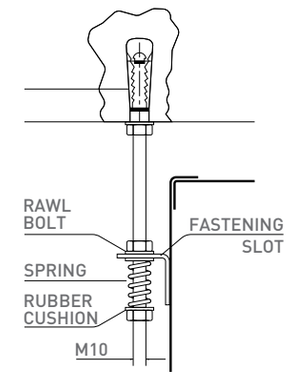
1. MOUNTING BRACKET
2. MOTOR JUNCTION BOX
3. FOAM INSULATION
4. DRAIN CONNECTION
5. SUPPLY DUCT COLLAR
6. AIR VENT
7. FILTER (OPTIONAL)
8. MOUNTING LEGS (OPTIONAL)
9. RETURN DUCT COLLAR
10. DRAIN PAN
11. COIL WATER INLET
12. COIL WATER OUTLET



*supply Duct Collar Is Bx270 For All Vertical Models.

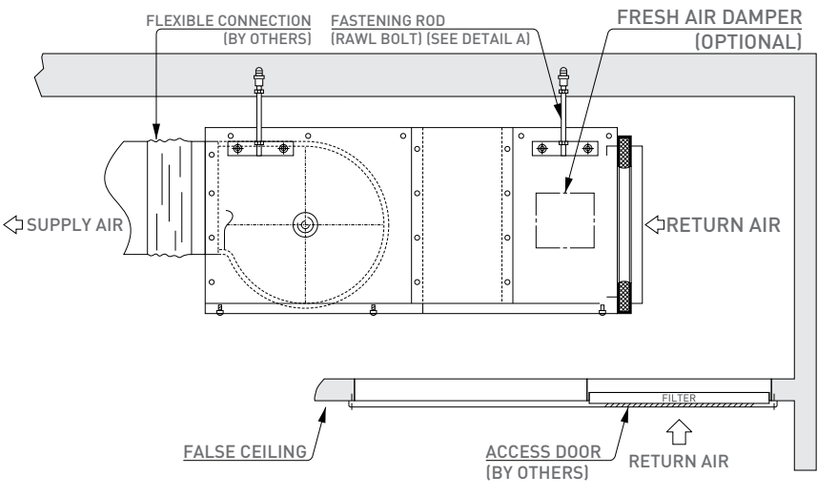
Figure 6	EXPOSED VERTICAL FREE STANDING MODELS									
Model	Nominal Air CFM	Number of Fans	A	B	C	Inlet	Outlet	Drain	Unit Weight (kg)	
									Oper.	Net
DF 800	800	1	650	285	500				67	70
DF 1000	1000	1	750	345	600				72	75
DF 1200	1200	1	950	750	700				96	90
DF 1400	1400	2	950	750	800	1"	1"	3/4"	96	100
DF 1600	1600	2	1050	805	900				103	105
DF 1800	1800	2	1200	870	1050				112	118
DF 2000	2000	2	1350	960	1200				120	127

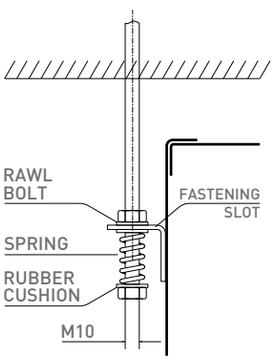
*All dimensions in mm except as specified *All dimensions ± 5 mm *All dimensions are subject to change without notice



A. FOR CONCRETE CEILING OR HOLLOW CONCRETE BLOCKS

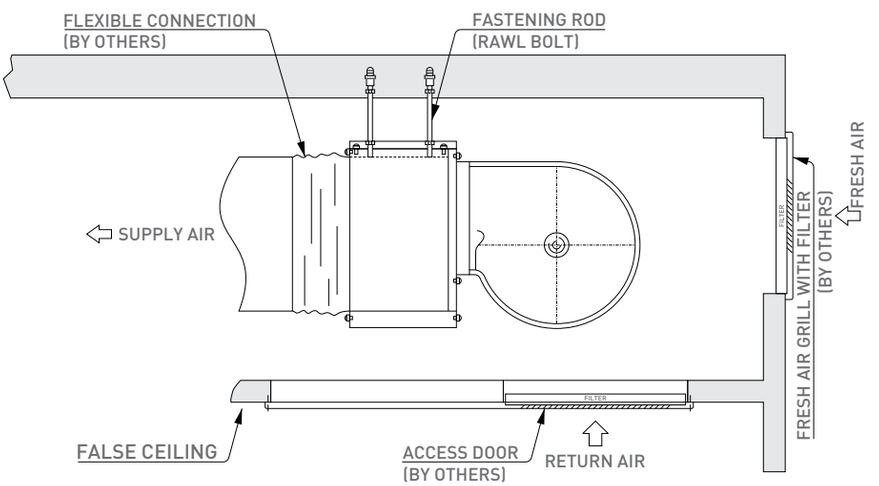
SUSPENDED FASTENING DETAILS DETAIL A

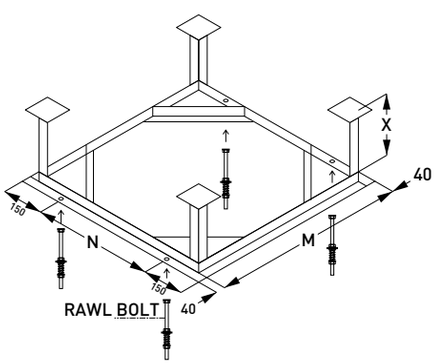


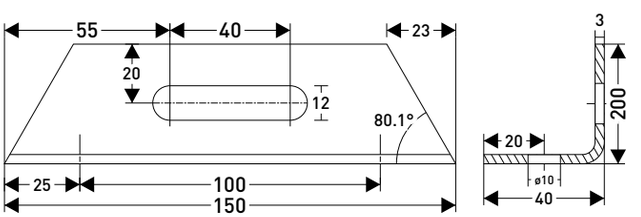


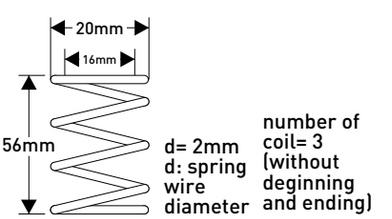
A. FOR CONCRETE CEILING OR HOLLOW CONCRETE BLOCKS

SUSPENDED FASTENING DETAILS DETAIL A









* The frame above is not included with units.
* All dimensions are in mm.
* The units are fastened to the Rawl bolts.
* The square metal plates in the end of hanger will be placed inside concrete before concrete pouring.
* M for Exposed Horizontal models is equal to A in dimension tables on page 13 and for Concealed
* Hori2ontal models is equal to C on the same page.
* N for Exposed Horizontal models is 650 mm and for
* Concealed Horizontal models is 155 mm.
* X should be determined according to ceiling dimentions.
* The thickness of metal angles (profiles) is at least 2 mm.
* 4 fastening rods for each unit are required.

* Using of springs to avoid transmission of vibration to the building is strongly recommended.
* For each spring it is recommended that k = 9 N/mm
* Various types of springs could have a k of 9 N/mm. A common example could be as in the figure

Table 11 AIR ENTHALPY vs. ALTITUDE						
Wet Bulb Temp. °F	Altitude					
	0	1000 (ft.)	2000 (ft.)	3000 (ft.)	4000 (ft.)	5000 (ft.)
	0	315 (m)	625 (m)	940 (m)	1250 (m)	1560 (m)
	Enthalpy of Air (Btu/lb.)					
35	13.01	13.18	13.36	13.54	13.74	13.94
36	13.44	13.62	13.8	14	14.20	14.41
37	13.87	14.06	14.25	14.46	14.67	14.89
38	14.32	14.51	14.71	14.92	15.14	15.37
39	14.77	14.97	15.18	15.4	15.63	15.87
40	15.23	15.44	15.66	15.89	16.12	16.37
41	15.7	15.92	16.14	16.38	16.63	16.89
42	16.17	16.42	16.64	16.88	17.14	17.41
43	16.66	16.89	17.14	17.39	17.66	17.94
44	17.15	17.39	17.65	17.92	18.20	18.49
45	17.65	17.91	18.17	18.45	18.74	19.04
46	18.16	18.43	18.7	18.99	19.29	19.61
47	18.68	18.96	19.25	19.55	19.86	20.19
48	19.21	19.5	19.8	20.11	20.44	20.78
49	19.75	20.05	20.36	20.69	21.03	2_1.38
50	20.30	20.61	20.94	21.27	21.63	22.00
51	20.86	21.19	21.52	21.87	22.24	22.62
52	21.44	21.77	22.12	22.49	22.87	23.27
53	22.02	22.37	22.73	23.11	23.51	23.92
54	22.62	22.98	23.36	23.75	24.16	$24._5$9
55	23.22	23.6	23.99	24.4	24.83	25.28
56	23.84	24.24	24.64	25.07	25.51	25.98
57	24.48	24.88	25.31	25.75	26.21	26.69
58	25.12	25.55	25.99	26.44	26.92	27.42
59	25.78	26.22	26.68	27.15	27.65	28.17
60	26.46	26.92	27.39	27.88	28.40	28.94
61	27.15	27.62	28.11	28.62	29.16	29.72
62	27.85	28.34	28.85	29.39	29.94	30.52
63	28.57	29.08	29.61	30.16	30.74	3_1.35
64	29.31	29.84	30.39	30.96	31.56	32.19
65	30.06	30.61	31.18	31.77	32.39	33.05
66	30.83	31.4	31.99	32.61	33.25	33.93
67	31.62	32.21	32.82	33.46	34.13	34.83
68	32.42	33.03	33.67	34.33	35.03	35.75
69	33.25	33.88	34.54	35.32	35.95	36.70
70	34.09	34.74	35.43	36.14	36.89	37.67
71	34.95	35.63	36.34	37.08	37.85	38.67
72	35.83	36.54	37.27	38.04	38.84	39.69
73	36.74	37.46	38.23	39.02	39.86	40.73
74	37.66	38.42	39.2	40.03	40.89	4_1.80
75	38.61	39.39	40.21	41.06	41.96	42.90
76	39.57	40.39	41.23	42.12	43.05	44.02
77	40.57	41.41	42.29	43.21	44.17	45.18
78	41.58	42.45	43.36	44.32	45.32	46.36
79	42.62	43.53	44.47	45.46	46.49	47.58
80	43.69	44.62	45.6	46.63	47.70	48.83
81	44.78	45.75	46.76	47.83	48.94	50.10
82	45.9	46.91	47.95	49.05	50.21	5_1.42
83	47.04	48.09	49.18	50.32	51.51	52.76
84	48.22	49.3	50.43	51.61	52.85	54.15
85	49.43	50.33	51.71	52.94	54.22	55.57

Table 12 AIR DENSITY vs. ALTITUDE			
Altitude Feet (meters)		Density	Press.
		lb./ft.3	in. w.g
0	0	0.0750	29.92
500	(160)	0.0739	29.38
1000	(310)	0.0728	28.85
1500	(460)	0.0718	28.33
2000	(610)	0.0707	27.82
2500	(770)	0.0697	27.31
3000	(920)	0.0686	26.82
3500	(1070)	0.0676	26.32
4000	(1220)	0.0666	25.84
4500	(1380)	0.0656	25.36
5000	(1530)	0.0646	24.90
5500	(1680)	0.0637	24.43
6000	(1830)	0.0627	23.98
6500	(1990)	0.0617	23.53
7000	(2140)	0.0608	23.09
7500	(2290)	0.0599	22.65
8000	(2440)	0.0590	22.22
8500	(2600)	0.0580	21.80
9000	(2750)	0.0571	21.39
9500	(2900)	0.0563	20.98
10000	(3050)	0.0554	20.58

Note:

Note:

Note:

UNIT HEATERS

AzarNasim
HVAC SYSTEMS

INTRODUCTION

This catalogue consists comprehensive information of unit heaters manufactured by Tahvieh Azar Nasim Company. Unit heaters of this company are designed for provision of warm air for industries, sport salons, store houses, pools and other similar places and heating fluid of these unit heaters is pumped hot water or water steam system. This system is usually installed above the ground level and air outlet is in horizontal or vertical position.

