YEKTA TAHVIEH Arvand IND.

Table of Contents

YEKTA TAHVIEH
Arvand IND.

Table of Contents

YEKTA TAHVIEH
Arvand IND.

Introduction
Quality , First of all !

For over 18 years **ARVAND** air handling equipments has been respected and regarded as a quality product . As you know todays air handling market is changing . Demands for improved indoor air quality , the reduction in noise generation , and ever shrinking mechanical equipments ,space in a building are among the factors that require better product for the market **ARVAND** has designed an air handler unit product line , that from an engineering stand point can not be challenged .

ARVAND AAHU'S air handling units are the ideal choice for the cooling , heating , humidifying , dehumidifying, purifying and ventilating of air in all residential commercial and industrial buildings .

AAHU series comprises 14 model covering wide range of air flow rate from 3200 m^3/hr to 68,000 m^3/hr.

The **ARVAND AAHU'S** air handlers are available with tremendous design flexibility . This flexibility is reflected in the numerous section and component available , combined with the ability to arrange the components in what ever configuration is required for the job. **ARVAND AAHU'S** air handlers can be shipped by component sections, (completely knocked down) , modules , or as a single unit. This gives the customer the option of installing a completely assembled unit , or by section for retrofit jobs requiring smaller sections to fit into the building . In a very special case a tailor made custom design units are available on request .

Features , Components And Options Structure

- Made from hot dip galvanized steel (G 90 or equal) or extrude aluminium profile.
- Joints by bolts to protect zinc coating and easy to field installation and accessibility.
- Rigid corner made by standard L type steel profile or very new type of aluminium or polyamide corners.
- Ability to ship in sections , modules or complete units.

Casing

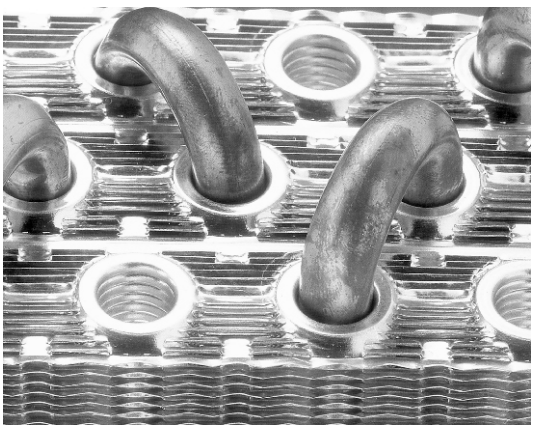
- Made from galvanized steel (G 90 or equal), coating with electro powder coating epoxy base coating on request) .
- Solid or perforated double wall skins , with 25 or 45 mm thick insulation plasto foam or rockwool insulations (80 kg/m^3 density) (polyuretane insulations are also available on request).
- Hinged access door with full grip handles in all sections in one side (both side on request) with optional sight windows and lights .
- Casing shall be provided with stainless steel in outer surface or inner surface or both on request.

Fans

- Forward curved , backward curved and air foil back ward curved. New design plug fans are available.
- Single speed as standard and two speed or variable speed drive motors on request.
- Internally or externally mounted motor.
- IP 54/55 with class F insulation on all internally mounted motors.
- Special motor (anti spark) , very high grade of protection and insulation .
- Statically and dynamically balanced wheels with certifications .
- Very high technology tapared bush pulleys in motor and fan.
- Self aligning , grease - Lubricated ball bearings with pillow blocks .

Coils

- Very advanced high technology extended surface with ENHANCED LOUVRED V- WAFFLE FINS with rippled edge for all type of chilled water , hot water , DX and steam coils , with aluminium or copper fin and copper tube in 1/2” and 5/8” OD
- Broadest range of fin spacing options (8 and 14 fin per inch as standard).
- 1 through 12 rows deep.
- Optional fin , tube and casing materials. Hydrauphobic blue coating on aluminum fins are available.
- Optional moisture eliminators on cooling coils.
- Visible sloped drain pans in coated galvanized steel or stainless steel on request .
- Optional access between coils for sensors or other controler installation.



Filters

- Flat and angular (V-Type) filter racks .
- Standard 50mm thick permanent washable aluminium filter panel and optional throw away glass fiber air filters.
- Bag filters , roll filters , oil filters , HEPA& ULPA filters in full range of filter efficiencies .
- Very new high technology filter frames with special clips for installation and removalof filters very easily.
- Full arrangement of air filter , in back and front of fan improve very clean air in special case and clean rooms.

Mixing Box

- Optional ultra seal low leak opposed blade dampers and standard aluminium airfoil profile blade .
- Externally mounted and linked as standard and internally mounted on request .
- Manual or motorized control damper .
- Shall be provide with all kind of filter combinations .
- Low leak dampers as standard and ultra seal low leak dampers on request

Diffusers

- Provided with %60 free area galvanized steel plate and shall be installed down stream of high efficiency filters (specially after fan sections) , silencer or blow throw coils.

Blenders

- Economic or space saving options for mixing fresh and return air .

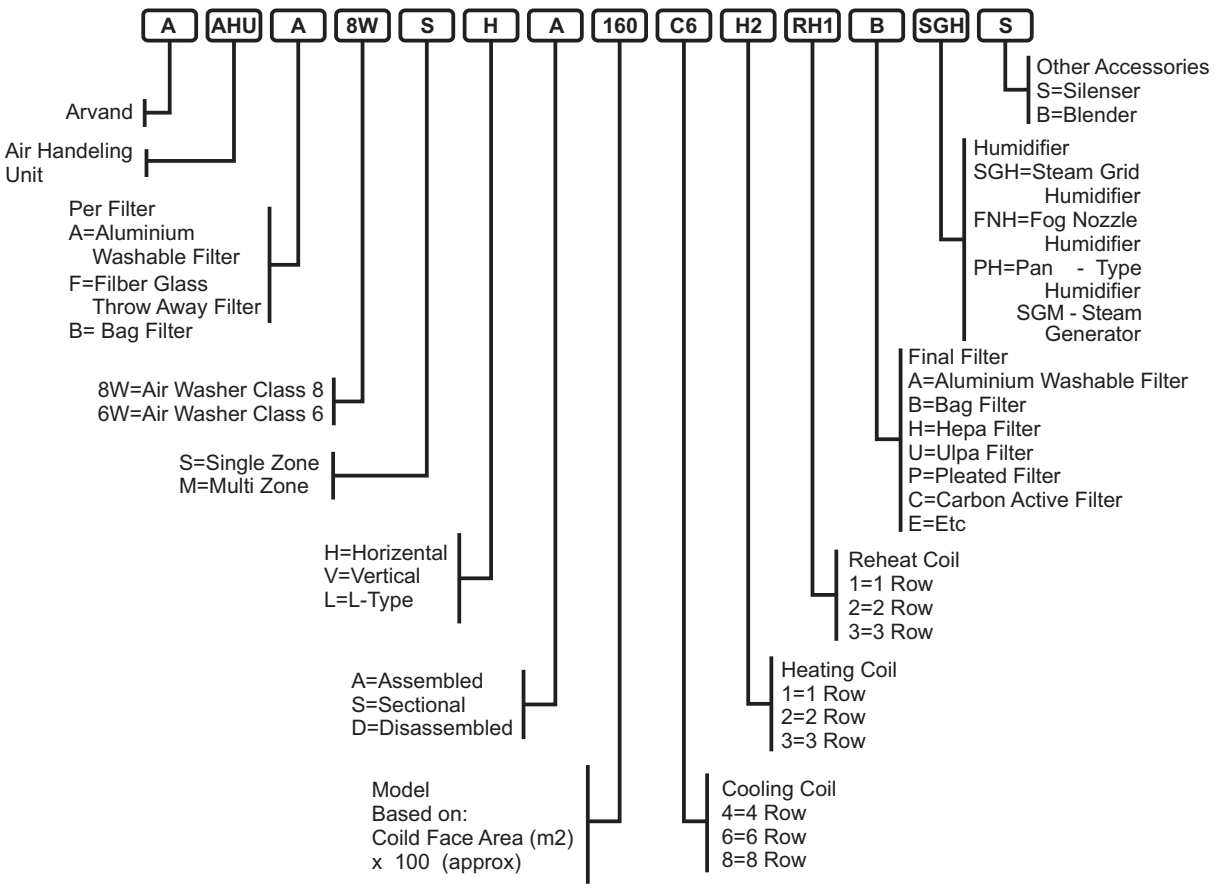
Sound Attenuators (Silencers)

- Full range of insertion loss are available up to 35 dB loss .

Humidifier

- Fine spray type that feed with hot water atomized and sprayed it to air stream under pressure.
- Steam grid type that feed with low pressure steam and inject dry steam to air stream.
- Pan type humidifier with stainless steel pan and multi stage electric heater may be use when large quantity of steam is required.
- Air washers in 2 models , class 6 and 8 , that spray a large quantity of water to air stream and the moisture content of air rises due to water evaporation.
- New technologies steam generator with splited box and internal mounted stainless steel nuzzles are available.

Nomenclature



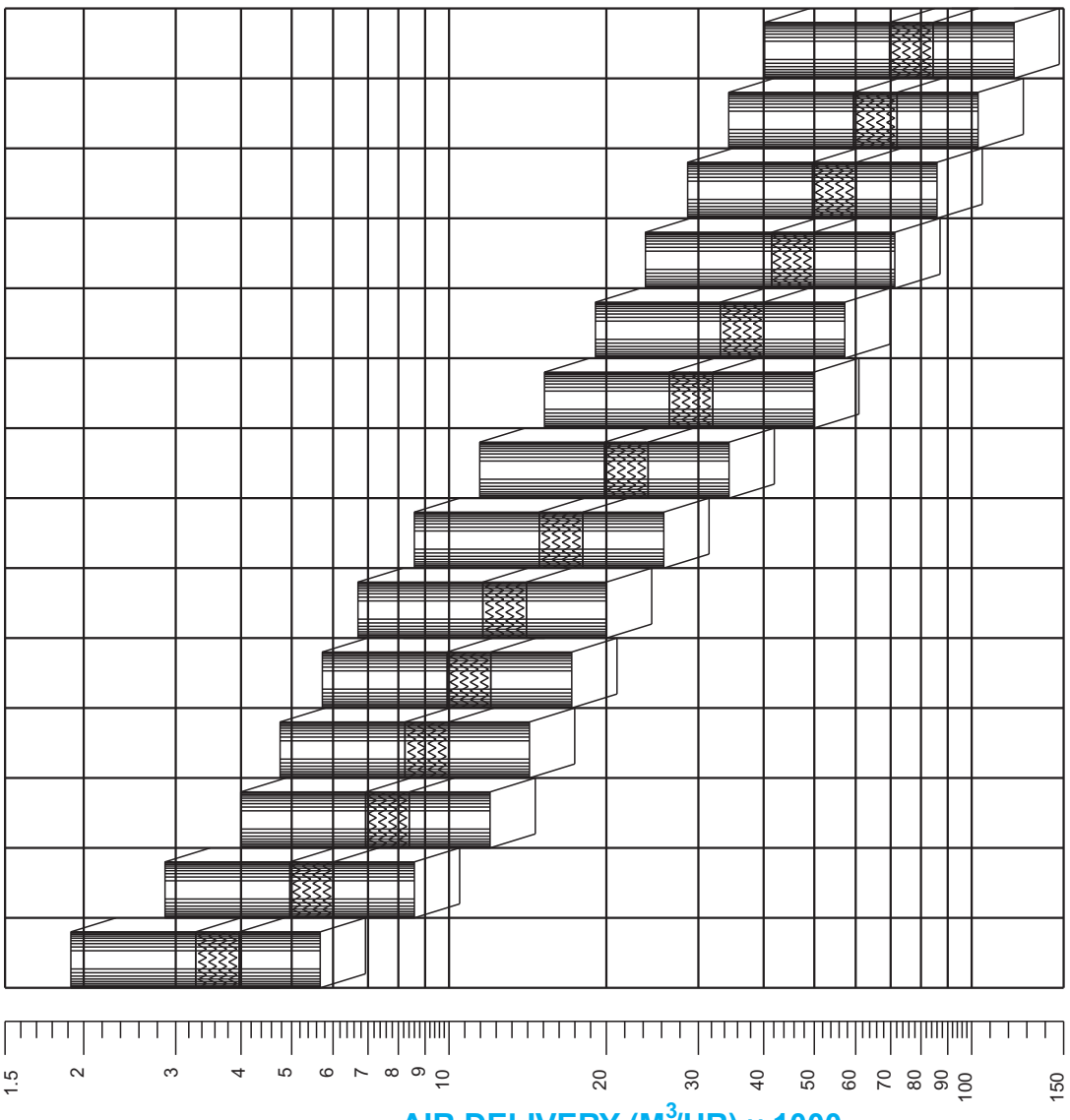
YEKTA TAHVIEH Arvand IND.

Quick Selection chart

- Cold water coil without eliminator
- Cold water coil with eliminator
- Hot water coil

Coil face velocities

1.5 2.6 3.15 4.5 m/s



AIR DELIVERY (M^3/HR) x 1000

UNIT	
AAHU Size	Coil Face Area (m^2)
740	7.44
630	6.35
530	5.30
440	4.40
350	3.53
280	2.82
210	2.12
160	1.59
120	1.24
100	1.06
85	0.88
70	0.74
50	0.53
35	0.35

Example : for 24000 m^3 /hr Air delivery you can use:
Model AAHU-160 just for heating (you can not use any cooling coil in the unit).
Model AAHU-210 for heating and cooling coil with droplet eliminators after cooling coils.
Model AAHU-280 for heating and cooling without droplet eliminators after cooling coils.

Table1 : Physical Data

A-AHU MODEL	Nominal Air Delivery (m^3/hr)	Coil Specification				V- Type Filter		Fan (Standard)		Motor (Standard)	
		Face Area(m^2)	No. of Coil	Tube in Height	Length (mm)	Face Area(m^2)	Thickness (mm)	No. of Fan	SIZE(DIA-WIDTH) (inch)	No. of Motor	Power* (kw)
35	3200	0.35	1	16	544	0.58	50	1	10 - 8	1	1.5
50	4900	0.53	1	16	824	0.87	50	1	12 - 9	1	2.2
70	6800	0.74	1	16	1150	1.17	50	1	12 - 12	1	3
85	8100	0.88	1	16	1368	1.45	50	1	15 - 15	1	4
100	9700	1.06	1	18	1476	1.75	50	1	18 - 13	1	4
120	11400	1.24	1	18	1727	2.33	50	1	18 - 18	1	5.5
160	14500	1.59	1	24	1686	2.9	50	1	20 - 20	1	7.5
210	19400	2.12	1	32	1705	3.5	50	1	22 - 22	1	11
280	25800	2.82	1	32	2268	4.67	50	1	25-20	1	11
350	32300	3.53	2	20	2225	6.1	50	2	20 - 20	2	7.5
440	40300	4.4	2	20	2774	7.84	50	2	22 - 22	2	11
530	48500	5.3	2	24	2810	8.75	50	2	25-20	2	11
630	58000	6.35	4	24	1685	10.5	50	2	25 - 25	2	15
740	68000	7.44	4	24	1974	11.66	50	2	28 - 28	2	15

*Standard motor powers are based on nominal air delivery in 75 mm H_2O total static pressure drop.
consult Yekta Tahvieh Arvand technical office for other conditions.

YEKTA TAHVIEH
Arvand IND.

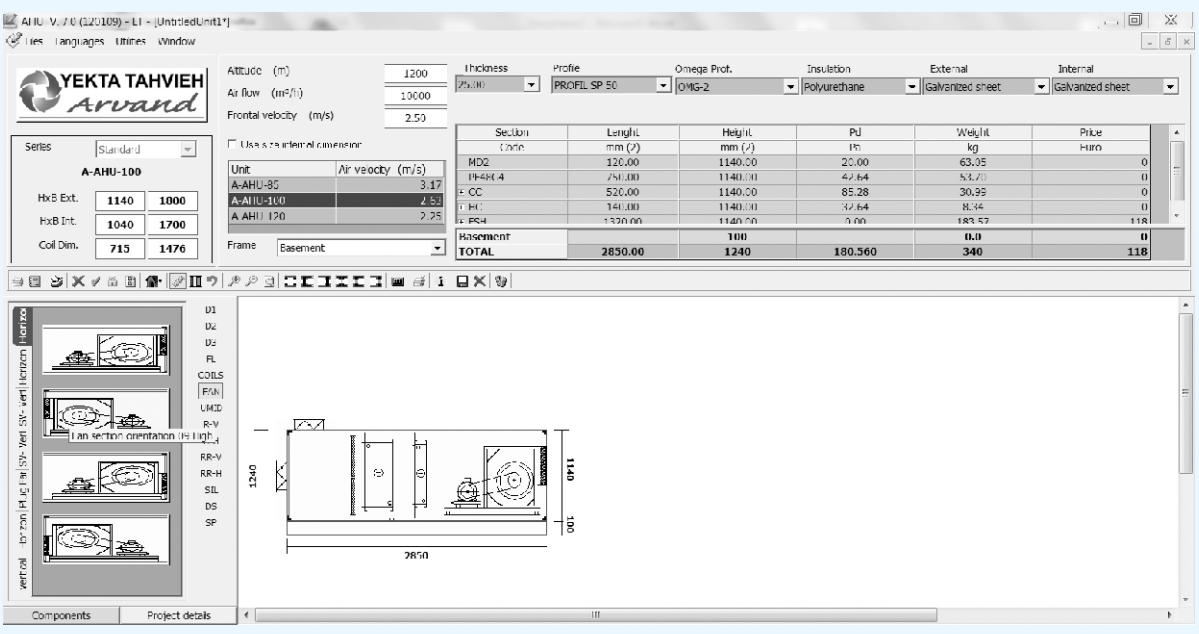
Certified Your Products Using Arvand AHU Software.

AHU Design Software

Arvand AHU software complies with Eurovent requirements and all designs with this program achieve this certification .
ARVAND AHU design software is made to ease the calculation of Air handling unit and enable consultants and HVAC. designers customization of their demand.
you can design all details including mixing box, filter, coils, , fan, separator, silencer, heat recuperator and all details in an Air handling unit. It is possible to calculate heating, cooling, direct expansion, steam and condensing coils in AHU.
For those customers using heat recovery, AHU also permits the estimation of such coils. This application is very simple and intuitive.

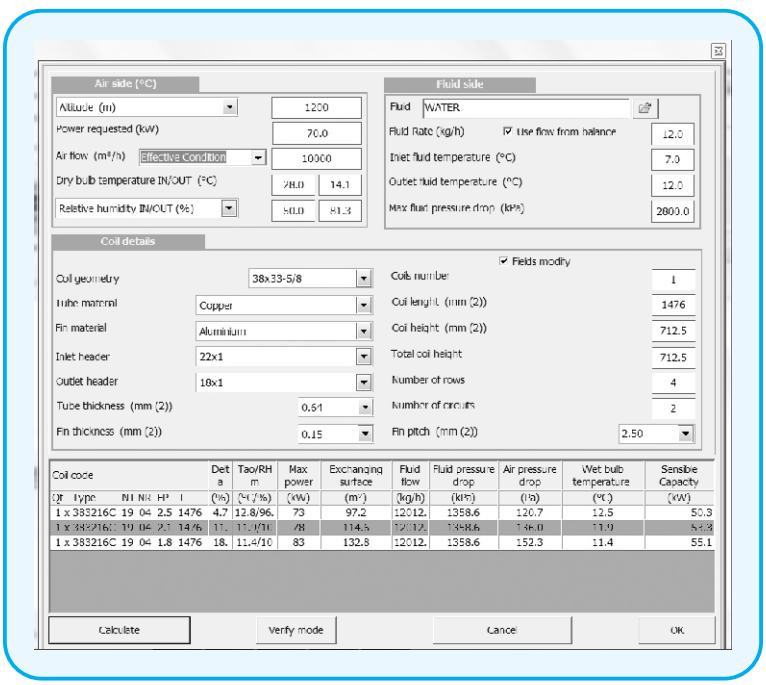
Total Guide For Working With AHU Software

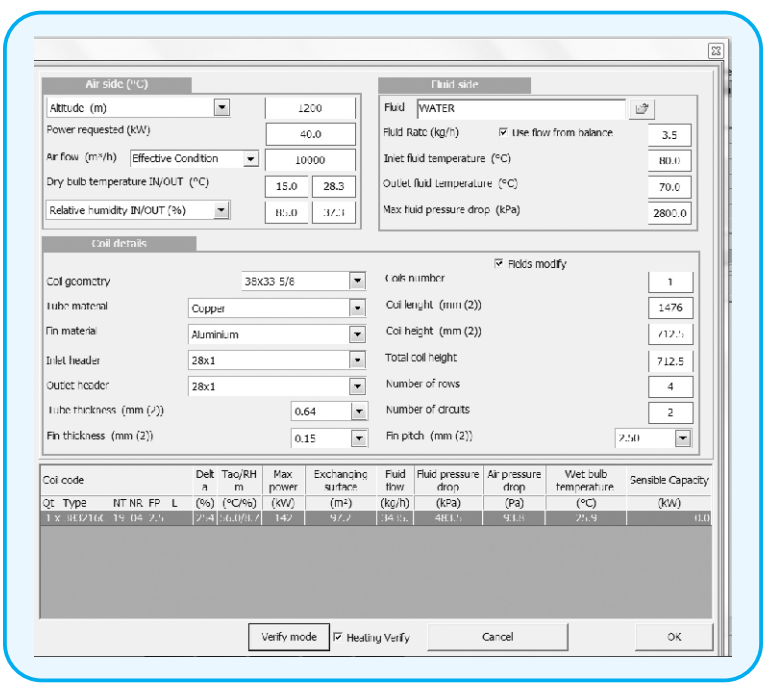
- Select file ,and then select new project.
- On the left side you can select different boxes in an Air handling unit.
- By selecting these boxes and attaching them together you can create your desired AHU.
- You should select right altitude for desired city and enter air flow.
- The program offers you 3 different sizes according to air velocity and you can choose one.



Coil Design

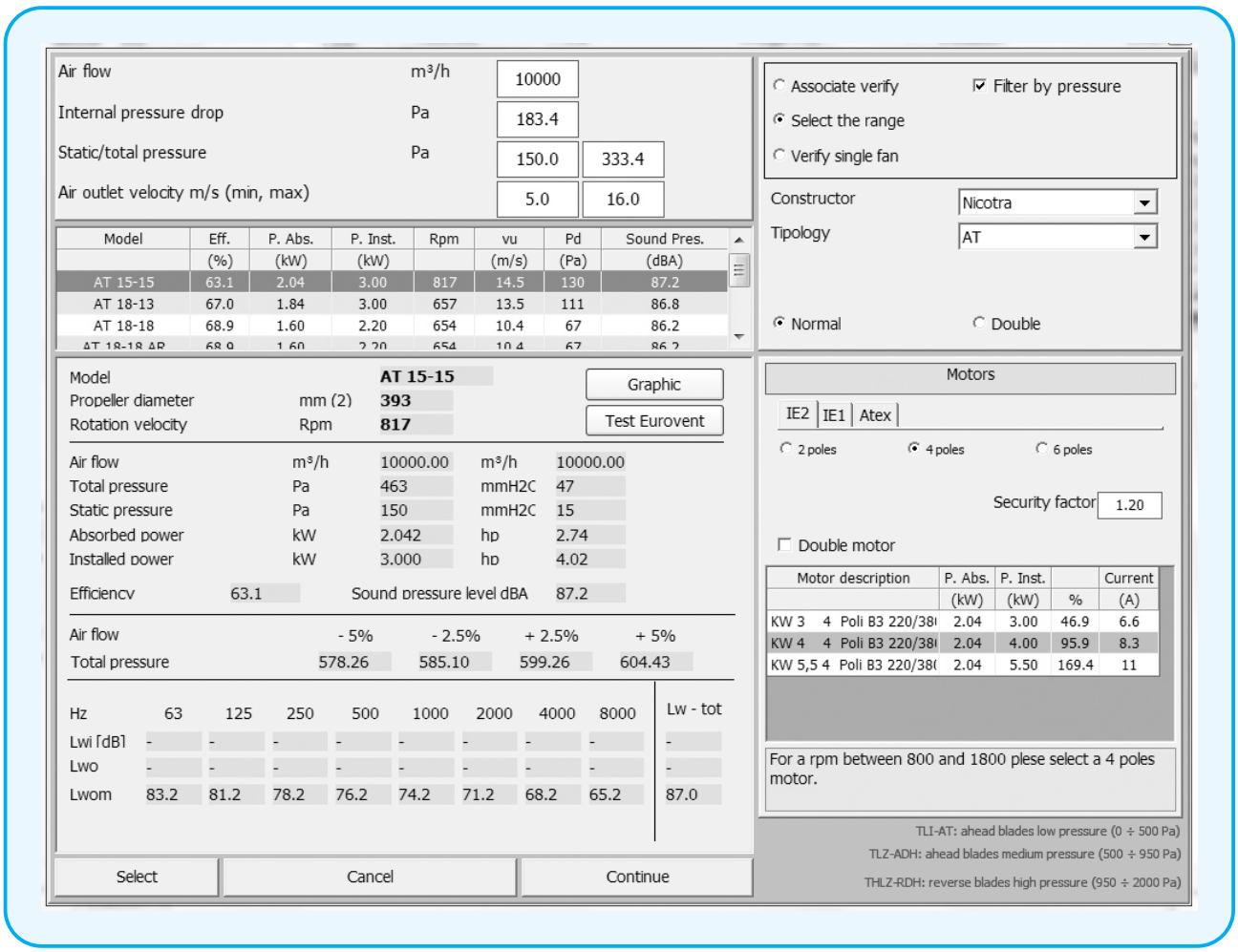
- Select the cooling coil, right click on it and then choose calculate menu.
- In calculate window you should enter your coil demands and select calculate tab, then different coil options appears with different capacities and efficiencies.
- Then you choose one of them and select continue.
- Then you should repeat this process for design of heating coil.





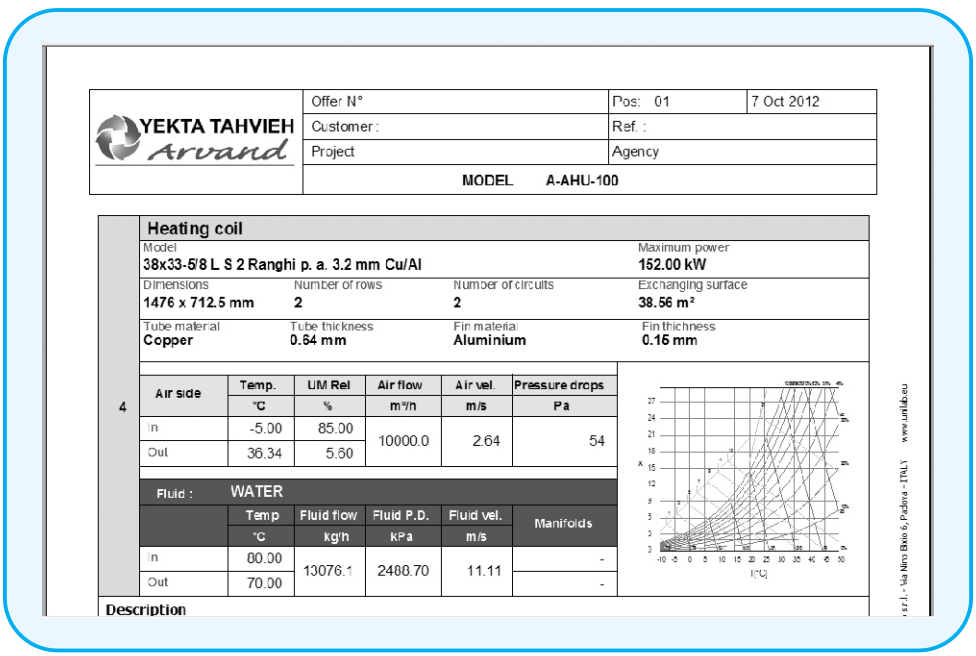
Fan and Motor Selection

- After designing of coils you should enter fan and motor properties including: air flow, internal Pressure drop, static / total
- pressure, and air velocity (min,max).
  Then click on select tab.
- Some options for fan selection will appear and you should choose and click one of them according to your desire.
- By clicking on graph tab you can see fan curve and choose optimum points for RPM according to efficiency.
- You can select fan brand ,also normal or double fan option.
- In motor selection you can choose motor type and number of poles.
- Click on one of the motors shown and click on continue tab.



Detailed Print

- By clicking the detailed print menu in main page , you can see design specifications of every section.
- The weight and dimensions are in first page.
- You can see coils input and output on psychrometric chart and ,fan curve in other pages .
- finally you can print the information.
- Don't forget to save your project.
- For more information on this program you can contact our engineering department.