Main elements details:
Main structure of each unit heater consists of aluminum or steel body or fiberglass decorative body, heating coil made of copper or steel pipes and aluminum fins, air outlet damper has adjustable single blades and propeller fan and electromotor, axial fan and related guard, four hanging plates according air outlet position (horizontal or vertical) for installation of unit heaters at the place.

Body:
The body is made of steel sheet with appropriate thickness together with one layer of baked furnace color; body of the decorative is made of fiberglass and aluminum body with aluminum sheets without color in different sizes and dimensions.

Coils:
Water coils are made of copper pipes and water steam coils are made of seamless steel pipes. Standard fins of both coils are made of aluminum fins. Copper fins may be made upon request. Electrical coil may replace water or steam coils as well.

Fan electromotor:
Electromotor of unit heaters are single velocity. ordinary electro motors are supplied with low velocity or any velocity according to order of he customer. Single phase and three phase motors both may be supplied upon request of the customer.
(for industrial, hothouse units centrifugal fans are used with static and dynamic balance.)

Fireproof electro motors (anti friction)
For dangerous places, elector motors with Exd certificate , Zonel, A11, B11 and heat temperature of class T4 is supplied. Velocity of existing electro motors is 1400 RPM which are wire wrapped as single phase or three phases.

Air damper:
Dampers are manually adjustable in which every blade is regulated singly and installed in outlet of unit heater. For hothouse unit heaters no damper is installed and standing industrial units' dampers are according to Italian ARISIO brand.

Classification of unit heaters:
1. General Industrial Unit Heaters
2. Standing Industrial Unit Heater
3. Hot house Unit Heaters (special for high temperatures above 60 centigrade)

All the three types may be designed and produced using hot water, steam, hot oil coils and electrical coils.

←Note: for this special case antistatic blade fans are supplied.

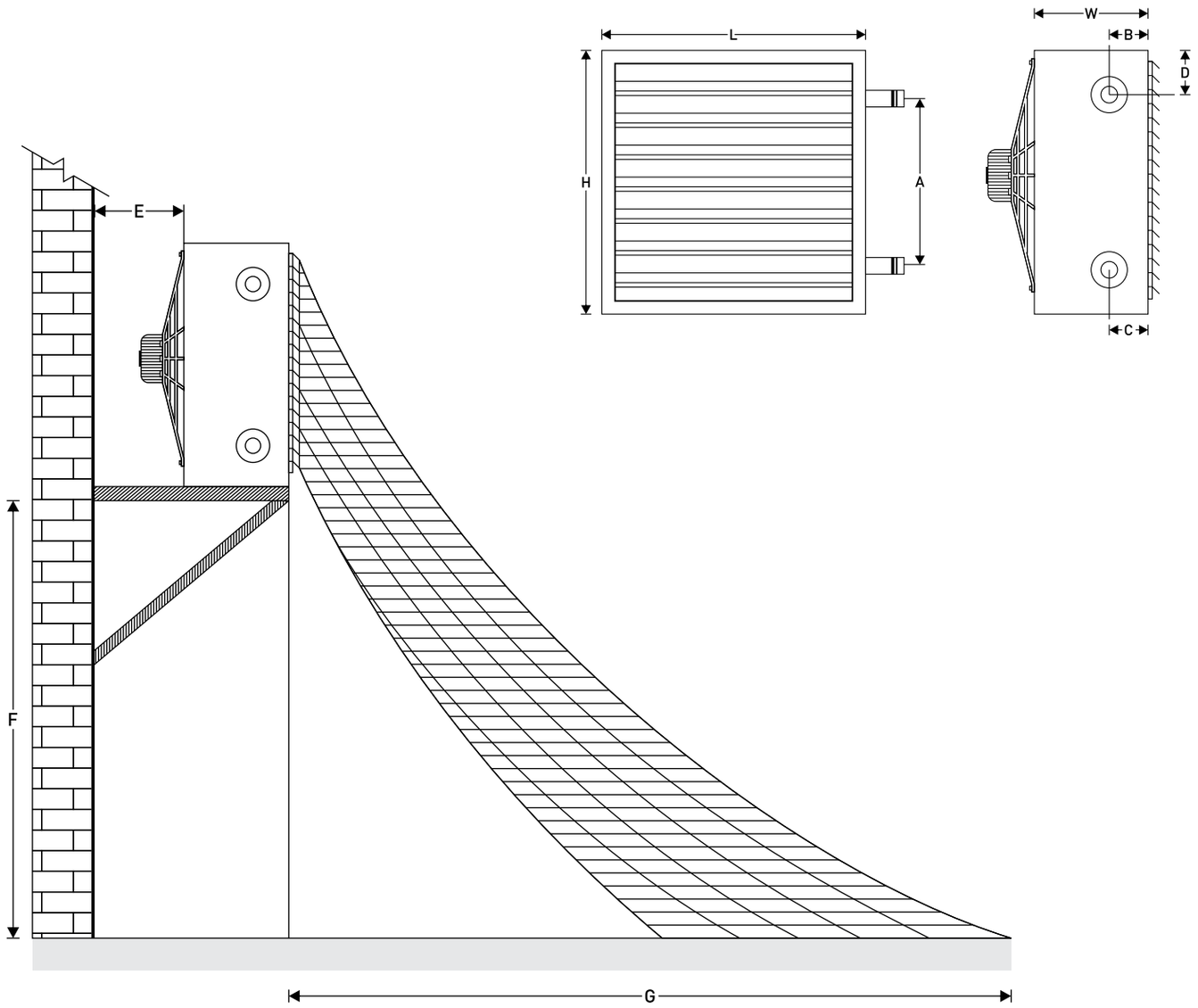


Figure 1

Model	L	W	H	A	B	C	D	E	F	G	Water (Inch)		Steam (Inch)	
											In	Out	In	Out
TU 40w-60S	500	350	500	300	120	80	100	410	2700	6500	1	1	1	3/4
TU 50w-75S	500	350	500	300	120	80	100	410	3000	8800	1	1	1	3/4
TU 70w-115S	580	350	580	390	120	80	100	410	3200	9100	1	1	1	3/4
TU 80w-140S	580	350	580	390	120	80	100	410	4000	12000	1	1	1	3/4
TU 120w-160S	660	350	660	460	120	80	100	410	4000	13000	1 1/4	1 1/4	1 1/4	1
TU 150w-230S	750	350	750	540	120	80	100	410	4000	14000	1 1/4	1 1/4	1 1/4	1
TU 180w-280S	750	350	750	540	120	80	100	410	4500	14500	1 1/4	1 1/4	1 1/4	1
TU 200w-300S	810	350	810	610	120	80	100	410	4500	15000	1 1/4	1 1/4	1 1/4	1
TU 250w-400S	850	350	850	650	120	80	100	410	4500	16000	1 1/4	1 1/4	1 1/4	1

Note: All Dimensions in mm

Table 2 -Hot Water Unit Heater Ratings – 1400 RPM						
Model	Air Flow CFM	BTU/hr.	Water Flow GPM	Water Pressure Drop (Ft.Wg)	MOTOR	
					Power (w)	Amps
TU 40w	1300	42000	4.2	0.55	120	0.6
TU 50w	1400	54000	5.4	0.62	120	0.6
TU 70w	1900	74000	7.4	0.92	150	0.7
TU 80w	2100	82000	8.2	1.15	150	0.7
TU 120w	2400	120000	12	1.4	170	0.8
TU 150w	3000	155000	15.4	3	170	0.8
TU 180w	3500	180000	18	3.7	170	0.8
TU 200w	3700	220000	22	3.5	170	0.8
TU 250w	3900	260000	26	4	170	0.8

Table 3 -Hot Water Unit Heater Ratings – 900 RPM						
Model	Air Flow CFM	BTU/hr.	Water Flow GPM	Water Pressure Drop (Ft.Wg)	MOTOR	
					Power (w)	Amps
TU 40w	800	29000	3	0.4	90	0.43
TU 50w	900	39000	4	0.47	90	0.43
TU 70w	1250	58000	5.8	0.65	100	0.48
TU 80w	1350	63000	6.3	0.76	100	0.48
TU 120w	1500	90000	9	0.99	110	0.52
TU 150w	1800	120000	12	2.2	170	0.7
TU 180w	2500	150000	15	2.7	170	0.7
TU 200w	2700	182000	18.2	2.5	170	0.7
TU 250w	2900	220000	22	2.9	170	0.7

F Entering Air Temperature on 180˚F Entering Water and 60˚*Standard ratings are based.

Table 4 Steam Unit Heater Ratings 1400 RPM				
Model	Air Flow CFM	BTU/hr.	MOTOR	
			Power (w)	Amps
TU 60 S	1200	62000	120	0.6
TU 75 S	1300	74000	120	0.6
TU 115 S	1800	115000	150	0.7
TU 140 S	2000	140000	150	0.7
TU 160 S	2200	160000	170	0.8
TU 230 S	3000	230000	170	0.8
TU 280 S	3400	280000	170	0.8
TU 300 S	3700	340000	170	0.8
TU 400 S	3800	450000	170	0.8

Table 5 Steam Unit Heater Ratings 900 RPM				
Model	Air Flow CFM	BTU/hr.	MOTOR	
			Power (w)	Amps
TU 60 S	800	45000	90	0.43
TU 75 S	900	54000	90	0.43
TU 115 S	1200	94000	100	0.48
TU 140 S	1350	110000	100	0.48
TU 160 S	1500	130000	110	0.52
TU 230 S	1700	180000	170	0.7
TU 280 S	2500	240000	170	0.7
TU 300 S	2700	280000	170	0.7
TU 400 S	2900	390000	170	0.7

F Entering Air Temperature˚* Standard ratings are based on 30 psi steam pressure and 60˚

Table 6	CFM Correction Factors Data										
-10	0	10	20	30	40	50	60	70	80	90	100
1.155	1.130	1.105	1.082	1.060	1.040	1.020	1.000	0.982	0.964	0.945	0.930

Table 7	Hot Water Correction Factors										
Entering Air Temp. °F	150	160	170	180	190	200	210	220	230	240	250
30	1.035	1.115	1.210	1.295	1.380	1.465	1.545	1.640	1.720	1.810	1.895
40	0.940	1.025	1.105	1.195	1.275	1.360	1.440	1.535	1.620	1.700	1.785
50	0.840	0.930	1.050	1.090	1.175	1.265	1.345	1.430	1.510	1.600	1.690
60	0.743	0.835	0.920	1.000	1.080	1.165	1.240	1.325	1.405	1.500	1.580
70	0.650	0.745	0.825	0.905	0.980	1.070	1.150	1.235	1.315	1.392	1.480
80	0.570	0.650	0.735	0.815	0.895	0.980	1.060	1.140	1.220	1.300	1.380
90	0.475	0.565	0.640	0.720	0.805	0.885	0.965	1.050	1.130	1.210	1.280
100	0.395	0.475	0.560	0.710	0.790	0.875	0.955	1.035	1.115	1.165	1.185

Table 8	Steam Correction Factors															
Entering Air Temp. °F	0	2	5	10	15	20	30	40	50	60	80	100	125	150	175	200
-30	1.133	1.163	1.200	1.258	1.308	1.348	1.420	1.482	1.532	1.585	1.654	1.717	1.792	1.847	1.903	1.956
-20	1.082	1.113	1.153	1.211	1.258	1.301	1.373	1.431	1.483	1.528	1.605	1.670	1.740	1.801	1.855	1.903
-10	1.036	1.066	1.107	1.164	1.212	1.254	1.325	1.384	1.436	1.481	1.558	1.623	1.693	1.755	1.808	1.856
0	0.989	1.020	1.060	1.117	1.166	1.207	1.278	1.338	1.386	1.434	1.512	1.576	1.647	1.708	1.762	1.810
10	0.942	0.973	1.013	1.071	1.118	1.161	1.233	1.292	1.342	1.388	1.465	1.530	1.601	1.660	1.715	1.764
20	0.894	0.926	0.967	1.024	1.073	1.114	1.186	1.244	1.296	1.341	1.418	1.483	1.553	1.615	1.669	1.717
30	0.849	0.880	0.920	0.977	1.026	1.067	1.139	1.198	1.250	1.294	1.372	1.436	1.506	1.568	1.622	1.670
40	0.802	0.883	0.873	0.930	0.978	1.021	1.092	1.151	1.202	1.248	1.325	1.390	1.461	1.521	1.575	1.628
45	0.779	0.810	0.850	0.907	0.955	0.997	1.069	1.128	1.180	1.224	1.302	1.366	1.436	1.496	1.552	1.601
50	0.756	0.786	0.827	0.884	0.932	0.974	1.045	1.104	1.156	1.201	1.273	1.343	1.414	1.474	1.529	1.576
55	0.732	0.763	0.803	0.861	0.908	0.951	1.023	1.081	1.133	1.178	1.255	1.320	1.390	1.451	1.505	1.553
60	0.709	0.740	0.780	0.837	0.885	0.927	1.000	1.058	1.109	1.154	1.231	1.297	1.367	1.427	1.482	1.531
65	0.686	0.716	0.757	0.814	0.862	0.904	0.976	1.034	1.086	1.131	1.209	1.273	1.343	1.407	1.459	1.506
70	0.662	0.693	0.733	0.791	0.838	0.881	0.935	1.011	1.063	1.108	1.186	1.250	1.320	1.380	1.435	1.484
75	0.639	0.670	0.710	0.767	0.815	0.857	0.939	0.988	1.040	1.084	1.163	1.226	1.297	1.357	1.412	1.460
80	0.616	0.646	0.687	0.744	0.792	0.934	0.906	0.865	1.016	1.061	1.139	1.203	1.273	1.335	1.389	1.436
85	0.592	0.623	0.663	0.720	0.768	0.811	0.883	0.941	1.993	1.038	1.116	1.180	1.251	1.310	1.365	1.414
90	0.562	0.600	0.640	0.696	0.745	0.787	0.860	0.918	0.969	1.014	1.093	1.156	1.226	1.288	1.342	1.390
100	0.522	0.533	0.593	0.650	0.698	0.732	0.813	0.871	0.923	0.968	1.045	1.110	1.181	1.240	1.295	1.344
110	0.476	0.506	0.547	0.603	0.652	0.694	0.766	0.825	0.876	0.921	0.998	1.063	1.134	1.194	1.248	1.297
120	0.429	0.460	0.500	0.556	0.605	0.647	0.720	0.778	0.830	0.874	0.952	1.027	1.086	1.147	1.201	1.251
140	0.336	0.366	0.407	0.464	0.512	0.554	0.626	0.685	0.737	0.781	0.858	0.923	0.993	1.055	1.108	1.156
160	0.242	0.273	0.313	0.370	0.418	0.460	0.533	0.591	0.642	0.688	0.765	0.831	0.901	0.961	1.012	1.065
180	0.149	0.179	0.220	0.227	0.325	0.367	0.439	0.498	0.550	0.594	0.671	0.737	0.808	0.868	0.921	0.970
200	0.056	0.085	0.127	0.183	0.232	0.274	0.345	0.405	0.455	0.501	0.577	0.643	0.713	0.775	0.775	0.876

Table 9															
Pressure (psi)	0	2	3	5	8	10	15	20	25	30	35	40	45	50	60
Temperature °F	212.00	218.47	221.50	227.16	234.78	239.41	249.73	258.85	266.85	274.64	280.64	286.74	292.37	297.70	307.30
Latent Heat Btu/Lb	970.40	966.20	964.27	960.54	955.58	952.49	945.49	939.26	933.63	923.77	923.77	919.14	915.14	911.24	903.91

Cont. Table 9															
Pressure (psi)	70	75	80	90	100	110	120	125	130	140	150	175	200	225	250
Temperature °F	316.03	320.00	323.89	331.16	337.86	344.22	350.09	353.00	355.65	360.89	365.92	377.47	387.88	397.27	406.01
Latent Heat Btu/Lb	897.28	894.20	8891.20	885.42	880.82	874.85	870.05	867.70	865.48	861.12	856.92	847.02	838.00	828.30	820.00

As the function of a unit heater is to transfer heat from steam or hot water to the surrounding Area. It´s necessary that the steam or hot water be delivered to the unit and removed from it In required quantity and condition.

The piping of the unit heaters must conform strictly to the system requirements, while at the same intended. The following are a few piping guidelines which must be observed when Designing piping system for unit heaters.

1. Steam and condensate lines in steam unit, must be sized for maximum load condition. This rule must be observed in hot water units, too. The maximum pressure loss in hot water Piping is 1m H2o per 30 m equal length of piping.

2. In steam unit heaters installation, the supply line should be pitched towards the main line In order to prevent of condensate flow into main line where it might reduce capacity and Cause noise, in hot water unit heaters both supply and return lines should be paralleled towards the unit.

3. The return line in steam unit heaters must be installed at minimum 300 mm below the unit, This prevents accumulation of condensate water in the return line, check valve, strainers and Traps. It also increases life time of this parts and will improve unit operation.

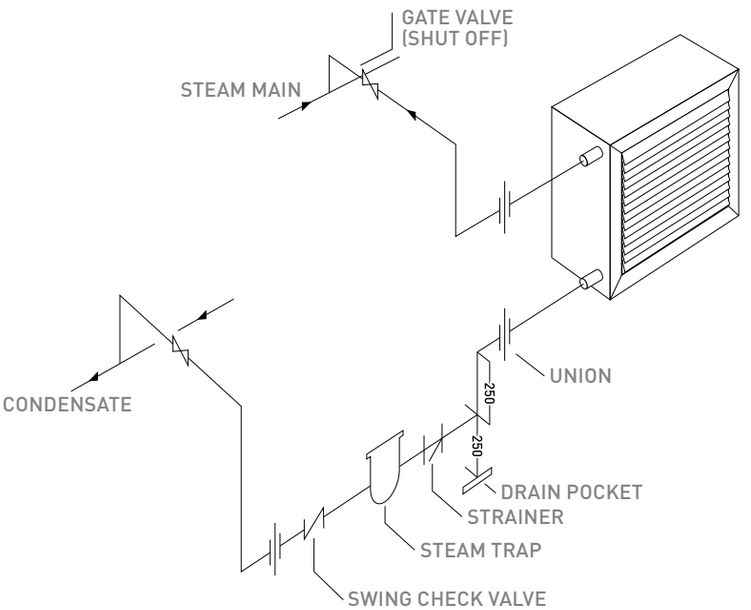
4. By using a steam trap in return line can improve heating capacity certainly. The trap size Must be proportionate to unit capacity, otherwise, the condensate water will accumulate in The unit or steam will eject from return line.

5. Dirt trap in return line, prevent entrance of dirt and scales in to the pipe line. Furthermore, by cleaning the dirt trap cartridge, you can throw away all scales and dirt from inside the Pipe line.

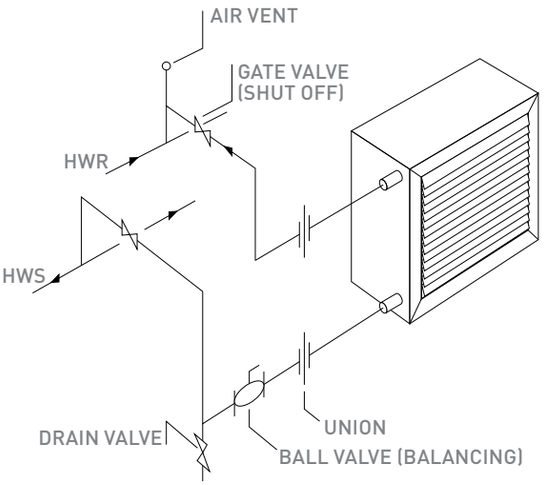
6. By connecting an air vent (at least 3/4") on top of the return line, can dearate piping system, periodically.

7. In order to improve the efficiency of system, it's necessary to insulate all pipe lines witch Are in contact with cold air in winter.