YEKTA TAHVIEH Arvand

Offer N°	Pos: 01	7 Oct 2012
Customer :	Ref. :	
Project	Agency	
MODEL A-AHU-100		

Heating coil

Model: 38x33-5/8 L S 2 Ranghi p. a. 3.2 mm Cu/Al — Maximum power: 152.00 kW

Dimensions	Number of rows	Number of circuits	Exchanging surface
1476 x 712.5 mm	2	2	38.56 m²

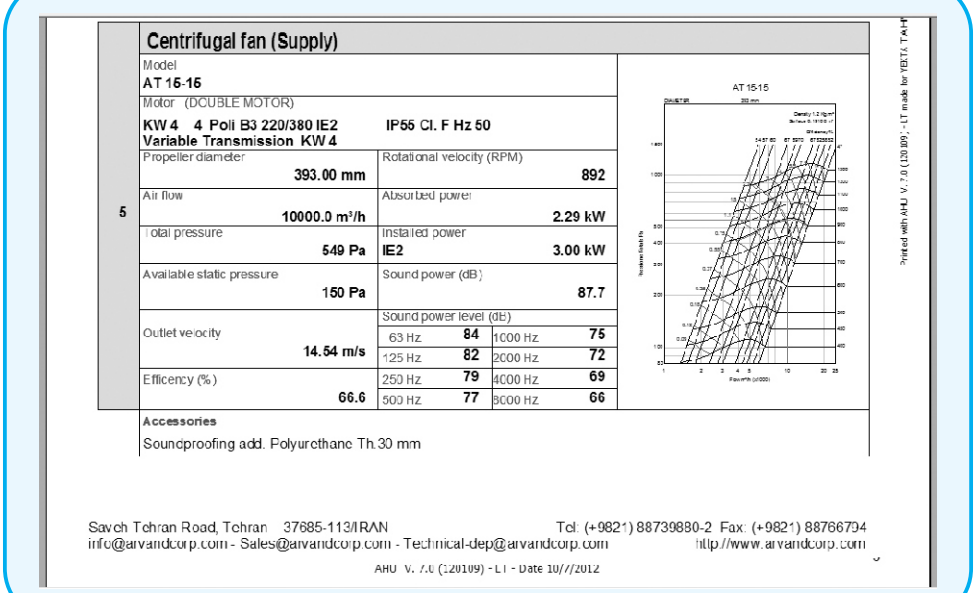
Tube material	Tube thickness	Fin material	Fin thichness
Copper	0.64 mm	Aluminium	0.16 mm

4

Air side	Temp. °C	UM Rel %	Air flow m³/h	Air vel. m/s	Pressure drops Pa
In	-5.00	85.00	10000.0	2.64	54
Out	36.34	5.60			

Fluid : WATER	Temp °C	Fluid flow kg/h	Fluid P.D. kPa	Fluid vel. m/s	Manifolds
In	60.00	13076.1	2488.70	11.11	-
Out	70.00				-

Description



Centrifugal fan (Supply)

Model: AT 15-15

Motor (DOUBLE MOTOR)

KW 4 4 Poli B3 220/380 IE2 IP55 Cl. F Hz 50
Variable Transmission KW 4

Propeller diameter	393.00 mm	Rotational velocity (RPM)	892
Air flow	10000.0 m³/h	Absorbed power	2.29 kW
Total pressure	549 Pa	Installed power IE2	3.00 kW
Available static pressure	150 Pa	Sound power (dB)	87.7
Outlet velocity	14.54 m/s	Sound power level (dB)	
Efficency (%)	66.6	63 Hz 84 / 125 Hz 82 / 250 Hz 79 / 500 Hz 77 / 1000 Hz 75 / 2000 Hz 72 / 4000 Hz 69 / 8000 Hz 66	

5

AT 15-15

Accessories

Soundproofing add. Polyurethane Th.30 mm

Printed with AHU V. 7.0 (120109) - LT made by YEKTA TAHVIEH

Savch Tehran Road, Tehran 37685-113/IRAN Tel: (+9821) 88739880-2 Fax: (+9821) 88766794
info@arvandcorp.com - Sales@arvandcorp.com - Technical-dep@arvandcorp.com http://www.arvandcorp.com

AHU V. 7.0 (120109) - LT - Date 10//2012

Selection Examples

Example 1 :

Given :

Location : Nozheh, Hamedan , 1010 m above sea level .

- Air Delivery---------- 15000 m^3/hr .
- Return Air---------- 12000 m^3/hr .
- Fresh Air---------- 3000 m^3/hr .
- V Type Filter .
- Bag Filter (Pre-Filter) 85% efficiency .
- External Static Pressure loss 30 mmH2O .

Summer Cooling :

- Cooling load ---------- 92000 Kcal/hr
- Indoor DB ---------- 27°C
- Indoor RH---------- 50 %
- Out door DB---------- 40°C
- Out door RH---------- 27 %

Winter Heating :

Steam Pressure ----------10 PSI (0.7bar)

- Heating Load ---------- 205,000 Kcal/hr
- Indoor DB---------- 24°C
- Indoor RH---------- 50 %
- Outdoor DB ---------- -16°C
- Outdoor RH---------- 48%

-Entering water temp. ---------- 80°C

Requirements :

A.Unit Size .

B.Cooling Coil specification , leaving DB , SHF .

C.Heating Coil specification , leaving DB .

D.Fan Performance , motor size .

E.Unit Dimension.

F.Humidifier Specifications .

Solution :

A -Unit Size :

- By considering Air delivery and allowable face velocity of unit, you can find face area of the unit .

When cooling coil is part of the unit , the maximum face velocity of unit is 2.6 m/sec (without eliminator after cooling coil) and 3.15 m/s with it .

Quick selection chart on page 6 is very usefull for selecting the unit based on Air delivery and permisible coil face velocity .

$$\text{Face Area}(m^2) = \frac{\text{Air Delivery}(m^3/hr)}{\text{max. Face Velocity}(m/s) \times 3600}$$

$$= \frac{15000}{2.6 \times 3600} = 1.6 m^2$$

-From table1 ARVAND AAHU-160 with face area of 1.59 m^2 is selected .

B-Cooling coil specification leaving DB , SHF :

Cooling process line demonstrate on chart . No.1 On page 16.

- First , determine DB of mixed air .

$$DB_{(mixed-air)} = \frac{\text{Fresh air flow}}{\text{Air delivery}} \times (\text{Outdoor air.DB}) + \frac{\text{Return air. flow}}{\text{Air delivery}} \times (\text{Indoor air.DB})$$

$$DB_{(mixed-air)} = \frac{3000}{15000} \times (40) + \frac{12000}{15000} \times (27) = 29.6\,^{\circ}C$$

- Determine entering mixed-air wet bulb :

From psychrometric chart on page 16 obtain indoor and outdoor air enthalpy as following :

$$h_{out} = 73.8\,KJ/Kg \quad \text{and} \quad h_{in} = 56.5\,KJ/Kg$$

$$h_{(mixed-air)} = \frac{3000}{15000} \times 73.8\,KJ/Kg + \frac{12000}{15000} \times (56.5\,Kj/Kg)$$

$$= 60.0\,KJ/Kg$$

On psychrometric chart the WB of entering mixed air obtained , 20.8°C .

1. From table 3, and considering total cooling load of 92000 Kcal/hr , for AAHU- 160 , the 6 rows/8 fin per inch coil with nominal cooling capacity of 96180 Kcal/hr can be chosen.
2. The correction factor for face velocity obtain from table 15. reffering to coil face velocity of 2.6 m/sec C.F.V =1.021 and the Bypass factor obtained from table 11 so:

   1-B.F=1-0.045=0.955

   So the corrected capacity obtained as below :

   Corrected capacity = 1.021 × 0.955 × 96180

   = 93780.7Kcal/hr

   - Determine Q factor :

$$Q = \frac{\text{Cooling capacity } (Kcal/hr)}{\text{Air delivery}(m^3/hr)} = \frac{93780.7}{15000} = 6.25$$

From table 7 , with Q= 6.25 and entering air wet bulb 20.8°C, obtained WBout =12.85°C .
Then from psychometric chart entering air dew point temp. is 16.5°C and from table 8 leaving air dry bulb temp obtained DBout=13.4°C
- SHF determine :

$$Q_S = 0.286 \times \text{air delivery } (m^3/hr) \times (DB_{in} - DB_{out})$$

$$Q_S = 0.286 \times 15000 \ (m^3/hr) \times (29.6 - 13.44)$$

$$= 69326.4 \text{ Kcal / hr}$$

$$SHF = \frac{Q_{sensible}}{Q_{Total}} = \frac{69326.4}{93780.7} = 0.74$$

C-Heating coil spec , leaving DB :
- Calculating entering mixed-air dry bulb :

$$DB_{(mixed-air)} = \frac{3000}{15000} \times (-16\,^{\circ}C) + \frac{12000}{15000} \times (24\,^{\circ}C)$$

$$= 16\,^{\circ}C$$

Total heating load is 205000 kcal/hr . Reffering to table 5 for AAHU-160 the 3 rows / 14 fin per inch coil have 211000 kcal /hr nominal capacity .
From table 12 and table 15 obtain correction factors for face velocity and entering conditions. So C.F.V = 1.016 and C.F.T= 1 , so , the corrected capacity obtained as below :
Corrected capacity= 1.016 x1x 211000= 214376 kcal/h
- Leaving air DB obtained as below :
Heating capacity (Kcal/hr) = 0.286× air delivery (temp.differance).

$$214376 = 0.286 \times 15{,}000 \times (DB_{out} - 16)$$

$$\Rightarrow DB_{out} = 66\,^{\circ}C .$$

D-Fan performance , motor size :
The selected Air handling unit has these accessories :
1. cooling coil: 6 rows / 8 fin per inch
2. Heating coil : 3 rows / 14 fin per inch
3. Mixing box
4. Fresh and Return dampers
5. V-Type washable Aluminium filter
6. Bag filter with 85% efficiency

Now, determine pressure loss of air throw each section :

1. Cooling coil

From chart on page 31 for 6 rows / 8 fin per inch cooling coil with 2.6 m/sec face velocity and SHF = 0.74 you find :

$\Delta P_{cooling\ coil}$ = 14 mm H2O

2. Heating coil

From chart on page 31 for 3 rows / 14 fin per inch heating coil with 2.6 m/sec face velocity and SHF = 1 you find:

$\Delta P_{heating\ coil}$ = 9.5 mm H2O

From table 19,20,21 you can find pressure loss of air throw other accessories :

$\Delta P_{mixing.box}$ = 2 mm H2O

$\Delta P_{Aluminium\ filter}$ = 2.5 mm H2O

$\Delta P_{Bag\ filter}$ =11 mm H2O

ΔP_{Damper} =1 mm H2O

So the total Air pressure loss of unit determine as below:

$\Delta P_{Internal}$=14+10+2+2.5+11+1=40.5

$\Delta P_{Total.Static} = \Delta P_{Internal} + \Delta P_{External}$= 30+40.5 = 70.5

From table 9, the correction factor for elevation and Temperature of ambient ,(1010 m above sea level and +16°C mixed air entering fan section) At winter operation of unit obtained 0.919

So , the corrected total static pressure is :

Corrected total static pressure = 70.5 / 0.919 = 76.4 mm H_2O

From table 2 (Fan rating) , Caracteristics of fan are as below :

Fan size : 20 – 20 (20" diameter and 20" width).

RPM : 858

Absorbed power : 4.94 KW

Efficiency : 70%

Sound pressure : 92 db

Actual absorbed power at 1010 m above sea level and +16°C entering air =0.919x4.94=4.53kw(6 hp)
and the motor is =1.2 (power factor) x 4.53

5.44 kw → 5.5 kw

Warning :

If air handling unit is designed for winter operation,to prevent over heating of motor , the maximum power consumption of unit is in cold weather start up . because the air density therefore the power absorbed by fan in this case is maximum .

So in this case for 1010 m elevation above sea level and –16°C entering air at start up , the correction factor obtained from comparison of air density in start up and normal operation in winter . So :

Densty of air at –16°C = 1.238 kg/m^3

Density of air at +16°C = 1.092 kg/m^3

So ,

$$\text{Correction factor} = \frac{1.238}{1.092} = 1.133$$

This multiplyer , correcet the actual power consumption of motor at start up .

So we must check the start up running of motor at winter start :

Actual start up running = 1.133 x 4.53 =

5.13 Kw < 5.5 Kw

So , these calculation shows that the winter start power absorbtion of unit is less than the motor power and it is acceptable. If the winter start up would be greater than the motor power , you must change the motor power one size larger .

E-Unit dimension and :

From table 37dimension of each section can be determined for model AAHU -160 :

Height = 1250 mm

Width = 2000 mm

and length of the unit according to length of each section can be determain from table 37 :

Components	Length(mm)
Mixingbox with fresh & return air (1.1)*	860
Pre - filter (Bag filter) (6.1)	700
6 Row Cooling coil (7.3.1.1)	410
3 Row Heating coil (7.1.1)	290
Fan Section (11.1)	1450
Overall Length	3710

*** reffer to table 36**

F-Humidifier Specifications:

For caculating the capacity of humidifier , you must obtain the difference between amount of water in entering and leaving air from the unit at winter .

NOTICE:

At normal air conditioning , humidifying done at winter operation of unit . Excep few industrial application such as paper, textile , silk belt tire and …. that need humidifying in all time .

Chart 2 on page 16 shows the psychrometric process of humidifying .

As shown you can see that in the humidifying process with fine spray nozzle or steam grid , the Dry Bulb temperature of air remain constant during the process .

So , at first, determine the water content of entering air:

$$W_{Mixed-Air} = \frac{3000}{15000}(1\,gr/Kg\text{-}Air) + \frac{12000}{15000}(9.3\,gr/Kg\text{-}Air)$$

$$= 7.64\,gr/Kg\text{-}Air$$

And then the difference between $W_{mixed\ air}$ and $W_{supply\ air}$ (that is the same with room design) .

The capacity of humidifier should be determined as below :

$$\Delta W = \left[9.3(gr/Kg\text{-}Air) - 7.64(gr/Kg\text{-}Air)\right] = 1.66(gr/Kg\text{-}Air)$$

$$\text{Humidifier Capacity} = 1.66\,gr/Kg\text{-}Air \times 15000\ m^3/hr \times 1.17\,Kg/m^3\text{-Dry Air} = 29133\ gr/hr$$

$$= 29.13\ Kg/hr\ (\text{Steam})$$

From table22,and considering steam pressure of 10 PSI (0.7 bar) and humidifier capacity of 29.13 Kg/hr model H-3 can be chosen.

Air washer Selection

Example 2:

Given :

Total air delivery ---------- 40,000 m3/hr

Entering dry bulb temp. ---------- 36°C

Entering wet bulb temp. ---------- ---22°C

Requirement :

-Unit size

-Leaving air temp. from unit .

-Circulating water rating.

Solution :

From table 26 and 27 and by considering air delivery model AAHU-440 with class 8 air washer is selected.

Face velocity in air washer box is :

$$V_{Face} = \frac{40000\ m^3/hr}{4.4\ m^2 \times 3600} = 2.52\ m/sec$$

From table 29 with 2.52 m/sec face velocity, the cooling efficiency of air washer is 0.93 .

Then :

$$E = \frac{DB_{in} - DB_{out}}{DB_{in} - WB_{in}} \Rightarrow 0.93 = \frac{36^\circ C - DB_{out}}{36^\circ C - 22^\circ C}$$

$$\Rightarrow DB_{out} = 23^\circ C$$

If class 6 air washer was selected the cooling efficiency E=0.62 and by above consideration DBout = 27.3°C

From table 28 the amount of Circulating water and recirculating pump specification obtained .

Air Washer Selection

Example 3 :

Given :

Sensible load ----------65000 Kcal/hr

Entering dry bulb temp. ---------- 41°C

Entering wet bulb temp. ----------25°C

RSHF ---------- 1

Relative humidity of indoor air ---------- 65%

Requirement :

Internal air temp.

Unit size

Solution:

We start with class 8 air washer for this application .

The average value of E form table 29 is 0.9 .

So ,

$$0.9 = \frac{41 - DB_{out}}{41 - 25} \Rightarrow DB_{out} = 26.6^\circ c$$

The evaporating cooling psychrometric process is demonstrated on chart 3 on page 16. you Know that in evaporating cooling process the WB of entering air remains constant.