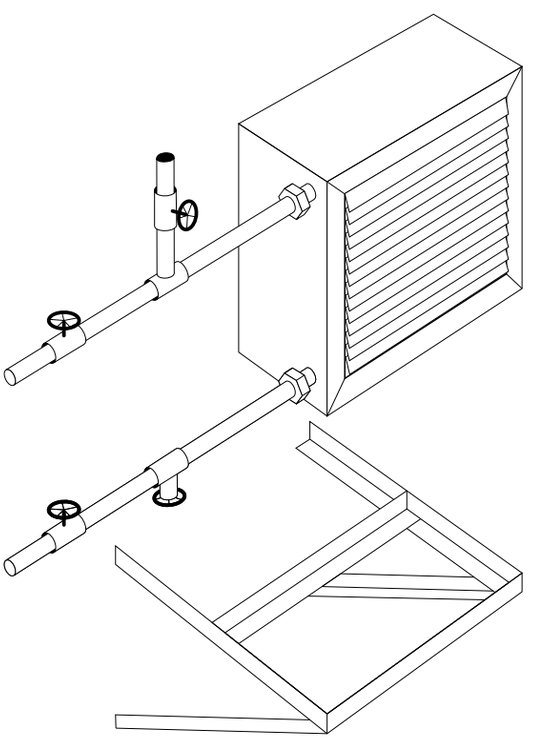
8. Steam piping and unit heaters should be supported independently.



STEAM HEATING SYSTEMS



HOT WATER SYSTEMS



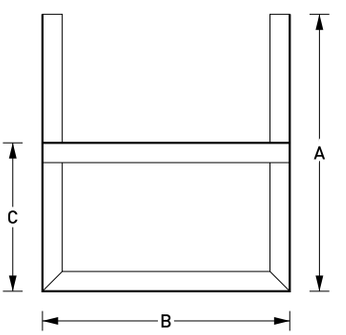


Table 10 Sitting Bracket Dimensions

Model	A (mm)	B (mm)	C (mm)	Weight (kg)	
				W	S
TU 40w-60s	800	540	380	25	32
TU 50w-75s	800	540	385	27	34
TU 70w-115s	800	620	385	31	38
TU 80w-140s	800	620	385	33	40
TU 120w-160s	800	700	385	38	45
TU 150w-230s	800	795	385	45	52
TU 180w-280s	800	795	385	46	55
TU 200w-300s	800	850	385	52	60
TU 250w-400s	800	890	385	60	67

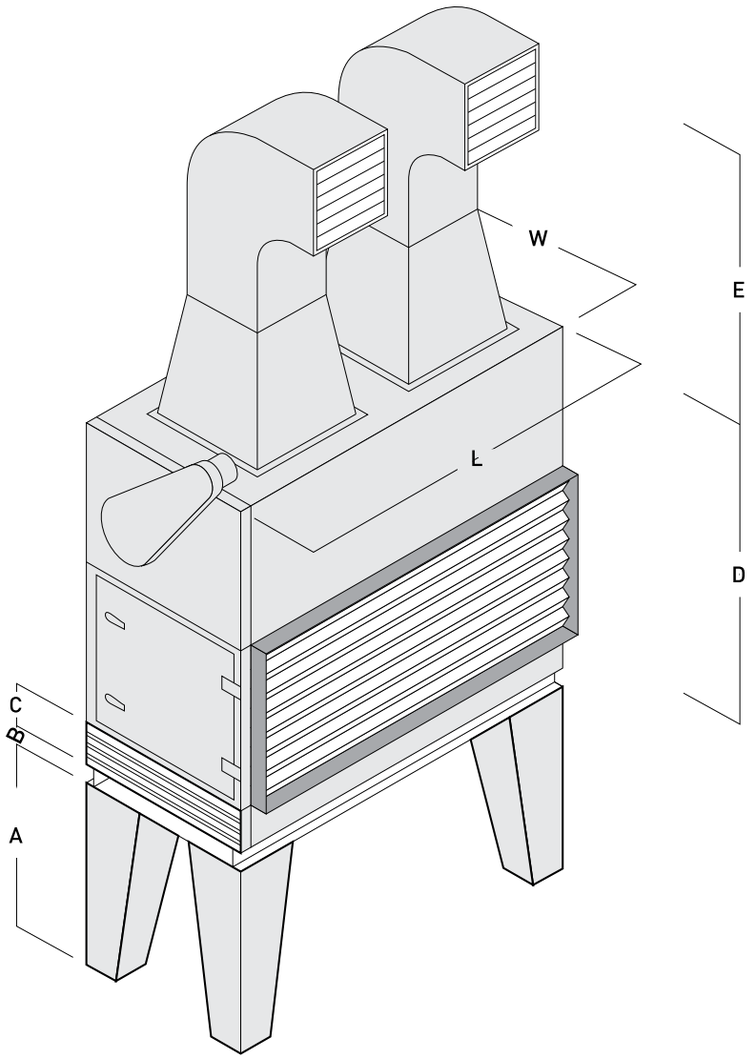


Table 11	Dimensions							
Model	L	W	A	B	C		D	E
TU 50-85 W - S	950	700	300	60	No. of Rows	Coil Width	1000	400
TU 65-90 W - S	1000	750	300	60			1000	400
TU 70-120 W - S	1300	800	300	60			1100	400
TU 75-125 W - S	1350	850	300	80			1100	400
TU 90-140 W - S	1500	1000	300	80			1150	400
TU 90-170 W - S	1800	1000	300	80	1	100	1150	400
TU 100-170 W - S	180	1100	300	100	2	150	1150	400
TU 100-185 W - S	1950	1100	400	100	3	180	1200	500
TU 100-200 W - S	2100	1100	400	120			1200	500
TU 100-220 W - S	2300	1100	400	120			1150	400

Note: All Dimensions in mm

Table 12

Model	Air Flow CFM	RPM	MOTOR		Fan Size	BTU/hr.	Water Flow GPM
			Power (w)	Amps			
TU 50 85 W	2000	596	0.5	0.78	1×14"	199000	20
	2500	620	0.75	1.18		248400	25
	3000	657	0.75	1.18		298000	30
	3500	705	0.75	1.18		348000	35
TU 65-90 W	3000	545	0.75	1.18	1×14"	299000	30
	3250	566	0.75	1.18		322920	33
	3900	615	1	1.5		387504	39
	4000	640	1	1.5		397440	40
TU 70-120 W	3800	590	1	1.5	1×14"	378000	38
	4500	620	1.5	2.3		448000	45
	5250	686	1.5	2.3		522000	53
	5400	705	1.5	2.3		537000	54
TU 75-125 W	4000	615	1.5	2.3	1×16"	398000	40
	4600	640	1.5	2.3		457000	46
	5000	686	2	3.15		496800	50
	6000	710	2	3.15		597000	60
TU 90-140 W	6500	650	1.5	2.3	1×16"	646000	65
	7000	690	1.5	2.3		695500	70
	7800	705	2	3.15		775000	78
	8400	757	2	3.15		835000	84
TU 90-170 W	8000	528	1.5	2.3	1×19"	795000	80
	8500	551	2	3.15		844500	85
	9000	595	2	3.15		895000	90
	10200	604	2	3.15		1000000	100
TU 100-170 W	8900	507	2	3.15	1×19"	885000	89
	9500	530	2	3.15		944000	95
	10500	551	3	4.7		1045000	105
	11400	640	3	4.7		1130000	114
TU 100-185 W	9300	420	3	4.7	1×22"	925000	93
	10600	460	4	6.3		1050000	105
	11000	482	4	6.3		1095000	109
	12600	530	4	6.3		1250000	125
TU 100-200 W	10000	420	4	6.3	1×22"	994000	100
	11000	439	5.5	8.6		1092000	110
	12000	482	5.5	8.6		1192000	120
	13200	528	5.5	8.6		1310000	131
TU 100-220 W	11600	469	2x3	2x4.7	2×19"	1152000	116
	12500	486	2x3	2x4.7		1242000	125
	13800	507	2x4	2x6.3		1371000	138
	15000	528	2x4	2x6.3		1490500	150

Standing Industrial Hot Water Unit Heater Ratings
3 Rows coil

Table 13

Model	Air Flow CFM	RPM	MOTOR		Fan Size	BTU/hr.	Water Flow GPM
			Power (w)	Amps			
TU 50 85 W	2000	596	0.5	0.78	1×14"	238000	24
	2500	620	0.75	1.18		297000	30
	3000	657	0.75	1.18		356000	36
	3500	705	0.75	1.18		416000	42
TU 65-90 W	3000	545	0.75	1.18	1×14"	356000	36
	3250	566	0.75	1.18		386000	39
	3900	615	1	1.5		464000	47
	4000	640	1	1.5		475000	48
TU 70-120 W	3800	590	1	1.5	1×14"	451000	46
	4500	620	1.5	2.3		534600	54
	5250	686	1.5	2.3		624000	63
	5400	705	1.5	2.3		642000	65
TU 75-125 W	4000	615	1.5	2.3	1×16"	476000	48
	4600	640	1.5	2.3		546500	55
	5000	686	2	3.15		594000	60
	6000	710	2	3.15		712800	72
TU 90-140 W	6500	650	1.5	2.3	1×16"	772000	78
	7000	690	1.5	2.3		832000	84
	7800	705	2	3.15		927000	93
	8400	757	2	3.15		998000	100
TU 90-170 W	8000	528	1.5	2.3	1×19"	950000	95
	8500	551	2	3.15		1000000	100
	9000	595	2	3.15		1070000	107
	10200	604	2	3.15		1210000	121
TU 100-170 W	8900	507	2	3.15	1×19"	1058000	106
	9500	530	2	3.15		1129000	113
	10500	551	3	4.7		1248000	125
	11400	640	3	4.7		1355000	136
TU 100-185 W	9300	420	3	4.7	1×22"	1105000	111
	10600	460	4	6.3		1259000	126
	11000	482	4	6.3		1306000	131
	12600	530	4	6.3		1497000	150
TU 100-200 W	10000	420	4	6.3	1×22"	1188000	119
	11000	439	5.5	8.6		1307000	131
	12000	482	5.5	8.6		1426000	143
	13200	528	5.5	8.6		1568000	157
TU 100-220 W	11600	469	2x3	2x4.7	2×19"	1378000	138
	12500	486	2x3	2x4.7		1485000	1498
	13800	507	2x4	2x6.3		1640000	164
	15000	528	2x4	2x6.3		1782000	179

*Standard Entering Hot water 180°F

Table 14

Model	Air Flow CFM	RPM	MOTOR		Fan Size	BTU/hr.
			Power (w)	Amps		
TU 50 85 s	2200	682	0.75	1.18	1×14"	221000
	2750	693	0.75	1.18		276000
	3300	720	1	1.5		332000
	3850	760	1.5	2.3		386600
TU 65-90 s	3300	615	1	1.5	1×14"	332000
	3575	625	1	1.5		359000
	4290	665	1.5	2.3		432000
	4400	690	1.5	2.3		442000
TU 70-120 s	4180	645	1.5	2.3	1×14"	420000
	4950	693	2	3.15		497000
	5775	745	2	3.15		580000
	5940	760	2	3.15		597000
TU 75-125 s	4400	658	2	3.15	1×16"	442000
	5060	690	2	3.15		510000
	5500	745	3	4.7		553000
	6600	813	3	4.7		663000
TU 90-140 s	7150	714	2	3.15	1×16"	718000
	7700	750	2	3.15		774000
	8580	760	3	4.7		862000
	9240	860	3	4.7		928000
TU 90-170 s	8800	574	2	3.15	1×19"	884000
	9350	595	3	4.7		939000
	9900	636	3	4.7		995000
	11220	660	3	4.7		1127000
TU 100-170 s	9790	574	2	3.15	1×19"	984000
	10450	595	3	4.7		1050000
	11550	636	3	4.7		1160000
	12540	665	3	4.7		1260000
TU 100-185 s	10230	461	4	6.3	1×22"	1028000
	11660	496	5.5	8.6		1172000
	12100	516	5.5	8.6		1215000
	13860	559	5.5	8.6		1392000
TU 100-200 s	11000	461	5.5	8.6	1×22"	1105000
	12100	478	7.5	11.8		1215000
	13200	516	7.5	11.8		1326000
	14520	574	7.5	11.8		1459000
TU 100-220 s	12860	525	2x4	2x6.3	2×19"	1292000
	13750	537	2x4	2x6.3		1381000
	15180	554	2x5.5	2x8.6		1525000
	16500	574	2x5.5	2x8.6		1657000