So, the cooling process lie down on WB = 25°C line

(reffer to chart 3) . the supply air condition is encounter point of lines WB= 25°C and DBout =26.6°C (point 2), So , the leaving air RH is 88% . room process lie down in RSHF= 1 line , so , encounter point of horizontal line from point 2 to RH=65% , is the indoor design condition of air by other means process 2 – 3 is room process. So, point 3 has DB=31.6°C , therefore you can find the amount of air delivery by this consideration:

$$Q_s = 0.286 \times \text{air delivery}(m^3/hr) \times (DB_3 - DB_2)$$

$$\text{air delivery}(m^3/hr) = \frac{65000\ Kcal/hr}{0.286 \times (31.6 - 26.6)} = 45455\ m^3/hr$$

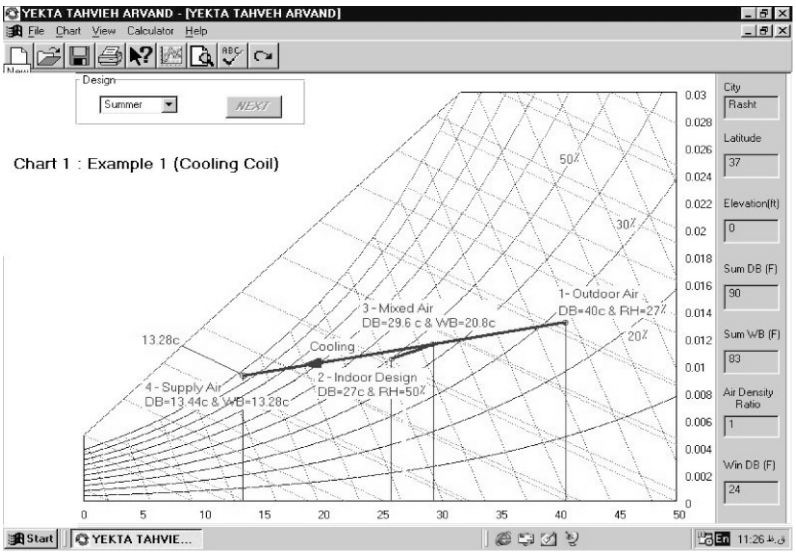
From table 26 model AAHU-530 is selected and the face velocity is:

$$\text{Face Velocity} = \frac{45000}{(5.3 \times 3600)} = 2.38\ m/sec$$

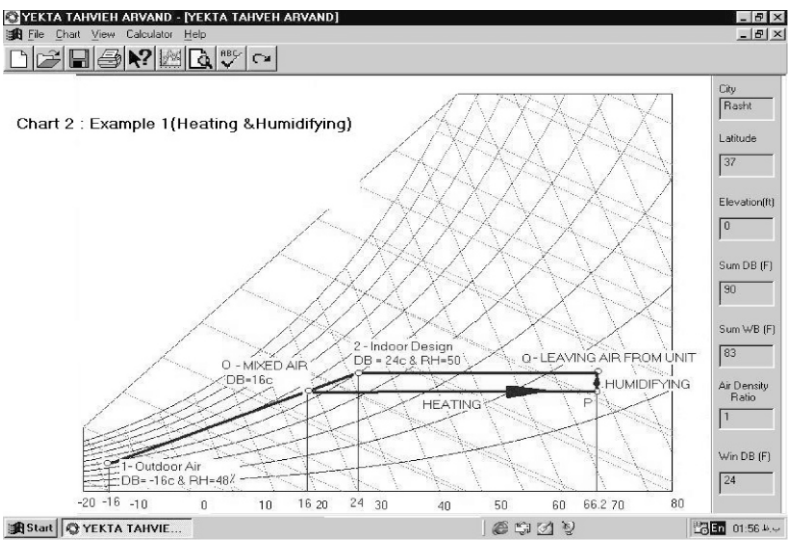
From table 29 by considering air washer model and face velocity the cooling efficiency obtained E= 0.94

By repeating the calculation with E=0.94 (replace with initial suppose E= 0.9) , DB_{out} = 26.1°C and air delivery reach 41500 m^3/hr

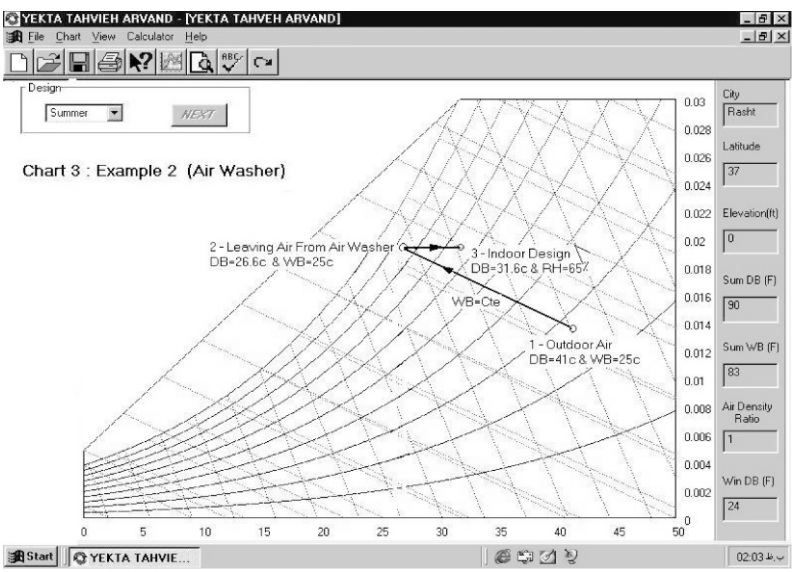
Example 1 : Cooling Process



Example 1 : Heating Process



Example 1 : Air Washer Cooling Process



YEKTA TAHVIEH Arvand IND.

Table 2-Fan Rating (forward)

A-AHU MODEl	Fan size Dia-Width (inch)	No. of Fan	Coil Face Velocity (m/S)	Air Delivery (m3/hr)	STATIC PRESSURE (mm H2O) 25 RPM	25 KW	25 db	25 % η	35 RPM	35 KW	35 db	35 % η	45 RPM	45 KW	45 db	45 % η	55 RPM	55 KW	55 db	55 % η	65 RPM	65 KW	65 db	65 % η	75 RPM	75 KW	75 db	75 % η
35	AT 10-8	1	2.3	2900	982	0.38	77	68	1136	0.49	79	69	1279	0.6	80	69	1413	0.73	82	68	1538	0.87	83	66	1655	1	85	65
			2.5	3150	1000	0.43	78	66	1146	0.55	80	68	1284	0.67	81	69	1414	0.8	83	68	1536	0.94	84	68	1652	1.08	85	67
			2.8	3525	1033	0.53	81	64	1168	0.65	82	67	1297	0.78	83	69	1420	0.92	84	69	1538	1.07	86	69	1650	1.22	87	68
			3	3780	1059	0.61	82	63	1187	0.74	83	66	1310	0.87	84	68	1429	1.02	86	69	1543	1.16	87	69	1652	1.32	88	69
			3.3	4160	1103	0.74	84	61	1221	0.88	85	65	1336	1.02	86	67	1447	1017	87	68	1555	1.33	88	69	1660	1.49	89	69
			3.6	4535	1150	0.9	86	59	1260	1.04	87	63	1368	1.19	88	65	1472	1.34	89	67	1574	1.51	90	68	1674	1.68	90	69
50	AT 12-9	1	2.3	4385	782	0.59	79	68	899	0.73	81	71	1011	0.87	82	73	1117	1.02	84	75	1218	1.19	85	75	1315	1.32	87	75
			2.5	4770	800	0.69	81	67	910	0.84	82	70	1015	0.99	83	72	1117	1.15	85	74	1214	1.31	86	74	1308	1.47	87	75
			2.8	5340	831	0.85	83	64	932	1.02	84	68	1029	1.2	85	70	1124	1.37	87	72	1215	1.54	88	71	1304	1.72	89	74
			3	5720	855	0.98	84	63	950	1.16	85	66	1043	1.35	86	69	1133	1.53	88	71	1220	1.72	89	72	1305	1.9	90	73
			3.3	6295	894	1.19	87	61	982	1.38	87	64	1068	1.6	88	67	1152	1.81	89	69	1233	2	90	70	1313	2.2	91	72
			3.6	6865	936	1.43	89	60	1018	1.66	89	63	1098	1.9	90	65	1176	2.11	91	69	1253	2.33	92	69	1328	2.56	93	70
70	AT 12-12	1	2.3	6125	829	0.96	81	62	955	1.18	82	65	1075	1.4	84	67	1189	1.64	86	67	1296	1.88	87	68	1397	2.14	88	68
			2.5	6660	847	1.13	82	59	965	1.36	84	63	1079	1.6	85	65	1189	1.85	87	67	1292	2.1	80	66	1391	2.37	89	68
			2.8	7460	881	1.43	85	57	987	1.68	86	61	1092	1.94	84	64	1194	2.21	88	65	1293	2.48	90	66	1388	2.77	91	67
			3	7990	907	1.66	87	56	1006	1.93	88	60	1105	2.2	89	62	1202	2.48	90	64	1297	2.77	91	65	1389	3.07	92	66
			3.3	8790	951	2.07	89	53	1041	2.35	90	57	1131	2.64	90	60	1221	2.94	91	62	1309	3.25	92	64	1396	3.57	93	65
			3.6	9590	998	2.54	91	51	1080	2.84	92	55	1163	3.15	93	58	1246	3.48	93	61	1328	3.8	94	62	1409	4.14	95	64
85	AT 15-15	1	2.3	7285	669	0.96	77	68	784	1.26	79	67	891	1.59	89	66	990	1.94	82	65	1084	2.31	84	63	1172	2.69	86	62
			2.5	7920	676	1.09	78	67	786	1.4	80	68	889	1.75	82	67	986	2.12	83	66	1077	2.5	85	65	1163	2.9	86	63
			2.8	8870	691	1.33	80	66	794	1.65	82	67	891	2	83	68	983	2.4	85	67	1070	2.8	86	66	1153	3.22	85	65
			3	9500	704	1.51	81	64	801	1.85	83	67	895	2.2	84	68	984	2.61	85	68	1068	3.02	87	67	1150	3.46	88	66
			3.3	10455	726	1.84	83	62	817	2.18	84	66	905	2.56	86	67	998	2.97	87	68	1070	3.4	88	68	1148	3.86	89	67
			3.6	11400	750	2.22	85	60	836	2.57	86	64	918	2.97	87	66	998	3.39	87	67	1075	3.83	89	68	1150	4.3	90	68
100	AT 18-13	1	2.3	8775	549	1.17	81	70	634	1.5	83	72	714	1.8	85	73	789	2.13	86	73	859	2.5	87	73	924	2.8	89	73
			2.5	9540	561	1.4	83	69	640	1.7	84	71	717	2	86	72	789	2.4	87	73	858	2.8	88	73	922	3.1	90	73
			2.8	10685	583	1.7	85	66	654	2.04	86	70	725	2.4	87	71	793	2.8	89	72	859	3.2	90	73	922	3.6	91	73
			3	11445	600	1.97	86	64	666	2.3	87	68	733	2.7	89	70	798	3.1	90	72	861	3.5	91	72	922	3.93	92	73
			3.3	12595	628	2.4	88	61	688	2.8	90	66	749	3.2	91	69	809	3.6	92	71	869	4	93	72	927	4.5	94	72
			3.6	13735	659	3	91	59	714	3.3	92	64	769	3.7	92	67	825	4.2	93	70	880	4.6	94	71	935	5.1	95	71
120	AT 18-18	1	2.3	10265	570	1.2	79	74	672	1.6	82	73	764	2.1	84	72	749	2.5	85	71	927	2.9	87	70	999	3.5	89	67
			2.5	11160	575	1.4	81	74	672	1.8	83	74	762	2.3	85	73	846	2.7	87	72	923	3.2	88	71	995	3.7	89	70
			2.8	12500	586	1.7	83	73	676	2.1	84	74	762	2.6	86	74	843	3.1	88	73	918	3.6	89	72	989	4.1	91	71
			3	13390	595	1.9	84	73	682	2.4	86	74	764	2.8	87	74	842	3.4	89	73	916	4	90	73	986	4.5	92	72
			3.3	14730	613	2.2	86	72	693	2.7	87	73	770	3.3	89	74	844	3.8	90	74	916	4.4	91	74	984	5	93	73
			3.6	16070	634	2.7	88	70	707	3.2	89	73	780	3.7	91	73	850	4.4	92	74	918	4.9	93	74	984	5.6	94	77
160	AT 20-20	1	2.3	13165	529	1.7	82	65	591	2.1	84	67	667	2.6	85	70	734	3.1	87	70	798	3.7	88	69	859	4.4	90	67
			2.5	14310	545	2	84	62	611	2.5	85	67	674	2.9	87	69	737	3.5	88	70	798	4	89	70	857	4.7	91	69
			2.8	16025	572	2.5	86	59	632	2.9	87	64	690	3.5	89	67	747	4	90	69	803	4.6	91	70	858	5.3	92	70
			3	17170	591	2.9	88	56	648	3.4	89	62	703	4	90	66	648	3.4	89	64	810	5.1	92	69	862	5.7	93	69
			3.3	18890	621	3.5	90	53	759	3.4	93	65	727	4.6	92	63	777	5.2	93	66	826	5.8	94	68	874	6.5	95	69
			3.6	20605	653	4.3	93	50	704	4.9	94	55	753	5.5	94	60	800	6.1	95	63	845	6.8	96	66	890	7.4	97	67

YEKTA TAHVIEH Arvand IND.