*Standard steam pressure 30 PSI

Standing Industrial Steam Unit Heater Ratings
2 Rows coil

Table 15

Model	Air Flow CFM	RPM	MOTOR		Fan Size	BTU/hr.
			Power (w)	Amps		
TU 50 85 s	2200	682	0.75	1.18	1×14"	271000
	2750	693	0.75	1.18		339000
	3300	720	1	1.5		406000
	3850	760	1.5	2.3		475000
TU 65-90 s	3300	615	1	1.5	1×14"	410000
	3575	625	1	1.5		440000
	4290	665	1.5	2.3		529000
	4400	690	1.5	2.3		542000
TU 70-120 s	4180	645	1.5	2.3	1×14"	515000
	4950	693	2	3.15		610000
	5775	745	2	3.15		712000
	5940	760	2	3.15		732000
TU 75-125 s	4400	658	2	3.15	1×16"	542000
	5060	690	2	3.15		623000
	5500	745	3	4.7		678000
	6600	813	3	4.7		812000
TU 90-140 s	7150	714	2	3.15	1×16"	881000
	7700	750	2	3.15		949000
	8580	760	3	4.7		1057000
	9240	860	3	4.7		1138000
TU 90-170 s	8800	574	2	3.15	1×19"	1084000
	9350	595	3	4.7		1152000
	9900	636	3	4.7		1219000
	11220	660	3	4.7		1382000
TU 100-170 s	9790	574	2	3.15	1×19"	1206000
	10450	595	3	4.7		1287000
	11550	636	3	4.7		1422000
	12540	665	3	4.7		1544000
TU 100-185 s	10230	461	4	6.3	1×22"	1260000
	11660	496	5.5	8.6		1436000
	12100	516	5.5	8.6		1490000
	13860	559	5.5	8.6		1707000
TU 100-200 s	11000	461	5.5	8.6	1×22"	1355000
	12100	478	7.5	11.8		1490000
	13200	516	7.5	11.8		1626000
	14520	574	7.5	11.8		1788000
TU 100-220 s	12860	525	2x4	2x6.3	2×19"	1584000
	13750	537	2x4	2x6.3		1693000
	15180	554	2x5.5	2x8.6		1869000
	16500	574	2x5.5	2x8.6		2032000

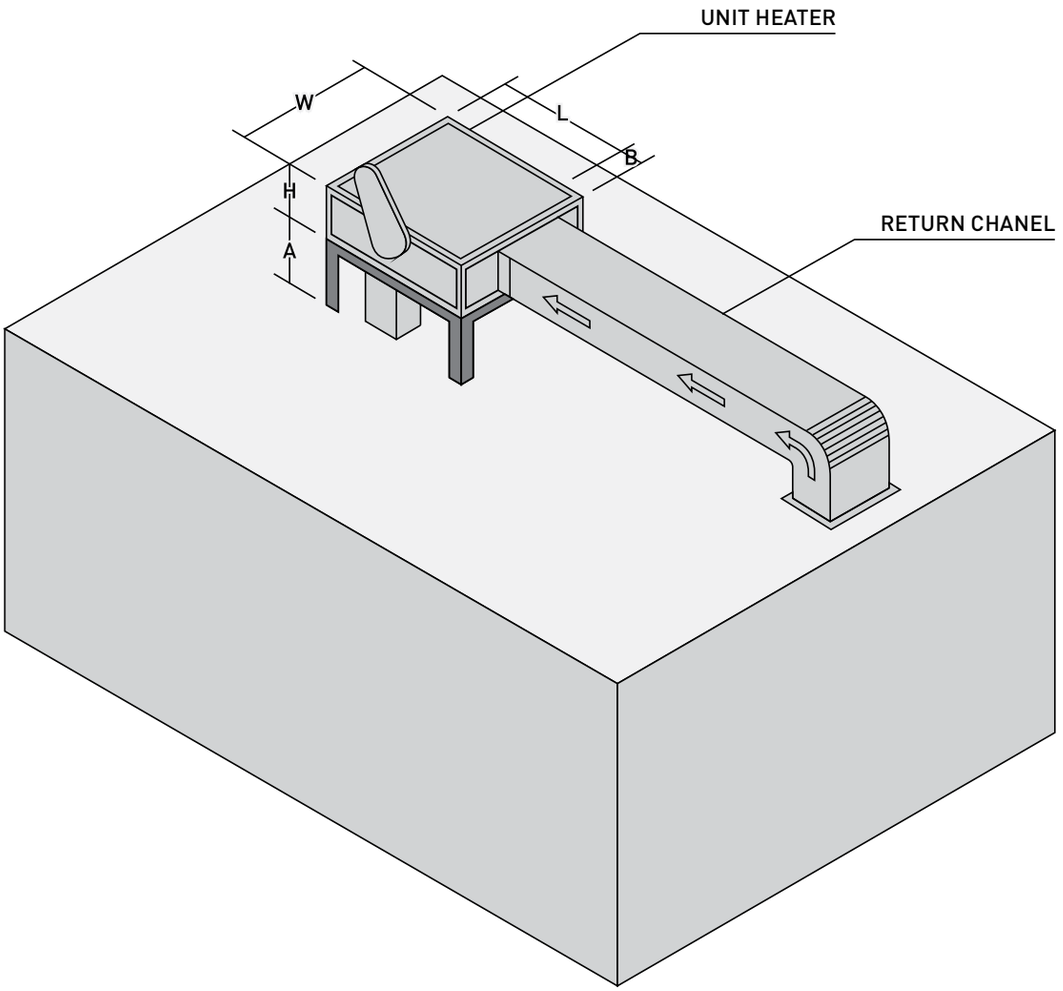


Table 16	Dimensions					
Model	L	W	H	A	B	
TU 50-40 W-S	750	650	700	300		
TU 40-50 W-S	800	750	800	300	No. of Rows	Coil Width
TU 50-50 W-S	800	750	800	300		
TU 50-60 W-S	850	800	800	300		
TU 60-60 W-S	850	800	800	300		
TU 75-75 W-S	1000	900	900	300	1	100
TU 75-75 W-S	1100	1000	900	300	2	150
TU 90-90 W-S	1250	1150	1100	300	3	180
TU 90-90 W-S	1300	1200	1100	300		
TU 100-100 W-S	1600	1400	1300	300		

Note: All Dimensions in mm

Hot House, Hot Water Unit Heater Ratings
2 Rows coil

Table 17

Model	Air Flow CFM	BTU/hr.	Water flow GPM	Fan Size	MOTOR	
					Power (w)	Amps
TU 50-40 w	1500	150000	15	1 × 14"	0.5	0.78
TU 40-50 w	2000	198000	20	1 × 14"	0.5	0.78
TU 50-50 w	2500	248000	25	1 × 14"	0.75	1.18
TU 50-60 w	3000	299000	30	1 × 14"	0.75	1.18
TU 60-60 w	3600	358000	36	1 × 16"	1.5	2.3
TU 60-75 w	4500	448000	45	1 × 16"	1.5	2.3
TU 75-75 w	5500	547000	55	1 × 18"	2	3.15
TU 90-90 w	6500	646000	65	1 × 19"	2	3.15
TU 90-90 w	8000	795000	80	1 × 19"	3	4.7
TU 100 -100 w	10000	994000	100	1 × 22"	4	6.3

Hot House, Hot Water Unit Heater Ratings
3 Rows coil

Table 18

Model	Air Flow CFM	BTU/hr.	Water flow GPM	Fan Size	MOTOR	
					Power (w)	Amps
TU 50-40 w	2000	237000	24	1 × 14"	0.5	0.78
TU 40-50 w	2500	297000	30	1 × 14"	0.75	1.18
TU 50-50 w	3200	381000	39	1 × 14"	0.75	1.18
TU 50-60 w	4000	475000	48	1 × 14"	1.5	2.3
TU 60-60 w	4600	547000	55	1 × 16"	1.5	2.3
TU 60-75 w	5500	654000	66	1 × 16"	2	3.15
TU 75-75 w	6800	808000	81	1 × 18"	2	3.15
TU 90-90 w	8000	950000	96	1 × 19"	3	4.7
TU 90-90 w	9000	1069000	108	1 × 19"	4	6.3
TU 100 -100 w	11000	1307000	132	1 × 22"	5	8.6

Hothouse Steam Unit Heater Ratings
1 Row coil

Table 19

Model	Air Flow CFM	BTU/hr.	Fan Size	MOTOR	
				Power (Hp)	Amps
TU 50-40 w	2000	200000	1 × 14"	0.5	0.78
TU 40-50 w	2500	252000	1 × 14"	0.75	1.18
TU 50-50 w	3000	300000	1 × 14"	0.75	1.18
TU 50-60 w	3800	382000	1 × 14"	1.5	2.3
TU 60-60 w	4500	452000	1 × 16"	1.5	2.3
TU 60-75 w	5400	544000	1 × 16"	2	3.15
TU 75-75 w	6500	655000	1 × 18"	2	3.15
TU 90-90 w	8200	823000	1 × 19"	3	4.7
TU 90-90 w	10000	1000000	1 × 19"	4	6.3
TU 100 -100 w	12000	1200000	1 × 22"	5.5	8.6

Hothouse Steam Unit Heater Ratings
2 Rows coil

Table 20

Model	Air Flow CFM	BTU/hr.	Fan Size	MOTOR	
				Power (Hp)	Amps
TU 50-40 w	2500	308000	1 × 14"	0.75	1.18
TU 40-50 w	3200	393000	1 × 14"	1.5	1.18
TU 50-50 w	3900	480000	1 × 14"	1.5	2.3
TU 50-60 w	5000	615000	1 × 14"	2	2.3
TU 60-60 w	5500	678000	1 × 16"	2	3.15
TU 60-75 w	7000	861000	1 × 16"	3	3.15
TU 75-75 w	8000	984000	1 × 18"	3	4.7
TU 90-90 w	9500	1169000	1 × 19"	4	6.3
TU 90-90 w	12000	1477000	1 × 19"	5.5	8.6
TU 100 -100 w	14000	1724000	1 × 22"	7.5	11.8

MODEL SELECTION:

Once determined the minimum volume of the air to be circulated inside the environment and Select the minimum number of units to install, the sizes and features of the units that better Fulfill the installation necessities have to be pointed out in the tables. Generally it's better to Select the units working at normal ration speed.

MAIN TENANCE RULES:

Azar Nasim unit heaters are hydraulically and mechanically tested. For this reason, along Working time is guaranteed without defect. The operating and the duration of the unit heaters Can be improved and extended following a maintenance program as listed below.

FAN MOTOR ASSEMBLY:

In case of various interventions of the magnetic starter, measure the current absorption (Amp) and be sure that it's not greater than the ratings of motor. The bearings are self Lubricated closed type and don't require particular maintenance and lubrication. If they will Result particularly noisy; please order to replacing them, at the beginning of each working Period, control that the blade is clean and without fouling on the both sides on the contrary Dismount the blade and put into a degreasing solution.

HEATING COIL:

At the beginning of each working period, it is necessary to clean the exchanging coil By means of blower with compressed air or brushing. In case of grease presence, Wash the finned pack with a degreasing solution and pay attention to don't wet the motor and Affect a well done drying of the exchanging coil before starting. The necessity and Frequency of the cleaning depends on the dust inside the environment where the unit heaters Are installed. Generally the above maintenance is elected yearly before each winter. During such maintenance, control the fixing screws, in motor mounting, blade and brackets, Regarding the spare parts of the unit and the ratings of the motor.

AEC	Air Entering Condencer Temperature (°F)
AC	Air - Cooled
CFM	Air Flow Rate (Ft.^{3}/l\/lin)
CF	Correction Factor for Entering Air Temprature
CT	Condesing Temperature (°F)
EAT	Entering Air Temperature (°F)
EDB	Entering Dry Bulb Temperature (°F)
EWB	Entering VVet Bulb Temperature (°F)
EWT	Entering Water Temperature (°F)
EHT	Entering Hot Water Temperature (°F)
FA	Coil Face Area Sq.. FT
FLA	Full Load Amps
FV	Face Velocity (Ft/min)
CPM	Condenser Water Flow Rate
HP	Normal Horse power
H_1	Enthalpy of Air Entering Evaporator Coil (Btu/Lb)
H_2	Enthalpy of Air Leaving Evaporator Coil (Btu/Lb)
HZ	Network Frequency (S-^{1})
kw	Compressor Power Input (kw)
LDB	Leaving Dry Bulb Temperature (°F)
Leq	Equivalent Length of Pipe From Package to Condenser Ft
LRA	Locked Rotate Amps
PD	Pressure Drop (Feet of Water)
PH	Phase
RLA	Rated Load Amps
SC	Starting Current Amps
SHC	Sensible Heat Capacity (MBH)
SP	Static Pressure (Inch of Water)
TC	Total Capacity (MBH)
THR	Total Heat Rejection (MBH)
V	Voltage
W.C	Water - Cooler

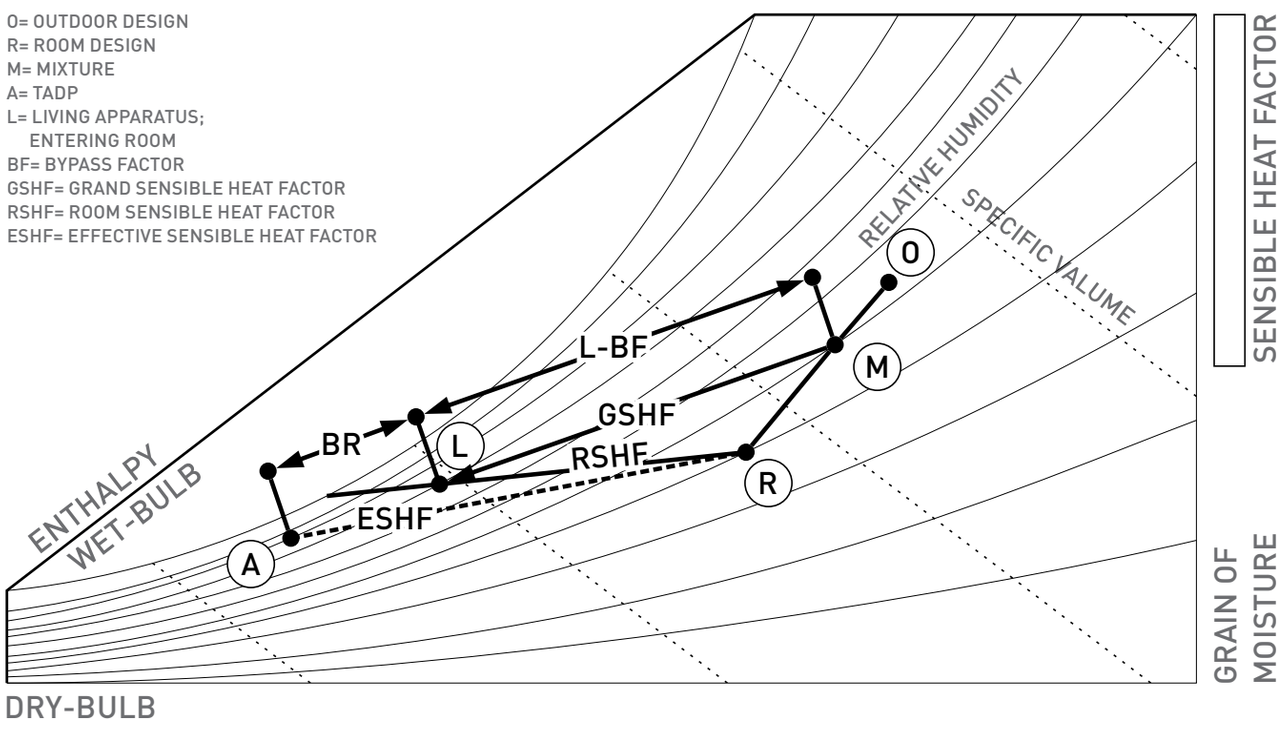
MBH ..... (kBtu/hr.)
Q T..... Total Cooling Load (kBtu/hr.)
Q S..... Sensible Cooling Load (kBtu/hr.)
RH .....Relative Humidity
RPM .....Revolution Per minute
WB..... Air Wet Bulb Temp (˚F)
w.g. ..... Water Gauge

AEC.....Air Entering Condenser Temperature (°F)
AC.....Air-Cooled
CFM.....Air Flow Rate (Ft .³/min)
CF.....Correction Factor for entering Air Temperature
CT.....Condensing Temperature (°F)
EAT.....Entering Air Temperature (°F)
EDB.....Entering Dry Bulb Temperature (°F)
EHT.....Entering Hot Water Temperature (°F)
EWB.....Entering Wet Bulb Temperature (°F)
EWT.....Entering Water Temperature (°F)
FA.....Coil Face Area Sq..Ft
FLA.....Full Load Amps
FV.....Face Velocity (Ft/min)
GPM.....Condenser Water Flow Rate
HP.....Normal Horse Power
H1.....Entering of Air Entering Evaporator Coil (Btu/Lb)
H2.....Enthalpy of Air Leaving Evaporator Coil (Btu/Lb)
HZ.....Network Frequency (s-1)
KW.....Compressor Power Input (Kw)
LDB.....Leaving Dry Bulb Temperature (°F)
Leq.....Equivalent Length of Pipe From Package to Condenser Ft. (meter)
LRA.....Locked Rotor Amps
PD.....Pressure Drop (Feet of water)
PH.....Phase
RLA.....Rated Load Amps
SC.....Starting Current Amps
SHC.....Sensible Heat Capacity (MBH)
SP.....Static Pressure (Inch of Water)
TC.....Total Capacity (MBH)
THR.....Total Heat Rejection (MBH)
V.....Voltage
W.C.....Water - Cooled
CT..... Total Load Correction Factor
CS..... Sensible Load Correction Factor
C WB..... Air Wet Bulb Correction Factor
C A..... Altitude Correction Factor
CFM .....Air flow rate (Ft.3/min)
DX .....Direct Expansion Coil
E / L..... Entering / Leaving
EDB / LDB..... ENT. /Lea. Air Dry Bulb Temp. (˚F)
EWB / LWB .....Ent. / Lea. Air Wet Bulb Temp. (˚F)
EWT .....Entering Water Temp. (˚F)
FPI..... Fins per Inch
FA..... Coil Face Area (Ft.2)
Air Velocity FV..... Coil Face
(fpm) FPM..... Air Velocity
(Ft/min) GPM..... Volumetric Water Flow Rate
(Gal/min)..... Enthalpy of Air (BTU/Lb.)
LWT .....Leaving Water Temp. (˚F)

Note:

IRAN CLIMATE CLASSIFICATION

INTERNAL AIR CONDITION								GEOGRAPHIC		EXTERNAL AIR CONDITION								CLASSIFICATION		TYPS
WINTER		SUMMER								WINTER		SUMMER								
TEMPERATURE DIFFERENCE		MOISTURE (W)	RELATIVE MOISTURE	TEMPERATURE				HEIGHT ABOVE SEA LEVEL	GEOGR-APHIC WIDTH	MIN. TEMP		DAILY RANG (DR)	MOISTURE (W)	RELATIVE MOISTURE	TEMPERATURE					
				WB		DB									WB		DB			
F	°C	gr/ib	%RH	F	°C	F	°C			F	°C	F	gr/ib	%RH	F	°C	F	°C	WINTER	SUMMER	
54	30	65	50%	62.5	17	75	24	1100-1800	30-36	17.6	-8	20-25	54	17%	70	21.1	105	40.5	COLD	DRY WARM	TYP 1
39.6	22	77	50%	67	19.5	80	26.7	20	26-32	32	0	30	87	20%	78	25.5	115	46.1	MODERATE	SEMI WET WARM	TYP 2
29.7	16.5	77	50%	67	19.5	80	26.7	10	25-30	41.9	5.5	20	200	51%	92	33.3	110	43.3	WARM	WET WARM	TYP 3
66.7	37	65	50%	62.5	17	75	24	1000-1900	33-39	5	-15	25	58	22%	69	20.5	99	37.2	VERY COLD	DRY MODERATE	TYP 4
46.8	26	65	50%	62.5	17	75	24	-20	37-38	24.8	-4	20	160	65%	84	28.9	95	35	COLD	WET MODERATE	TYP 5