Table 2-Fan Rating (forward) Continue

A-AHU MODEL	Fan size Dia-Width (inch)	No. of Fan	Coil Face Velocity (m/S)	Air Delivery (m3/hr)	STATIC PRESSURE (mm H2O) 25				35				45				55				65				75			
					RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η
210	AT 22-22	1	2.3	17550	491	2.3	85	65	555	2.9	87	69	605	306	88	70	682	4.2	90	70	742	5	91	70	799	5.8	93	68
			2.5	19080	507	2.7	87	63	566	3.3	88	67	625	4	90	70	684	4.7	91	70	741	5.5	92	70	796	6.3	94	70
			2.8	21370	534	3.4	90	60	674	3.5	93	69	640	407	92	67	693	5.5	93	70	745	6.3	94	70	797	7.1	95	70
			3	22895	553	4	91	57	603	4.6	92	62	653	5.3	93	66	702	6.1	94	68	751	7	95	70	800	7.8	96	70
			3.3	25185	584	4.9	94	54	630	5.6	95	60	675	6.4	95	63	720	7.1	96	66	765	8	97	68	810	8.9	98	70
			3.6	27475	617	6	96	51	660	6.8	97	56	701	7.6	98	60	743	8.4	98	63	784	9.3	99	66	825	10	100	67
280	AT 25-20	1	2.3	23350	429	3.11	84	71	483	3.94	86	72	535	4.82	88	72	586	5.75	89	71	634	6.73	91	70	429	3.11	92	68
			2.5	25380	442	3.6	86	70	494	4.47	87	71	543	5.4	89	72	591	6.37	91	72	637	7.39	92	71	442	7.92	93	70
			2.8	28425	466	4.45	88	68	512	5.4	90	70	558	6.4	91	71	602	7.43	93	72	645	8.5	94	72	466	8.94	94	71
			3	30455	482	5.12	89	67	527	6.11	91	69	570	7.15	92	71	611	8.23	94	72	652	9.35	95	72	482	9.7	95	72
			3.3	33500	508	6.23	92	65	550	7.32	93	68	590	8.44	94	70	629	9.56	95	71	667	10.8	96	71	508	11	96	72
			3.6	36545	536	7.52	94	64	575	8.71	95	66	612	9.9	96	68	649	11.1	97	70	684	12.4	98	71	536	12.4	98	72
350	AT 2x 20-20	2	2.3	29225	549	2.1	84	62	614	2.5	86	67	677	3	87	69	738	3.5	88	70	798	4.1	89	70	856	4.8	91	69
			2.5	31770	569	2.5	86	59	530	2.9	87	65	689	3.5	88	68	746	4	90	70	802	4.6	91	70	858	5.2	92	70
			2.8	35580	602	3.1	89	55	658	3.6	90	60	711	4.1	91	65	764	4.7	92	68	815	5.3	93	68	866	6	94	70
			3	38120	624	3.6	91	52	678	4.2	92	59	729	4.7	92	63	779	5.3	93	66	827	5.9	94	66	875	6.6	95	69
			3.3	71935	659	4.5	93	50	711	5.1	94	55	758	5.7	95	60	805	6.3	95	63	850	7	96	63	894	7.6	97	67
			3.6	45745	695	5.5	95	47	745	6.2	96	52	790	6.8	97	56	834	7.5	97	60	876	8.2	98	60	917	8.9	99	65
440	AT 2x 22-22	2	2.3	36430	498	2.5	86	65	560	3	87	68	621	3.7	89	70	682	4.5	90	70	741	5.2	92	70	798	6	93	69
			2.5	39600	515	2.9	88	62	572	3.5	89	67	629	4.2	90	69	686	5	92	70	742	5.8	93	70	796	6.5	94	70
			2.8	44350	544	3.7	90	58	595	4.3	91	63	646	5	93	67	697	5.8	94	69	748	6.6	95	69	798	7.5	96	70
			3	47520	565	4.3	92	56	613	5	93	61	661	5.7	94	65	708	6.5	95	67	756	7.3	96	67	803	8.2	97	70
			3.3	52270	598	5.3	95	53	642	6.1	96	59	686	6.8	96	62	729	7.7	97	65	773	8.5	98	65	816	9.4	99	69
			3.6	57020	633	6.6	97	50	674	7.4	78	54	714	8.2	98	60	754	9	99	63	794	9.9	100	63	833	10.8	100	67
530	AT 2x 25-20	2	2.3	43880	420	2.8	83	71	477	3.6	85	72	532	4.45	87	72	584	5.36	89	71	634	6.32	91	69	681	7.76	93	70
			2.5	47700	432	3.22	85	70	485	4.06	86	72	537	4.95	88	72	587	5.9	90	71	635	6.9	92	70	682	8.45	94	70
			2.8	53420	452	3.95	87	69	501	4.86	88	71	549	5.81	90	72	595	6.81	91	72	640	7.85	93	72	687	8.78	95	71
			3	57240	467	4.51	88	68	514	5.47	90	70	559	6.46	91	71	603	7.5	93	72	645	8.6	94	72	692	10.5	96	72
			3.3	62965	491	5.47	90	66	534	6.5	92	67	576	7.56	93	70	617	8.66	94	71	657	9.8	95	72	704	12	97	72
			3.6	68685	516	6.56	92	65	556	7.68	94	67	596	8.82	95	69	634	10	96	71	671	11.2	97	71	719	13.1	99	71
630	AT 2x 25-25	2	2.3	52575	412	3.6	86	67	474	4.6	87	68	534	5.6	89	69	591	6.7	90	67	645	7.8	92	67	696	9	93	67
			2.5	57150	422	4.2	88	65	479	5.2	89	68	536	6.3	90	68	591	6.8	91	69	643	8.6	93	69	693	9.8	94	68
			2.8	64000	440	5.2	91	63	491	6.3	92	66	542	7.4	93	68	593	8.7	94	69	642	9.9	95	69	690	11.2	96	69
			3	68580	454	6	93	62	502	7.1	93	65	550	8.3	94	67	597	9.6	95	68	644	11	96	68	690	12.3	97	69
			3.3	75555	477	7.3	95	60	520	8.5	96	63	564	9.8	96	66	607	11	97	67	650	12.6	98	67	693	14	92	68
			3.6	82295	501	8.7	98	58	541	10	98	62	581	11.5	99	65	620	13	99	66	660	14.6	100	66	700	16	101	68
740	AT 2x 28-28	2	2.3	61600	361	4.3	84	66	413	5.3	85	70	465	6.3	87	71	516	7.4	89	72	565	8.5	90	72	612	9.7	92	72
			2.5	66960	371	5	85	64	420	6	87	68	466	7.2	88	70	514	8.3	90	72	561	9.5	91	72	606	10.7	93	73
			2.8	74995	375	5.3	86	63	431	7.5	89	65	474	8.6	91	68	516	9.9	92	70	559	11.2	93	70	601	12.5	94	72
			3	80350	401	7.2	90	60	441	8.5	91	63	481	9.8	92	66	521	11	93	68	561	12.5	94	68	600	13.8	95	71
			3.3	88385	421	8.8	92	57	458	10.2	93	61	495	11.7	94	64	531	13	95	66	567	14.5	96	66	603	16	97	70
			3.6	96420	443	9.6	95	55	478	12.3	95	59	511	13.8	96	62	545	15.5	97	64	678	17	98	64	611	18.5	98	68

YEKTA TAHVIEH
Arvand IND.

Table 2-Fan Rating (Backward)

A-AHU MODEL	Fan size Dia-Width (inch)	No. of Fan	Coil Face Velocity (m/S)	Air Delivery (m3/hr)	STATIC PRESSURE (mm H2O)																							
					65				75				85				105				135				155			
					RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η
35	RDZ 250	1	2.3	2900	2841	0.67	78	82	2986	0.77	79	82	2034	1.5	86	46	3379	1.1	81	80	3728	1.5	83	78	3942	1.6	84	77
			2.5	3150	2922	0.74	78	81	3063	0.85	79	82	3198	0.95	80	82	3450	1.2	81	81	3794	1.5	84	80	4006	1.7	85	78
			2.8	3525	3049	0.85	79	80	3185	1	80	81	3316	1.1	81	82	3561	1.3	82	82	3898	1.7	84	81	4106	2	85	82
			3	3780	3139	0.95	80	79	3273	1.1	81	80	3400	1.2	81	82	3641	1.4	83	82	3973	1.9	84	82	4178	2.1	85	81
			3.3	4160	3280	1.1	81	77	3408	1.2	82	79	3532	1.3	82	80	3765	1.6	83	81	4089	2	85	82	7290	2.3	86	82
			3.6	4535	3425	1.2	89	75	3548	1.4	83	77	3668	1.5	83	78	3894	1.8	85	80	4209	2.2	86	82	4406	2.5	87	82
50	RDZ 315	1	2.3	4385	2231	1.1	79	76	2346	1.3	80	76	2456	1.4	81	77	2660	1.7	83	77	2937	2.2	85	76	3106	2.5	87	76
			2.5	4770	2292	1.2	80	75	2405	1.4	81	76	2513	1.5	82	76	2714	1.8	83	77	2988	2.4	85	76	3156	2.7	87	77
			2.8	5340	2388	1.4	81	74	2498	1.6	82	75	2602	1.7	83	75	2799	2.1	84	76	3068	2.7	86	77	3233	3.1	87	77
			3	5720	2454	1.6	82	72	2562	1.7	83	74	2665	1.9	83	75	2858	2.3	84	76	3123	2.9	86	77	3287	3.3	87	77
			3.3	6295	2559	1.8	83	70	2663	2	83	72	2763	2.2	84	73	2951	2.6	85	75	3211	3.2	87	76	3372	3.7	88	76
			3.6	6865	2669	2.1	84	68	2769	2.3	84	70	2865	2.5	85	71	3048	2.9	86	73	3302	3.8	88	75	3459	4.1	88	76
70	RDZ 315	1	2.3	6125	2528	1.7	82	71	2633	1.9	83	72	2734	2.1	84	74	2923	2.5	85	75	3185	3.1	87	76	3346	3.5	88	76
			2.5	6660	2629	1.9	83	69	2730	2.1	84	71	2828	2.4	85	72	3013	2.8	86	74	3269	3.5	87	76	3427	3.9	88	76
			2.8	7460	2787	2.4	85	65	2883	2.6	86	67	2976	2.8	86	70	3153	3.3	87	72	3100	4.1	88	74	3555	4.5	89	75
			3	7990	2897	2.6	86	63	2989	2.9	86	66	3079	3.1	87	68	3251	3.6	88	70	3492	4.5	89	73	3643	5	90	74
			3.3	8790	3068	3.2	88	60	3156	3.5	88	62	3241	3.7	89	65	3404	4.3	89	66	3636	5.1	90	71	3782	5.7	91	72
			3.6	9590	3247	3.8	90	57	3329	4.1	90	60	3409	4.3	90	62	3565	4.9	91	65	3787	5.8	91	69	3928	6.5	92	70
85	RDZ 355	1	2.3	7285	2191	2	83	73	2288	2.2	84	75	2379	2.5	84	76	2548	2.9	86	77	2778	3.6	87	78	2920	4.1	89	79
			2.5	7920	2271	2.2	84	71	2366	2.5	85	73	2455	2.7	85	74	2623	3.2	86	76	2850	4	87	77	2990	4.6	89	78
			2.8	8870	2394	2.6	86	68	2486	2.9	86	70	2573	3.2	86	71	2737	3.8	87	74	2961	4.6	89	76	3098	5.2	90	77
			3	9500	2479	3	86	66	2568	3.3	87	68	2654	3.6	87	70	2815	4.2	88	73	3036	5.1	90	75	3172	5.7	91	76
			3.3	10455	2614	3.5	88	63	2698	3.8	88	65	2780	4.2	88	67	2936	4.8	89	70	3153	5.8	91	73	3287	6.5	92	74
			3.6	11400	2753	4.2	89	60	2832	4.5	89	53	2910	4.8	90	65	3060	5.5	91	68	3271	6.6	92	71	3402	7.4	92	73
100	RDZ 400	1	2.3	8775	1832	2.5	82	73	1915	2.6	83	75	1995	2.9	84	76	2144	3.5	85	77	2348	4.3	87	79	2474	4.9	88	79
			2.5	9540	1897	2.6	83	71	1978	3	84	73	2055	3.2	85	74	2200	4	86	76	2401	4.8	87	78	2525	5.4	88	79
			2.8	10685	2000	3.2	85	67	2076	3.5	85	70	2150	3.8	86	71	2291	4.5	87	74	2485	5.5	88	76	2606	6.2	89	77
			3	11445	2070	3.6	86	65	2145	3.9	86	67	2217	4.3	86	69	2353	5	88	73	2544	6	89	75	2662	6.8	90	76
			3.3	12595	2181	4.3	87	61	2253	4.7	88	64	2321	5	88	66	2453	5.8	89	70	2637	7	90	73	2752	7.7	91	75
			3.6	13735	2296	5.1	89	58	2364	5.5	89	61	2429	6	89	63	2556	6.7	90	67	2733	7.9	91	71	2845	8.8	92	73
120	RDZ 450	1	2.3	10265	1581	2.6	83	75	1675	2.6	83	76	1729	3.3	84	77	1865	4	86	78	2050	5	88	79	2164	5.7	89	79
			2.5	11160	1632	3	83	73	1706	3.3	84	75	1777	3.7	85	76	1909	4.4	86	78	2092	5.5	88	79	2204	6.3	89	79
			2.8	12500	1712	3.5	85	70	1783	3.9	85	72	1851	4.3	86	74	1980	5.1	87	76	2157	6.3	89	78	2267	7.1	90	78
			3	13390	1768	4	86	68	1837	4.3	86	70	1903	4.8	87	72	2029	5.6	88	74	2203	6.9	89	77	2311	7.8	91	78
			3.3	14730	1855	4.7	87	65	1921	5.1	88	67	1985	5.6	88	70	2106	6.5	89	72	2275	7.8	91	75	2381	8.8	91	77
			3.6	16070	1946	5.5	89	62	2009	6	89	64	2070	6.5	89	66	2187	7.5	90	70	2351	6.9	91	74	2154	9.8	91	75
160	RDZ 500	1	2.3	13165	1431	3.5	84	74	1498	3.9	85	75	1561	4.3	85	76	1681	5.1	87	78	1844	6.5	89	79	1945	7.4	90	79
			2.5	14310	1479	3.9	85	72	1544	4.3	85	74	1606	4.7	86	76	1723	5.7	87	77	1884	7.1	89	78	1983	8.1	91	78
			2.8	16025	1554	4.7	86	68	1617	5.2	86	70	1677	5.7	87	72	1790	6.7	88	75	1946	8.2	90	77	2043	9.2	91	78
			3	17170	1606	5.3	87	66	1667	5.8	88	68	1726	6.3	88	70	1837	7.4	89	74	1990	9	91	76	2085	10.1	92	77
			3.3	18890	1688	6.3	88	62	1774	6.8	89	68	1803	7.4	89	67	1910	8.5	90	70	2059	10.3	92	74	2152	11.5	93	75
			3.6	20605	1773	7.5	90	59	1829	8.1	91	62	1883	8.6	91	64	1986	9.8	92	68	2130	11.7	93	71	2221	13	93	74

Table 2-Fan Rating (Backward)