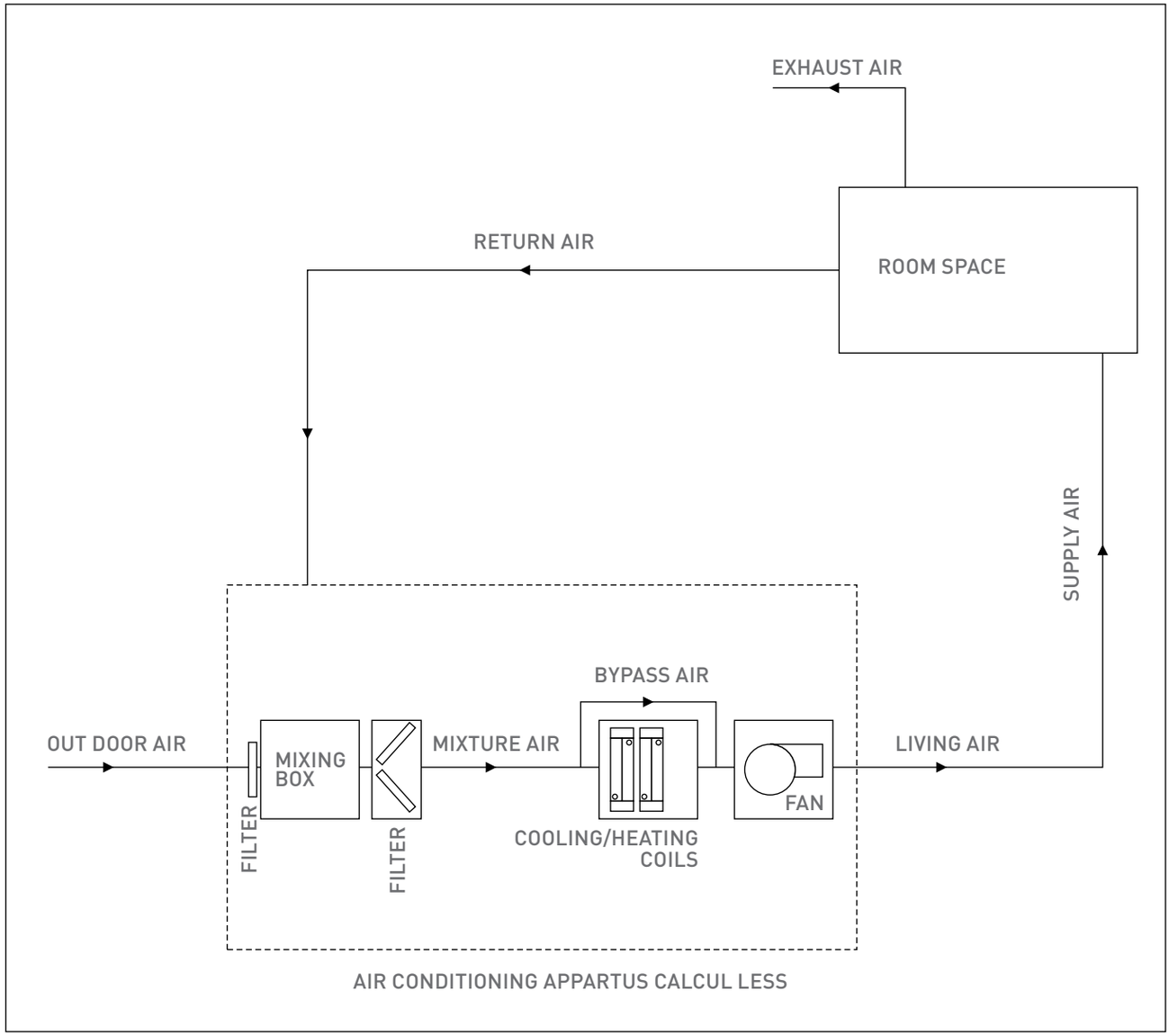
AIR PROCESS IN HVAC SYSTEM

In one HVAC system, fresh air (normally about %20 of local air) Mix with return air in mixing box, then mix point (M) with passing above refrigerant coil, changes to frost point (t_{adb}) of device. discharging air spesification from refrigerant coil come to plat ratio of device (BF) (L point).

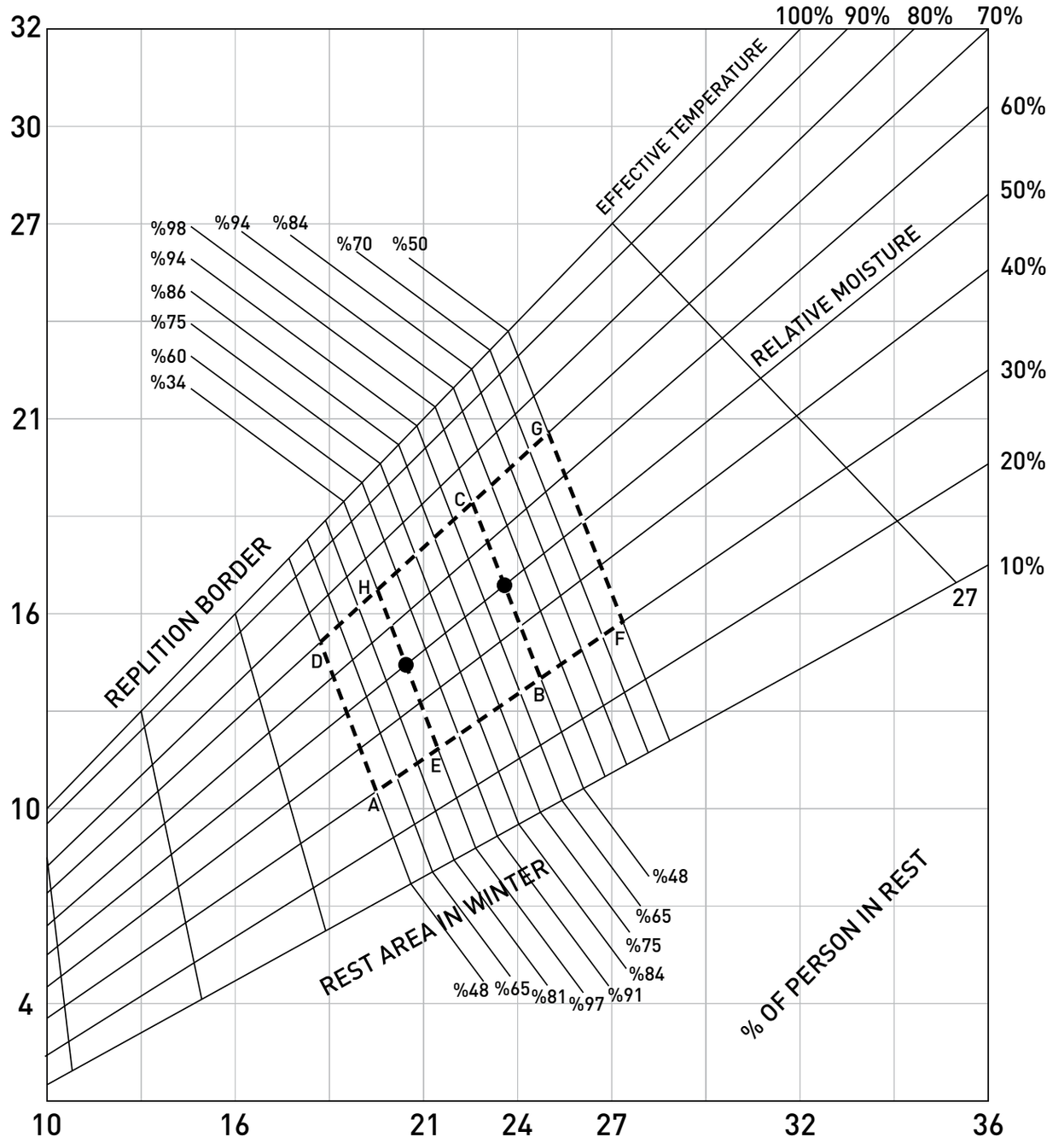
AIR CIRCULATION DIAGRAM IN HVAC SYSTEM

In one HVAC system indoor, in room according to fresh air ratio, needed air has ventilated through alit of windows, opening and closing doors, or exhaust fansand then return air has entered to mixing box by channels.

RETURN AIR CONDITIONING SYSTEM DIAGRAM



ABCD: WINTER REST REGION
EFGH: SUMMER REST REGION



DRY AIR TEMPERATURE (°C)

HUMAN REST AREA

TYPE 5 | TYPE 4 | TYPE 3 | TYPE 2 | TYPE 1

WET MODERATE | DRY MODERATE | WET WARM | SEMI WET WARM | DRY WARM

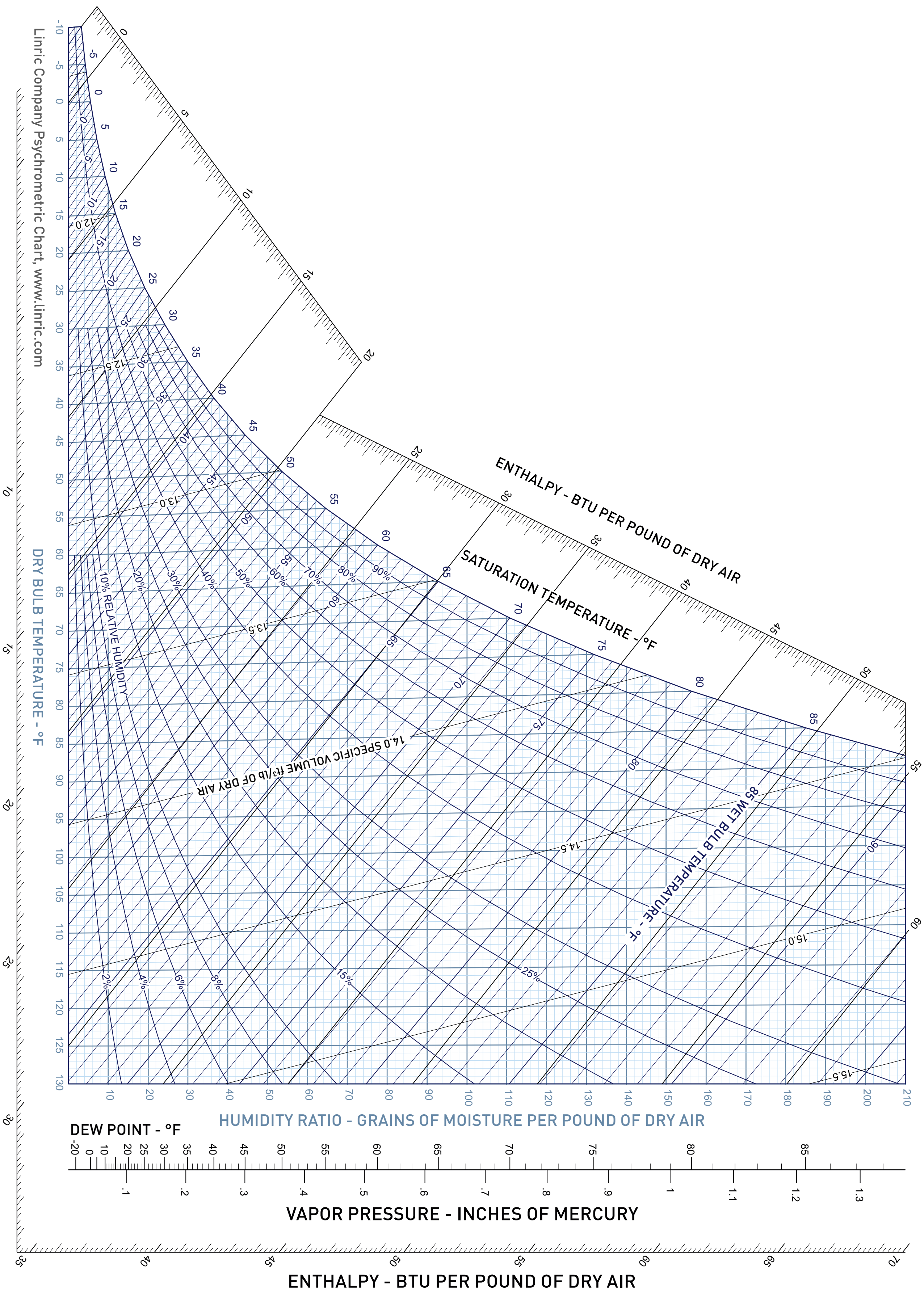
IRAN CITIES IN CLIMATE CLASSIFICATION					
TYPE 1	TYPE 2	TYPE 3	TYPE 4		TYPE 5
ABADEH	ABADAN	BORAZJAN	AZAR SHAHR	SHAHR E KORSD	AZAD SHAHR
ABARQU	AQAJARI	BANDAR IMAM QOMAYNI	ASHTIAN	SHIRVAN	ASTARA
ARDESTAN	ANDIMESHG	BANDAR AMIR	ABHAR	SALMAS	ASTANEH
ARDAKAN YAZD	AHVAZ	BANDAR BOUSHEHR	ARAK	SANANDAJ	AMOL
ISFAHAN	IRANSHAHR	JASK	ARDEBIL	SANQAR	URMIA
IQLID	IZEH	BANDAR QORAMSHAHR	URMIA	QAZVIN	BABOL
IMAM CITY	BAM	BANDAR DEYLAM	AZNA	QOCHAN	BABOLSAR
ILAM	BEHBAHAN	BANDAR ABBAS	ESLAMABAD	KAMIRAN	BANDAR ANZALI
BAQEIN	JESR NADERI	BANDAR GANAVEH	ESFARAYEN	KARAJ	BANDAR TORKAMAN
NAFT	HAMIDIYEH	BANDAR MAHSHAHR	ASHTARIEH	MAKOO	BANDAR GAZ
BAFQ	QASH	TONB E BOZORG	ALIGOODARZ	MAHALAT	BEHSHAHR
BIRJAND	DEZFOL	TONB E KOCHAK	AHAR	MARAQEH	TONEKABON
PASARGAD	DASHT E ABBAS	ABOMOSA ISLAND	\IRANSHAH	MARIVAN	CHABOKSAR
TAFTAN	DO GONBADAN	KHARK ISLAND	BAJGIRAN	MESHKIN SHAHR	CHALOS
TEHRAN	RAMEHRMAZ	QESHM ISLAND	BAZARGAN	MASHHAD	RAMSAR
JAHROM	ZABOL	KISH ISLAND	BANEH	MALAYER	RASHT
JIROFT	SOOSANGERD	LAVAN ISLAND	BOJNOORD	MIANDOAB	RODSAR
QORAMABAD	SHOUSH	LARK ISLAND	BOROJERD	MIANEH	RODBAR
QOMAYNI SHAHR	SHOSHTAR	MINOO ISLAND	BOIEN	NOSOOD	SAARI
DAMQAN	KAHNOJ	HORMOZ ISLAND	BOEINZAHRA	NEYSHABOOR	SIAHKAL
DARGAZ	GACHSARAN	HENGAM ISLAND	BOOKAN	HARSIN	SOME SARA
RAVAND	LAAR	CHABAHAR ISLAND	BIJAR	HAMEDAN	FOOMAN
RAFSANJAN	MASQUE SOLEYMAN	MINAB	BISTOON		QAEM SHAHR
ZAHEDAN	HOVEYZEH		PAVEH		KALACHAY
SABZEVAR			PIRANSHAHR		GORGAN
SEMNAN			TABRIZ		LAHIJAN
SIRJAN			TAKAB		LANGEROOD
BABAK CITY			TOISARKAN		MANJIL
SHIRAZ			HESARAK		NEKA
FERDOUS			QORAMDAREH		NOOR
FASA			QOMEYN		NOSHAHR
QASR E SHIRIN			QANSAR		HASHTPAR
QOM			QOY		
QAMSHEH			DAMAVAND		
KASHAN			DOOZDOOZAN		
KASHMAR			DEHLORAN		
KERMAN			RODEHEN		
KAHRIZAK			RAVANSAR		
GARMSAR			ZANJAN		
GONABAD			SARAB		
NAEIN			SARDASHT		
NAJAFABAD			SAQEZ		
NEYRIZ			SOOMAR		
YASOJ			SHAHIN DEJ		
YAZD			SHEMIRAN		

SUMMER & WINTER INNER DESIGN ACCORDING TO HUMAN WELFARE CONDITIONS										
BUILDING TYPE	Summer					Winter				
	Luxury Location		Normal Location			With Humidify			Without Humidify	
	DRY TEMP.	RELATIVE MOISTURE	DRY TEMP.	RELATIVE MOISTURE	TEMP. SWING	DRY TEMP.	RELATIVE MOISTURE	TEMP. SWING	DRY TEMP.	TEMP. SWING
Hotel, Houses, Apartments, Hospital, Office, School	74-76	50-45	77-79	50-45	2-4	74-76	35-30	-3 to -4	75-77	-4
Places with Limited accupied: Bank, Barbery, Shop, Supermarket and so ...	76-78	50-45	78-80	50-45	2-4	72-74	35-30	-3 to -4	73-75	-4
Place With High Temperature: Confferance Hall, Mosque, Church, Restaurant, Cinema.	76-78	55-50	78-80	60-65	1-2	72-74	40-35	-2 to -3	74-76	-4
Industrial Buildings and factories: Machinanis Saloon.	77-80	55-45	80-85	60-50	3-6	68-72	36-30	-4 to -6	70-74	-6

PROVIDED RANGES IN TEMPRATURE SWING COLUMN IS USED IN THERMOSTICE ROOMS.

WINNER INNER DESIGN TEMPERATURE FOR STRUCTURE					
DESIGN TEMP. [°F]	INTERIOR TYPE		INTERIOR TEMP. [°F]	LOCATION TYPE	
72-74	PRIVATE ROOM	HOSPITALS	73-75	HOUSES	
70-95	SURGERY ROOM		65-68	SHOP	
70	BATH		72-74	PUBLIC BUILDINGS	
75	BED ROOM & BATH	HOTELS	60-65	FACTORIES	
72	DINNIG ROOM		55-68	CORRIDORS	
68-74	OFFICES		72-74	CLASSROOM	SCHOOLS
68-72	CINEMAS		67-72	COMMUNITIES HALL	
66	KITCHENS		68-70	W.C	

SUMMER & WINTER OUTDOOR DESIGN CONDITIONS IN AOME CITIES IN IRAN						
CITY NAME	SUMMER			WINTER	GEOGRAPHIC WIDTH	HEIGHT ABOVE SEA LEVEL
	DRY TEMPERATURE	HUMID TEMPERATURE	DAILY RANG (°F)	DRY TEMPERATURE		
ABADAN	115	81	32	39	30	7
ARAK	97	70	30	8	34	5780
URMIA	93	72	27	9	38	4400
ISFAHAN	100	68	29	14	33	5200
AHVAZ	115	80	35	37	31	66
IRANSHAHR	115	84	29	37	27	1870
BABOLSAR	92	82	15	32	37	0
BANDAR ANZALI	90	82	15	32	37	0
BANDAR ABBAS	105	90	16	50	27	30
BANDAR LENGE	110	98	15	47	27	43
BANDAR MAHSHAHR	110	86	15	45	30	40
BOSHEHR	105	87	16	43	29	46
BIRJAND	103	74	30	17	33	4800
TABRIZ	95	86	24	18	38	4500
TEHRAN	100	74	27	22	35	4000
CHABAHAR	104	90	12	50	25	20
QARK	105	90	16	55	28	0
QORAMABAD	105	78	33	26	33	4000
QORAMSHAHR	115	80	35	45	30	0
DEZFOOL	115	79	31	30	32	500
RAMSAR	90	70	13	31	37	0
RASHT	90	83	22	24	37	0
ZABOL	116	84	27	40	31	1600
ZAHEDAN	105	76	32	17	29	4500
ZANJAN	95	72	31	3	37	5400
SABZEVAR	100	75	31	16	36	3100
SAQEZ	97	75	37	2	36	4900
SEMNAN	105	79	25	23	36	3800
SANANDAJ	100	72	33	9	35	5000
SHAHROOD	96	74	28	15	36	4500
SHEMIRAN	95	70	30	20	35	5600
SHIRAZ	100	70	35	22	30	5000
TABAS	113	78	33	25	34	3000
FASA	105	77	31	28	29	4600
QAZVIN	102	76	31	17	36	4300
KASHAN	110	83	29	24	34	3150
KERMAN	100	72	33	15	30	5800
KERMANSHAH	100	65	42	13	34	4600
GORGAN	102	85	19	30	37	400
MASHHAD	96	67	29	12	36	3104
HAMEDAN	95	63	38	14	35	5500
YAZD	105	76	28	20	32	4000



Linric Company Psychrometric Chart, www.linric.com
ENTHALPY - BTU PER POUND OF DRY AIR
SATURATION TEMPERATURE - °F
DRY BULB TEMPERATURE - °F
10% RELATIVE HUMIDITY
20%
30%
40%
50%
60%
70%
80%
90%
2%
4%
6%
8%
15%
25%
14.0 SPECIFIC VOLUME ft³/lb OF DRY AIR
12.0
12.5
13.0
13.5
14.5
15.0
15.5
85 WET BULB TEMPERATURE - °F
HUMIDITY RATIO - GRAINS OF MOISTURE PER POUND OF DRY AIR
DEW POINT - °F
VAPOR PRESSURE - INCHES OF MERCURY
ENTHALPY - BTU PER POUND OF DRY AIR

Note:

تهویه آذرنسیم

سیستم‌های تهویه مطبوع سرمایش گرمایش

کاملترین تولیدکننده سیستم‌های تهویه مطبوع سرمایشی و گرمایشی

تندیس دیموند طلایی

ISO 9001: 2008

QMS

گواهینامه استاندارد کیفیت

رضایتمندی مشتری- سال ۹۰

رضایتمندی مشتری- سال ۹۱

Mamonieh Ind. Town,
80 Km Tehran-Save Highway
Tel: +98 (86) 45 25 00 12-23

اتوبان تهران ساوه-کیلومتر ۸۰،
شهرک صنعتی مأمونیه
تلفن: ۰۸۶-۴۵ ۲۵ ۰۰ ۱۲-۲۳