A-AHU MODEL	Fan size Dia-Width (inch)	No. of Fan	Coil Face Velocity (m/S)	Air Delivery (m3/hr)	STATIC PRESSURE (mm H2O) 65				75				85				105				135				155			
					RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η	RPM	KW	db	% η
210	RDZ 560	1	2.3	17550	1303	4.7	86	73	1363	5.3	87	74	1419	5.8	87	76	1525	7	89	77	1670	8.8	91	78	1760	10	92	78
			2.5	19080	1349	5.4	87	71	1407	6	87	73	1462	6.6	88	74	1566	7.8	89	76	1709	9.7	91	77	1797	11	92	78
			2.8	21370	1421	6.5	88	67	1476	7.1	89	69	1529	7.8	90	71	1629	9.1	91	74	1768	11.2	92	76	1856	12.6	93	77
			3	22895	1472	7.3	90	65	1525	8	90	67	1576	8.7	90	69	1674	10.1	91	72	1810	12.3	93	75	1895	13.7	94	76
			3.3	25185	1550	8.7	91	61	1601	9.5	92	64	1650	10.2	92	66	1743	11.7	93	70	1875	14	94	73	1957	15.6	95	75
			3.6	27475	1633	10.4	93	58	1680	11.1	93	61	1727	11.9	93	63	1817	13.5	94	67	1943	16	95	71	2023	17.8	96	73
280	RDZ 630	1	2.3	23350	1176	6.3	87	74	1227	7	88	76	1278	7.7	89	77	1371	9.2	90	79	1501	11.5	92	80	1581	13.1	93	80
			2.5	25380	1220	7.2	88	71	1269	7.9	89	74	1317	8.7	90	75	1408	10.2	91	78	1535	12.7	93	80	1614	14.4	94	80
			2.8	28425	1290	8.7	90	67	1337	9.5	91	70	1382	10.4	91	72	1468	12.1	92	75	1590	14.6	94	78	1666	16.5	95	79
			3	30455	1340	9.9	91	64	1384	10.8	92	67	1427	11.6	92	70	1511	13.4	93	73	1629	16.1	94	76	1703	18	95	78
			3.3	33500	1417	12	93	60	1459	12.9	93	63	1499	13.8	94	66	1579	15.7	95	70	1691	18.6	96	74	1763	20.6	96	76
			3.6	36545	1496	14.4	95	57	1536	15.4	95	60	1575	16.4	95	62	1650	18.3	96	67	1757	21.4	97	71	1826	23.5	97	73
350	RDZ 2x (500)	2	2.3	29225	1492	14.1	85	71	1556	4.5	86	73	1618	5	86	75	1735	5.8	88	77	1894	7.3	89	78	1993	8.3	91	78
			2.5	31770	1547	4.6	86	68	1610	5.1	86	71	1671	5.6	87	72	1784	6.6	88	75	1941	8.1	90	77	2038	9.1	91	78
			2.8	35580	1636	5.6	88	65	1695	6.1	88	67	1753	6.7	88	69	1863	7.8	89	72	2014	9.4	91	75	2109	10.6	92	76
			3	38120	1697	6.4	89	62	1755	7	89	65	1811	7.5	89	67	1917	8.6	90	70	2066	10.5	92	74	2158	11.6	93	75
			3.3	41935	1791	7.7	90	58	1831	8.1	91	62	1900	8.9	91	64	2002	10.1	92	67	2146	12	93	71	2236	13.3	94	73
			3.6	45745	1890	9	92	55	1942	9.8	92	58	1993	10.5	92	60	2091	11.8	93	64	2229	14	94	68	2317	15.3	95	70
440	RDZ 2x (560)	2	2.3	36430	1323	5	86	72	1381	5.5	87	74	1437	6.1	87	75	1543	7.3	89	76	1687	9.1	91	78	1776	10.4	92	78
			2.5	39600	1371	5.7	87	61	1428	6.3	88	72	1473	6.7	88	73	1585	8.1	89	75	1727	10.1	91	75	1814	11.5	92	77
			2.8	44350	1448	6.9	89	66	1501	7.5	89	68	1554	8.2	90	70	1653	9.6	91	73	1790	11.7	92	75	1875	13.2	93	76
			3	47520	1501	7.8	90	63	1553	8.5	90	66	1603	9.2	91	68	1700	10.6	92	71	1834	12.9	93	74	1918	14.5	94	75
			3.3	52270	1584	9.5	92	60	1633	10.1	92	63	1681	11	92	65	1773	12.5	93	65	1903	14.8	94	72	1984	16.5	95	73
			3.6	57020	1671	11.2	93	56	1717	12	94	60	1763	12.8	94	62	1751	14.5	95	66	1976	17	95	70	2054	18.8	96	72
530	RDZ 2x (630)	2	2.3	73880	1146	5.7	86	76	1199	6.3	87	77	1250	7	88	78	1346	8.5	89	79	1478	10.7	91	80	1560	12.3	93	80
			2.5	47700	1186	6.5	87	73	1237	7.2	88	75	1286	8	89	77	1380	9.5	90	78	1509	11.8	92	80	1589	13.5	93	80
			2.8	53420	1250	7.8	89	70	1298	8.5	89	72	1345	9.3	90	74	1434	11	91	76	1558	13.5	93	79	1636	15.2	94	80
			3	57240	1295	8.8	90	67	1341	9.6	91	70	1386	10.5	91	72	1472	12.2	92	75	1594	14.8	93	78	1670	16.6	95	79
			3.3	62965	1365	10.6	92	63	1409	11.5	92	66	1451	12.3	92	68	1533	14	93	72	1649	17	95	76	1723	18.8	95	77
			3.6	68685	1438	12.6	93	60	1480	13.5	94	62	1520	14.5	94	65	1598	16.3	94	69	1709	19.3	96	73	1780	21	96	75
630	RDZ 2x (630)	2	2.3	52575	1240	7.6	89	70	1289	8.3	89	72	1289	8.3	89	72	1425	10.7	91	77	1551	13	93	79	1629	15	94	80
			2.5	57150	1294	8.8	90	67	1340	9.6	91	70	1394	10.7	91	71	1471	12.1	92	75	1593	14.8	93	78	1669	16.5	95	79
			2.8	64000	1378	11	92	62	1421	11.8	92	65	1464	12.7	93	68	1545	14.5	94	71	1660	17.4	95	75	1733	19.3	96	77
			3	68580	1437	12.6	93	60	1478	13.5	94	62	1519	14.5	94	65	1597	16.3	95	70	1708	19.3	96	73	1779	21	97	75
			3.3	75555	1529	15.5	95	55	1568	16.5	95	58	1606	17.5	96	61	1680	19.5	96	65	1785	22.6	97	70	1852	24.8	98	73
			3.6	82295	1621	18.7	97	51	1658	19.8	97	54	1694	20.1	98	57	1764	23	98	62	1864	26	99	67	1928	28.6	99	70
740	RDZ 2x (710)	2	2.3	61600	1076	8.6	89	72	1121	9.5	89	73	1164	10.5	90	75	1245	12.3	91	77	1375	15.3	93	80	1426	17.3	94	80
			2.5	66960	1119	9.9	90	68	1162	10.8	91	71	1204	11.8	91	73	1273	13.9	92	76	1392	17	94	78	1460	19	95	79
			2.8	74995	1186	12.1	92	64	1227	13.2	92	67	1267	14.3	93	69	1342	16.5	94	73	1448	19.8	95	76	1477	20.1	95	78
			3	80350	1233	13.8	93	62	1273	15	93	65	1311	16	94	67	1384	18.5	95	70	1487	22	96	74	1551	24.5	97	76
			3.3	88385	1305	16.7	95	58	1343	18	95	61	1379	19.2	95	63	1442	21.7	96	67	1548	25.6	97	71	1610	28	98	74
			3.6	96420	1380	20	96	54	1416	21	96	57	1450	22.8	97	60	1517	25.5	98	64	1612	29.6	99	69	1672	32.4	99	71

YEKTA TAHVIEH Arvand IND.

Table 3: Chilled water Cooling Coils Rating (1000Kcal/hr)

Model Air Delivery (m^3/hr)	Entering Air WB (°C)	Cooling capacity (1000 kcal/hr)					
		8Fin/in			14Fin/in		
		4Row	6 Row	8Row	4Row	6 Row	8Row
35 (3200)	19	10.8H	15.5H	18.6H	13.6H	18.3H	21.4H
	22	15.8H	22.8H	27.1H	19.6H	26.4H	26.8F
	24	20.8H	28.2H	33.2H	26.1H	33.6H	34.5F
	26	25.6H	34.8H	36.2H	31.8H	35.6F	41.5F
50 (4900)	19	22.8H	21.5F	26.7F	23.4H	25.9F	31F
	22	27.7H	31.4F	39.7F	35.2H	37.8F	44.6F
	24	34.2H	40.8F	49.1F	36.2F	48.9F	56.1F
	26	42.3H	50F	59F	45.4F	59.1F	66.9F
70 (6800)	19	27.8H	32.7F	39.5F	29F	39.2F	45.9F
	22	33.3H	49.1F	60F	42.6F	56.2F	65F
	24	44.2F	60.3F	72.2F	56.1F	71.5F	73.8D
	26	54.1F	72.9F	78.3D	68.1F	87.1F	88.7D
85 (8100)	19	34H	40.3F	48.6F	37F	48.5F	56.2F
	22	44F	60F	58.5F	53.4F	71.6F	71.2D
	24	54.8F	73.7F	78.7D	69.2F	78.3D	90.6D
	26	67.3F	79.2F	94.6D	84.5F	94.8D	108.2D
100 (9700)	19	35.2F	49F	58.5F	44.6F	59.1F	67.8F
	22	53.5F	72.5F	75D	65.3F	88.6F	86.3D
	24	67.3F	79.5F	95.5D	84.7D	95D	110D
	26	81.5F	96.2F	115D	101.8D	114.4D	130.3D
120 (11400)	19	54.9F	60.7F	62.8D	43.5D	71.3F	73.4D
	22	65.3F	88.1F	93.7D	62.7D	103.8F	104.5D
	24	80.8F	97.5D	115.2D	86.2D	125.6F	131.2D
	26	98.1F	118D	138.1D	106.6D	149.8F	156.6D
160 (14500)	19	54.5F	75F	89.1F	69.2 F	90.1F	92.7D
	22	82.5F	110.3F	118.8D	104.1F	112.1D	132.2D
	24	102.5F	121.5D	145.6D	129.4F	145.1D	166D
	26	124.4F	147.7D	174.2D	133.3D	175.8D	198.6D

Model Air Delivery (m^3/hr)	Entering Air WB (°C)	Cooling capacity (1000 kcal/hr)					
		8Fin/in			14Fin/in		
		4Row	6 Row	8Row	4Row	6 Row	8Row
210 (19400)	19	73.3F	100.5F	120F	92.8F	120.7F	124.2D
	22	110.6F	148.1F	158.8D	140F	150.5D	178.3D
	24	138.1F	182.4F	196D	173F	195.7D	223.3D
	26	167F	199D	235.7D	209F	236D	268D
280 (25800)	19	103.9F	123.6D	151D	132F	149.5D	175D
	22	156F	185.8D	222D	159D	215D	248D
	24	168D	229D	270D	212D	274D	307D
	26	206D	278D	323D	259D	328D	365D
350 (32300)	19	130F	176F	188.4D	166F	187D	220D
	22	195F	232D	278D	200D	269D	310D
	24	210.8D	289D	338.6D	265D	343D	386D
	26	258D	348D	404.8D	326D	411D	458D
440 (40300)	19	170F	203D	244D	185D	245D	283D
	22	222.5D	302D	355D	269D	360D	405D
	24	278D	372D	442D	349D	441D	488D
	26	337D	446D	515D	424D	527D	580D
530 (48500)	19	204F	244D	294D	259F	295D	340D
	22	266D	364D	427D	324D	433D	487D
	24	335F	447D	521D	420D	529D	589D
	26	407D	538D	620D	511D	634D	698D
630 (58000)	19	219 F	301F	360 F	280 F	364F	416 F
	22	331F	445F	477 D	418F	531F	536D
	24	414F	491D	589 D	521F	587D	671D
	26	502F	597D	706 D	630F	708D	801D
740 (68000)	19	266 F	362 F	430 F	339 F	437 F	452 D
	22	402 F	531 F	571 D	508 F	553 D	643 D
	24	498 F	596 D	703 D	627 F	707 D	800 D
	26	602 F	718 D	845 D	663 D	851 D	955 D

Rating are based on , inlet water temperature 7 °C
outlet water temperature 12 °C and Coil face velocity 2.54 m/sec.
Consult YEKTA TAHVIEH ARVAND technical office for other condition.

F:Full Circuit
H:Half Circuit
D:Double Circuit

Table 4: Direct Expansion Coils Rating (1000Kcal/hr)

Model Air Delivery (m^3/hr)	Ent.Air Dry Bulb temp.°c	8 fin/inch						14 fin/inch					
		Entering Air Wet Bulb Temp.(°C)											
		16		19		22		16		19		22	
		4Row	6 Row	4Row	6 Row	4Row	6 Row	4Row	6 Row	4Row	6 Row	4Row	6 Row
35 (3200)	24	9.4	13.9	14.7	19	-	-	12.2	-	-	-	-	-
	27	11	12.7	14.7	19	19.1	-	12.6	15.1	16.6	-	-	-
	29	12.6	15.6	14.7	19	19.1	24.7	14.4	17.2	16.6	-	21.6	-
	32	14.1	17.5	14.1	17.5	19.1	24.7	16.3	19.4	16.3	-	21.6	-
50 (4900)	24	14.4	21.2	22.4	30	-	-	18.5	-	-	-	-	-
	27	16.7	20.8	22.4	30	29.1	-	19.3	23	25.3	-	-	-
	29	19.1	23.8	22.4	30	29.1	37.6	22	26.3	25.3	-	32.8	-
	32	21.5	26.7	21.5	26.7	29.1	37.6	24.8	29.6	24.8	-	32.8	-
70 (6800)	24	20	29.4	31.2	40.3	-	-	25.8	-	-	-	-	-
	27	23.3	28.8	31.2	40.3	40.5	-	26.8	32	35.3	-	-	-
	29	26.6	33	31.2	40.3	40.5	52.3	30.6	36.6	35.3	-	45.8	-
	32	30	37.2	30	37.2	40.5	52.3	34.5	41.1	34.5	-	45.8	-
85 (8100)	24	23.8	35.1	37.1	48	-	-	30.7	-	-	-	-	-
	27	27.8	34.4	37.1	48	48.2	-	32	38	42	-	-	-
	29	31.7	39.3	37.1	48	48.2	62.2	36.5	43.5	42	-	54.5	-
	32	35.7	44.2	35.7	44.2	48.2	62.2	41	48.9	41	-	54.5	-
100 (9700)	27	33.3	41.3	44.6	57.6	57.9	-	38.3	45.7	50.4	-	-	-
	29	38	47.2	44.6	57.6	57.9	74.7	43.8	52.2	50.4	-	65.5	-
	32	43	53	42.8	53.1	74.7	74.7	49.3	58.7	49.3	-	65.5	-
120 (11400)	24	33.5	49.4	52.3	67.5	-	-	43.2	-	-	-	-	-
	27	39.1	48.5	52.3	67.5	67.9	-	45	53.6	59	-	-	-
	29	44.6	55.4	52.3	67.5	67.9	87.6	51.4	61.3	59	-	78	-
	32	50.2	62.3	50.2	62.3	67.9	87.6	57.8	69	57.8	-	76.7	-
160 (14500)	24	42.7	63	66.8	86.2	-	-	55.3	-	-	-	-	-
	27	50	61.8	66.8	86.2	86.8	-	57.3	70.8	75.5	-	-	-
	29	57	70.6	66.8	86.2	86.8	111.8	65.5	78.1	75.5	-	98	-
	32	64.1	79.4	64.1	79.4	86.8	111.8	73.7	87.8	73.7	-	98	-
210 (19400)	24	57.1	84.3	89.3	115.8	-	-	73.8	-	-	-	-	-
	27	66.6	82.6	89.3	115.8	116	-	76.6	91.3	100.8	-	-	-
	29	76.1	94.4	89.3	115.8	116	149.4	87.6	104.4	100.8	-	130.9	-
	32	85.7	106.1	85.6	106.2	116	149.4	98.5	117.5	98.5	-	130.9	-
280 (25800)	24	76	112.1	118.7	153	-	-	98.2	-	-	-	-	-
	27	88.6	109.8	118.7	153	154.2	-	102	121.5	134	-	-	-
	29	101.2	125.5	114	153	154.2	198	116.5	138	134	-	43.9	-
	32	114	141.2	141.2	141.2	154.2	198	131	156.2	131.1	-	43.6	-
350 (32300)	24	95.1	89.8	148.6	192	-	-	122.8	-	-	-	-	-
	27	111	137.5	148.6	192	193	-	127.6	152	163.3	-	-	-
	29	126.7	157.1	148.6	192	193	248.8	145.8	173.8	167.8	-	218	-
	32	142.6	176.7	142.6	176.7	193	248.8	164	195.6	167.8	-	217.9	-
440 (40300)	24	118.6	175	185.3	238	-	-	153.2	-	-	-	-	-
	27	138.3	171.5	185.3	238	121.5	-	159	189.7	209.3	-	-	-
	29	158	196	185.3	238	121.5	310.4	181.8	216.8	209.3	-	271.8	-
	32	177.8	220.1	178.2	220	121.5	310.4	204	224	204.6	-	271.8	-
530 (48500)	24	142.7	210.6	223.1	287.7	-	-	184.5	-	-	-	-	-
	27	166.6	206.5	223.1	287.7	289.8	-	191.6	228	252	-	-	-
	29	190.4	236	223.1	287.7	289.8	373.7	219	261	252	-	327.3	-
	32	214.1	266	214	265.4	289.8	373.7	246.3	294	246.3	-	327.3	-
630 (58000)	24	170.8	252.2	267.2	344.4	-	-	220.8	-	-	-	-	-
	27	199.2	247	267.2	344.4	347	-	229.2	273.2	301.6	-	-	-
	29	227.2	282.4	267.2	344.4	347	447.2	262	312.4	301.6	-	392	-
	32	256.2	317.6	256.2	317.6	347	447.2	294.8	351.4	294.8	-	392	-
740 (68000)	24	200.3	295.6	313	403.6	-	-	259	-	-	-	-	-
	27	236	289.6	313	403.6	410.6	-	268.6	323.6	353.6	-	-	-
	29	270	330.9	313	403.6	410.6	524.2	307	366.2	353.6	-	459.2	-
	32	300.4	372.3	300.4	372.3	410.6	524.2	345	412	345	-	459.2	-

Rating are based on 7 °C Saturated Suction temperature and 2.54 m/sec Coil face velocity.
Consult YEKTA TAHVIEH ARVAND Technical office for other condition.

Table 5: Hot Water Heating Coils Rating (1000Kcal/hr)

Model Air Delivery (m^3/hr)	Fin Series	1ROW				2ROW			
		Entering Air Dry Bulb Temp.(°C)							
		-20	-10	0	16	-20	-10	0	16
35 (3200)	8	23H	20H	17.6H	13H	44.5H	39.6H	34.6H	26.8H
	14	33H	28.7H	25H	18.4H	58.6H	52H	45.7H	35.2H
50 (4900)	8	38H	33H	29H	22H	64H	57H	50H	38H
	14	53H	47H	41H	31H	85F	75F	66H	50H
70 (6800)	8	54H	48H	42H	32H	93F	82H	72H	55H
	14	77F	69H	60H	46H	122F	109F	95F	73H
85 (8100)	8	65H	58H	51H	39H	112F	99F	87F	67H
	14	93F	83F	73H	59H	149F	132F	115F	90F
100 (9700)	8	71H	64H	55H	43H	123F	110F	96F	75F
	14	103H	91H	81F	61H	166D	147F	130F	100F
120 (11400)	8	94H	84H	73H	56H	160F	143F	125H	97H
	14	134F	119H	105H	81H	212F	190F	167F	130H
160 (14500)	8	121F	108H	94H	73H	205F	183F	161F	125H
	14	172F	153H	134H	104H	271H	242F	213F	167F
210 (19400)	8	162F	144H	127H	98H	276F	246F	216F	168F
	14	231F	205F	180F	140H	365D	324F	285F	223H
280 (25800)	8	220H	195F	171F	133H	373D	333F	292F	229F
	14	312H	280F	244F	190F	491D	439D	387D	303F
350 (32300)	8	271F	242F	213H	166H	462F	412F	363F	284F
	14	387F	345F	303F	236F	610F	544D	480F	337F
440 (40300)	8	341F	306F	267F	210H	588D	521F	458F	359F
	14	488F	435F	383F	298F	770D	689D	606D	475F
530 (48500)	8	414H	369H	325H	253H	706F	629F	554F	434F
	14	590F	527F	463F	361H	933F	831F	732F	575F
630 (58000)	8	485F	430H	377H	291H	822F	731F	650F	500F
	14	686F	613F	535F	414H	1088D	968D	852F	661F
740 (68000)	8	532F	508F	448H	347H	971F	867F	763F	595F
	14	815F	725F	634F	496F	1286D	1147D	1008F	785F

Model Air Delivery (m^3/hr)	Fin Series	3ROW				4ROW			
		Entering Air Dry Bulb Temp.(°C)							
		-20	-10	0	16	-20	-10	0	16
35 (3200)	8	58.6H	52H	46H	36H	69H	62H	54H	43H
	14	73H	65H	57H	45H	81H	73H	64H	51H
50 (4900)	8	88F	78F	72H	57H	106.5H	95.5H	82F	64F
	14	109F	98F	86F	53.5F	123F	110F	97F	76.5F
70 (6800)	8	125F	111F	98F	77F	146F	131F	115.5F	91F
	14	155F	138F	122F	96F	173F	155F	137F	108F
85 (8100)	8	150F	134F	118F	93F	175F	157F	139F	109F
	14	186F	166F	147F	115F	207F	185F	164F	130F
100 (9700)	8	180F	162F	142F	111F	211F	188.5F	167F	132F
	14	224F	200F	177F	139F	242D	223F	197F	156F
120 (11400)	8	213F	191F	168F	132F	248F	225F	198F	157F
	14	267F	239F	209F	165F	289D	259F	235F	186F
160 (14500)	8	274F	245F	224F	170F	319F	286F	253F	200F
	14	339F	303F	268F	211F	367D	299F	299F	237F
210 (19400)	8	366F	327F	289F	227F	415D	372D	327D	256D
	14	454F	406F	259F	283F	491D	440D	389D	306D
280 (25800)	8	491F	440F	389F	306F	560D	501D	442D	348D
	14	609F	454F	482F	381F	661D	592D	524D	414D
350 (32300)	8	615F	551F	487F	384F	701D	627D	554F	450F
	14	762F	683F	604F	478F	827D	742D	656D	520D
440 (40300)	8	772F	692F	611F	482F	881D	790D	698D	550D
	14	956F	857F	759F	601F	1040D	932D	825D	654D
530 (48500)	8	930F	833F	736F	580F	1061D	950D	840D	664D
	14	1151F	1032F	913F	723F	1250D	1122D	995D	788D
630 (58000)	8	1097F	976F	826F	678F	1279F	1145F	1012F	801F
	14	1356F	1215F	1072F	848F	1468D	1350F	1195F	950F
740 (68000)	8	1300F	1162F	1025F	809F	1508D	1325D	1201F	950F
	14	1610F	1444F	1274F	1008F	1748D	1565D	1385D	1129F

Rating are based on, Inlet water Temperature 80 °C , Outlet Water Temperature 70 °C and Coil face velocity 2.54(m/sec) .
For other conditions , rating should be corrected by table 12 , 15 .

F:Full Circuit
H:Half Circuit
D:Double Circuit

Table 6: Steam Heating Coils Rating (1000Kcal/hr)

Model Air Delivery (m^3/hr)	Steam press. (bar)	Entering Air Dry Bulb Temp (°C)							
		-20		-10		0		16	
		1Row	2 Row	1Row	2 Row	1Row	2 Row	1Row	2 Row
35 (3200)	0.35	35	60	33	55	30	51	25	43
	1	39	66	36	61	33	57	29	49
	2	42	72	39	67	37	63	33	55
	4	47	81	45	76	42	72	38	64
50 (4900)	0.35	54	91	49	84	45	77	39	66
	1	59	100	55	93	50	86	44	75
	2	64	109	60	102	56	95	49	84
	4	72	123	68	116	64	108	57	98
70 (6800)	0.35	74	126	68	117	63	107	53	91
	1	82	139	76	129	70	120	61	104
	2	89	152	83	142	77	132	68	116
	4	100	170	94	161	89	151	79	135
85 (8100)	0.35	88	151	82	139	75	127	64	108
	1	97	166	90	154	83	142	72	123
	2	106	181	99	169	92	157	81	138
	4	120	204	112	210	106	179	95	161
100 (9700)	0.35	106	181	98	167	90	153	76	130
	1	116	199	108	185	100	170	87	148
	2	127	217	119	203	111	189	98	166
	4	143	244	135	230	127	216	114	194
120 (11400)	0.35	124	212	115	196	105	179	89	153
	1	137	233	127	217	117	200	102	174
	2	149	254	140	238	126	221	114	195
	4	167	281	158	270	148	253	133	227
160 (14500)	0.35	159	270	146	250	134	228	114	195
	1	174	297	162	276	150	255	130	221
	2	190	324	178	304	166	282	146	249
	4	214	365	202	344	190	323	170	290

Model Air Delivery (m^3/hr)	Steam press. (bar)	Entering Air Dry Bulb Temp (°C)							
		-20		-10		0		16	
		1Row	2 Row	1Row	2 Row	1Row	2 Row	1Row	2 Row
210 (19400)	0.35	212	361	198	333	179	305	153	260
	1	236	397	217	369	200	340	174	296
	2	254	434	238	405	221	377	195	332
	4	286	488	270	460	253	432	227	387
280 (25800)	0.35	282	481	260	443	238	406	203	346
	1	310	528	288	491	266	499	231	393
	2	338	577	316	539	294	502	259	442
	4	381	649	359	612	337	574	302	515
350 (32300)	0.35	352	602	325	555	300	507	253	433
	1	388	661	360	614	333	567	289	492
	2	423	722	396	675	368	628	324	553
	4	472	813	449	766	421	719	378	644
440 (40300)	0.35	440	750	405	692	371	633	316	540
	1	483	825	449	765	415	707	360	614
	2	527	900	494	841	459	783	404	890
	4	594	1013	560	954	525	897	471	803
530 (48500)	0.35	530	903	488	833	447	673	381	650
	1	582	992	541	922	450	851	433	739
	2	685	1084	594	1013	553	943	487	830
	4	716	1220	674	1150	633	1080	567	967
630 (58000)	0.35	634	1082	585	997	535	912	457	778
	1	697	1188	648	1104	598	1019	520	885
	2	761	1297	711	1212	662	1129	583	994
	4	857	1461	807	1376	758	1292	679	1157
740 (68000)	0.35	743	1268	685	1169	627	1070	534	912
	1	816	1392	759	1294	701	1195	608	1036
	2	892	1520	833	1421	776	1323	683	1165
	4	1004	1712	947	1613	888	1514	795	1357

Rating are based on 2.5 m/sec coil face velocity and full circuiting (except one row deep steam coils inAHU- 630 to up which are half circuiting) .
For other conditions , rating should be corrected by table 13 and 15.

Table 7: Supply Air condition in cooling process.

Q	Entering Air Wet Bulb temp. (°c)																	
Kcal/m³	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
0.5	13.2	14.5	15.6	16.2	17.5	18.5	19.5	20.5	21.3	22.5	23.6	26.4	25.6	26.7	27.5	28.7	29.7	30.5
1	12.7	14.8	15	15.7	16.9	18	19	20	21	22.2	23.2	24.2	25.3	26.3	27.4	28.3	29.5	30.2
2	11.2	12.2	13.8	14.6	15.5	16.8	17.8	18.9	20	21	22.2	23.3	24.5	25.5	26.4	27.6	28.6	29.9
3	9.8	11	12.4	13.3	14.6	15.5	16.8	17.9	19	20	21.2	22.3	23.5	24.6	25.5	26.7	28	29.6
4	8.5	9.6	11	11.9	13.2	14.5	15.4	16.8	17.7	19	20.3	21.3	22.6	23.7	24.8	26	27.2	28.3
5		8.9	9.3	10.4	11.9	13.2	14.3	15.5	16.7	17.9	19.2	20.5	21.6	22.9	23.8	25.3	26.5	27.6
6			8	9	10.2	11.6	13.2	14.3	15.5	17	18	19.4	20.6	22	23	24.4	25.6	26.7
7				7.2	9	10.2	11.6	13.1	14.2	15.6	17	18.2	19.7	21	22.1	23.5	24.7	25.9
8					7	8.8	10.2	11.7	13	14.5	15.8	17.2	18.6	20	21.2	22.5	23.9	25.3
9						6.9	8.8	10.2	11.5	13.2	14.6	15.9	17.5	19	20.2	21.6	23	24.4
10							6.9	8.8	10	11.7	13.3	14.8	16.3	17.8	19	20.5	22.1	23.3
11								6.8	8.5	10.2	11.8	13.5	15	16.7	17.9	19.7	21	22.5
12									6.9	8.6	10.4	12	13.8	15.5	16.9	18.5	20	21.5
13										7	8.8	10.6	12.5	14.2	15.7	17.5	19	20.5
14											7.2	9.1	11.2	13	14.5	16.2	17.8	19.5
15												7.5	9.6	11.5	13.2	15	16.9	18.6
16													7.9	10	11.7	14.8	15.5	17.4

Table 8: Leaving WB Temp. of supply air .

Leaving Air Wet bulb Temp.(°C)	Entering Air Dew Point temp. (°c)							
	10	12	14	16	18	20	22	24
	Leaving Air Dry Bulb temp. (°C)							
4	5	5	5	5	5	5	5	5
6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
8	8.6	8.4	8.2	8.2	8.2	8.2	8.2	8.2
10	11.4	10.8	10.6	10.4	10.2	10.2	10.2	10.2
12	14.6	13.6	12.8	12.4	12.2	12.2	12.2	12.2
14	19.7	16.9	15.6	14.7	14.5	14.3	14.2	14.2
16	25.4	22.2	19	17.5	16.6	16.4	16.2	16.2
18			24	21.9	19.7	19.2	18.6	18.4
20					23.6	22	21.4	20.4
22						26	24.2	23
24								26

Table 9: Total static pressure drop correction factor

AIR TEMP. (°C)	ELEVATION ABOVE SEA LEVEL.(M)						
	0	300	600	1000	1300	1600	2000
10	1.039	1.015	0.985	0.951	0.915	0.885	0.843
21	1	0.967	0.937	0.896	0.868	0.838	0.801
38	0.946	0.918	0.889	0.848	0.823	0.794	0.758
66	0.869	0.839	0.813	0.77	0.753	0.727	0.696
93	0.803	0.777	0.753	0.72	687	0.673	0.643
121	0.747	0.722	0.7	0.669	0.648	0.626	0.598
148	0.697	0.674	0.654	0.624	0.605	0.584	0.558
177	0.654	0.634	0.615	0.586	0.57	0.551	0.524
204	0.616	0.596	0.577	0.552	0.534	0.516	0.493
232	0.582	0.567	0.55	0.552	0.509	0.492	0.466

Notice : The meaning of air-temp. is mixed air temp.

Table 10:Air density (kg^3/m) in various temp. and elevation

ELEVATION(M)	AIR TEMP.(°C)							
	-20	-10	0	10	20	30	40	50
0	1.39	1.34	1.29	1.24	1.2	1.16	1.12	1.09
300	1.35	1.3	1.25	1.21	1.17	1.13	1.09	1.06
600	1.31	1.26	1.21	1.17	1.13	1.09	1.06	1.03
1000	1.26	1.21	1.16	1.12	1.08	1.05	1.02	0.98
1300	1.22	1.17	1.13	1.09	1.05	1.01	0.98	0.95
1600	1.17	1.13	1.09	1.05	1.01	0.98	0.95	0.92
2000	1.12	1.08	1.04	1	0.97	0.94	0.91	0.88

Table 11: Cooling Coils Bypass Factor

Tube Rows	Fin/in	Air Velocity (m/sec)					
		2	2.3	2.5	2.8	3	3.3
2	8	0.3	0.32	0.35	0.38	0.41	0.45
	14	0.1	0.12	0.15	0.19	0.23	0.3
4	8	0.1	0.11	0.12	0.13	0.14	0.15
	14	0.02	0.025	0.03	0.035	0.04	0.04
6	8	0.03	0.04	0.04	0.05	0.05	0.06
	14	0.005	0.005	0.005	0.006	0.007	0.01
8	8	0.01	0.01	0.015	0.015	0.02	0.02
	14	-	-	-	-	.	0.002

Table 12: Heating Coils Correction Factor (CFT)

Entering Water temp (°C)	Entering Air Dry bulb temp. (°c)													
	- 4	0	2	4	6	8	10	12	14	16	18	20	22	24
80	1.3	1.25	1.22	1.17	1.13	1.1	1.08	1.04	1.02	1	0.95	0.92	0.89	0.87
75	1.23	1.17	1.13	1.11	1.07	1.02	1.01	0.97	0.95	0.92	0.88	0.85	0.83	0.8
70	1.15	1.09	1.05	1.03	0.98	0.95	0.94	0.89	0.87	0.84	0.82	0.78	0.75	0.73
65	1.07	1	0.98	0.95	0.92	0.87	0.85	0.82	0.78	0.75	0.73	0.7	0.67	0.64
60	0.98	0.93	0.88	0.86	0.83	0.78	0.76	0.73	0.7	0.67	0.64	0.61	0.58	0.56

Corrected capacity = Correction factor from this table x capacity from table 5.

Table 13 : Steam Heating Coil Correction Factor

Entering Air DB temp. (°C)	Steam Pressure (bar)									
	0.15	0.35	0.70	1.00	1.40	2.00	2.80	3.50	4.00	5.50
-23	1.22	1.26	1.32	1.38	1.43	1.5	1.58	1.64	1.66	1.77
-18	1.16	1.2	1.27	1.33	1.36	1.45	1.52	1.58	1.64	1.72
-12	1.1	1.15	1.22	1.27	1.32	1.4	1.47	1.52	1.58	1.67
-7	1.06	1.1	1.16	1.22	1.27	1.35	1.42	1.48	1.52	1.61
1	1	1.05	1.11	1.17	1.22	1.3	1.36	1.42	1.48	1.56
4	0.94	0.99	1.06	1.11	1.16	1.24	1.31	1.36	1.42	1.51
7	0.92	0.97	1.03	1.08	1.14	1.22	1.28	1.34	1.39	1.48
10	0.9	0.94	1	1.06	1.11	1.18	1.26	1.32	1.36	1.44
13	0.86	0.91	0.98	1.03	1.08	1.16	1.23	1.28	1.34	1.43
16	0.84	0.89	0.95	1	1.06	1.14	1.2	1.26	1.31	1.4
18	0.82	0.86	0.92	0.98	1.03	1.11	1.18	1.24	1.28	1.38
21	0.78	0.83	0.9	0.95	1	1.06	1.15	1.2	1.26	1.35
24	0.77	0.81	0.88	0.92	0.98	1.06	1.13	1.18	1.23	1.32
27	0.74	0.78	0.84	0.9	0.95	1.03	1.1	1.16	1.2	1.3
29	0.7	0.75	0.82	0.88	0.92	1	1.07	1.13	1.18	1.27
32	0.68	0.73	0.8	0.85	0.9	0.98	1.05	1.1	1.15	1.24
38	0.63	0.67	0.74	0.8	0.83	0.92	0.99	1.05	1.1	1.19

Table 14: Cooling sensible heat factor (SHF)

Entering Dry Bulb temp.(°C)	Entering air Wet Bulb Temp. (°C)				
	16	18	20	21	23
24	0.76	0.64	0.53	0.43	0.34
27	0.91	0.73	0.66	0.54	0.45
29	1.00	0.90	0.78	0.66	0.55
32	1.00	1.00	0.90	0.78	0.67

Table 15 : Air Velocity Correction Factor (C.F.V)

$U_{m/sec}$	CFV	$U_{m/sec}$	CFV	$U_{m/sec}$	CFV	$U_{m/sec}$	CFV
1.00	0.530	2.40	0.962	3.20	1.17	4.10	1.386
1.20	0.600	2.50	0.989	3.30	1.195	4.20	1.408
1.40	0.667	2.54	1.000	3.40	1.22	4.30	1.431
1.60	0.730	2.60	1.016	3.50	1.224	4.40	1.454
1.80	0.791	2.70	1.042	3.60	1.268	4.50	1.476
2.00	0.850	2.80	1.069	3.70	1.292	4.60	1.493
2.10	0.878	2.90	1.094	3.80	1.319	4.70	1.521
2.20	0.907	3.00	1.120	3.90	1.339	4.80	1.543
2.30	0.935	3.10	1.145	4.00	1.36	4.90	1.564

Table 16 : Chilled and Hot Water coils Connections (inch).

AAHU Model	CHILLED WATER						HOT WATER							
	8Fin/in			14Fin/in			8Fin/in				14Fin/in			
	Rows Deep													
	4	6	8	4	6	8	1	2	3	4	1	2	3	4
35	1-1/4	1-1/4	1-1/2	1-1/2	1-1/2	2	1	1	1-1/4	1-1/4	1	1-1/4	1-1/4	1-1/2
50	1-1/2	1-1/2	2	1-1/2	2	2	1	1-1/4	1-1/2	1-1/2	1	1-1/4	1-1/2	1-1/2
70	1-1/2	2	2	2	2	2	1	1-1/4	1-1/2	1-1/2	1-1/4	1-1/4	1-1/2	2
85	2	2	2	2	2-1/2	2-1/2	1-1/4	1-1/2	1-1/2	2	1-1/4	1-1/2	1-1/2	2
100	2	2	2-1/2	2-1/2	2-1/2	2-1/2	1-1/4	1-1/2	2	2	1-1/2	2	2	2-1/2
120	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	1-1/2	2	2	2-1/2	2-1/2	2	2	2-1/2
160	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	1-1/2	2	2-1/2	2-1/2	2	2	2	2-1/2
210	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2	2	2-1/2	2-1/2	2	2	2-1/2	2-1/2
280	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2
350	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 1-1/2	2 x 2	2 x 2-1/2	2 x 2-1/2	2 x 2	2 x 2	2 x 2	2 x 2-1/2
440	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 2	2 x 2	2 x 2-1/2	2 x 2-1/2	2 x 2	2 x 2	2 x 2-1/2	2 x 2-1/2
530	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 2-1/2	2 x 2	2 x 2	2 x 2-1/2	2 x 2-1/2	2 x 2	2 x 2	2 x 2-1/2	2 x 2-1/2
630	4 x 2-1/2	4 x 2-1/2	4 x 2-1/2	4 x 2-1/2	4 x 2-1/2	4 x 2-1/2	4 x 2	4 x 2	4 x 2-1/2	4 x 2-1/2	4 x 2	4 x 2	4 x 2	4 x 2-1/2
740	4 x 2-1/2	4 x 2-1/2	4 x 2-1/2	4 x 2-1/2	4 x 2-1/2	4 x 2-1/2	4 x 2	4 x 2	4 x 2-1/2	4 x 2-1/2	4 x 2	4 x 2	4 x 2	4 x 2-1/2

Table 17 : Steam Coil Connections(in)

AAHU	SUPPLY			CONDENSATE		
Model	1 Row	2Row	3Row	1 Row	2Row	3Row
35	1-1/4	2	2	1-1/4	1-1/4	1-1/2
50	1-1/2	2	2	1-1/4	1-1/4	1-1/2
70	1-1/2	2	2	1-1/2	1-1/2	1-1/2
85	2	2	2	1-1/2	1-1/2	1-1/2
100	2	2	2	1-1/2	1-1/2	1-1/2
120	2	2	2	1-1/2	1-1/2	1-1/2
160	2	2	2	1-1/2	1-1/2	1-1/2
210	2	2	2	2	2	2
280	2	2	2	2	2	2
350	2 x 2	2 x 2	2 x 2	2 x 1-1/2	2 x 1-1/2	2 x 1-1/2
440	2 x 2	2 x 2	2 x 2	2 x 1-1/2	2 x 1-1/2	2 x 1-1/2
530	2 x 2	2 x 2	2 x 2	2 x 1-1/2	2 x 1-1/2	2 x 1-1/2
630	4 x 2	4 x 2	4 x 2	4 x 1-1/4	4 x 1-1/4	4 x 1-1/4
740	4 x 2	4 x 2	4 x 2	4 x 1-1/4	4 x 1-1/4	4 x 1-1/4

Table 18: Dx Coil Connections(in)

AAHU	4ROW		6ROW	
Model	SUCTION	LIQUID	SUCTION	LIQUID
35	1-1/8	5/8	1-1/8	7/8
50	1-3/8	1-1/8	1-5/8	1-1/8
70	1-5/8	1-1/8	1-5/8	1-1/8
85	1-5/8	1-1/8	1-5/8	1-1/8
100	1-5/8	1-1/8	1-5/8	1-1/8
120	1-5/8	1-1/8	1-5/8	1-3/8
160	1-5/8	1-3/8	2-1/8	1-5/8
210	2-1/8	1-5/8	2-1/8	1-5/8
280	2-5/8	1-5/8	2-5/8	1-5/8
350	2 x 1-5/8	2 x 1-3/8	2 x 2-1/8	2 x 1-5/8
440	2 x 2-1/8	2 x 1-3/8	2 x 2-1/8	2 x 1-5/8
530	2 x 2-1/8	2 x 1-5/8	2 x 2-5/8	2 x 1-5/8
630	4 x 1-5/8	4 x 1-3/8	4 x 2-1/8	4 x 1-3/8
740	4 x 1-5/8	4 x 1-3/8	4 x 2-1/8	4 x 1-5/8

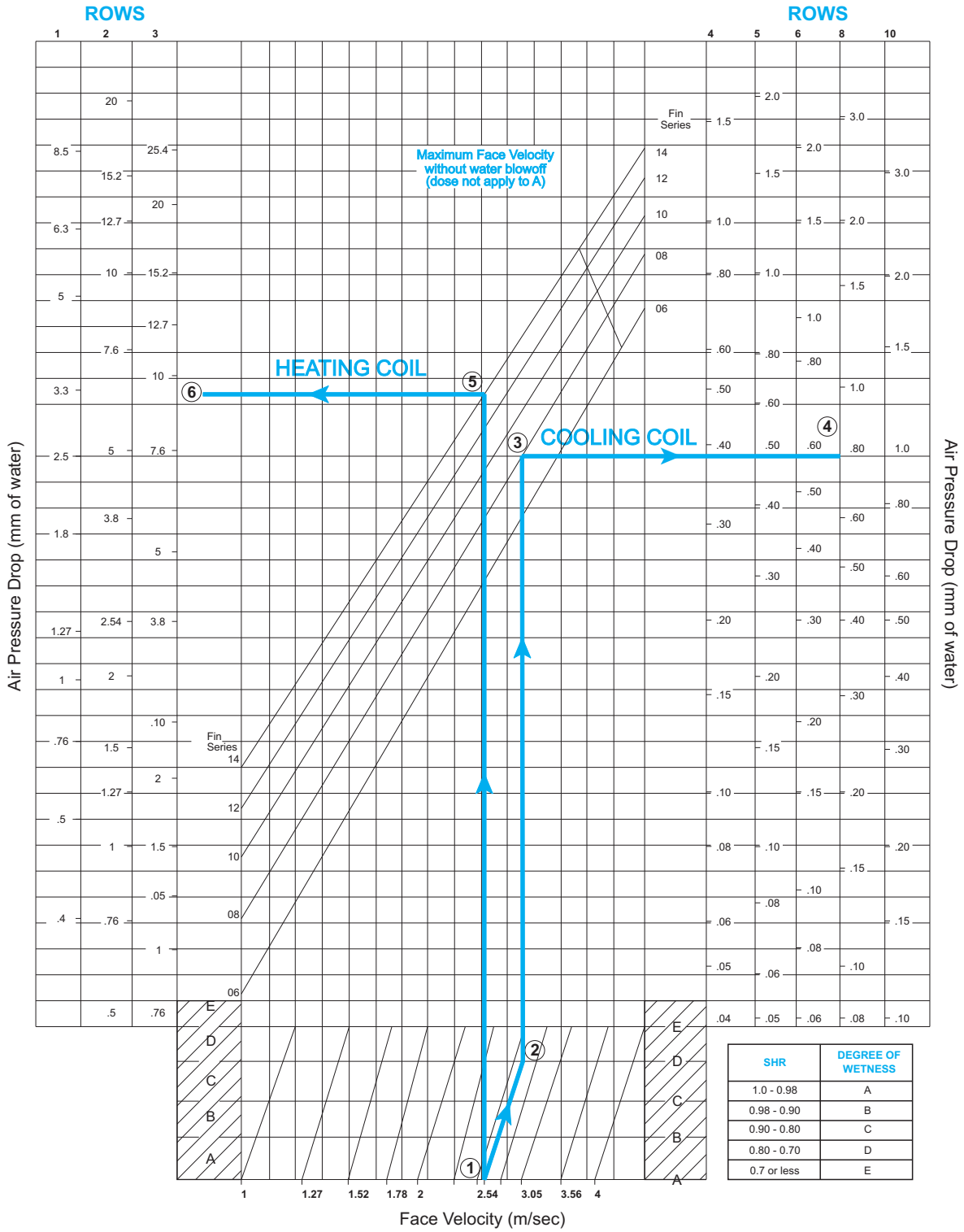
Table 19 : Accessories air side pressure drop ($\Delta P(mmH_2O)$)

Damper	Electrical Heater	Air Washer		Mixing Box
		C-6	C-8	
1	5	9	11	2

Table 20: Air Pressure Loss In Al.Washable Filters

Standard Panel Size(cm)	Dim : 50 x 50 x 5									
Air Velocity in Filter Face (m/sec)	1.50	1.80	2.00	2.30	2.50	2.80	3.00	3.30	3.6	4
$\Delta P(mmH_2O)$	0.85	1.2	1.5	1.9	2.3	2.7	3.7	4.3	5.5	7.6

Coils air side pressure drop (1 thru 10 rows)



SHR	DEGREE OF WETNESS
1.0 - 0.98	A
0.98 - 0.90	B
0.90 - 0.80	C
0.80 - 0.70	D
0.7 or less	E

Note : The letters A,B,C,D or E following the face velocity Indicate the degree of wetness at which the coil would be operating. Refer to the chart at the lower right-hand corner for the appropriate degree of wetness.

Table 21:Air Filters Technical Data

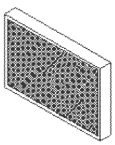
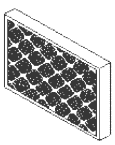
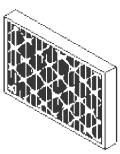
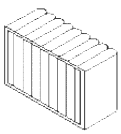
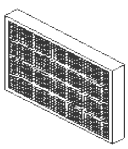
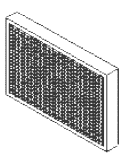
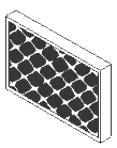
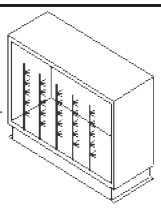
Filter Type	Media Type	Efficency (%)	Pressure Drop		Face velocity (m/s)	Eurovent (EU)	Standard sizes LxWxT(mm)	Description
			Initial	Final				
Metalic Pre- filter	Aluminium 	Arrest 65-70	10-20	124	1.52	3-4	500x500x50 625x400x20 625x400x50	Permanent washable panel type air filter,constructed with corrugated aluminium expanded sheet are being used at the first stage of filteration.with regards to the size of their mesh situated on the last cancellate plates.These pre-filters are able to filter suspended particles in the air with diameter of 1 to 2 mm and above.
Fiberglass Pre-filter	Amerglass or Amercool 	25-30	25-30	130	2	3	600x600x50 600x300x50 490x490x50 615x490x50	The media covering the surface of these pre-filter is either amerglass or amercool. The media is plassed inside a strong cardboard frame.
Synthetic (Non-woven) Pre-filter	Synthetic (Non-woven) Materials 	35	38	130	2	4	600x600x(50,100) 600x300x(50,100) 490x490x50 615x490x50	The media covering the surface of these types of pre-filters are produced from synthetic non-woven materials with an option to be fitted by a safety wire mesh in zig zag or acardeon shape pleated,placed inside of cardboard boxes.
Bagfilter	Polyester 	60-65 80-85 90-95	76 110 170	178 203 254	2.5	6-9	595x595x(300,600,900) 595x295x(300,600,900)	The media or filter cloth is usually made of polyester materials with difference thicknesses to suit various demands of customers.Bag filters are usually used in second stage of air handling unites and other clean places as pre-filter for HEPA filters.
Fine Filters	Glass Micro Fiber 	60-65 80-85 90-95	120 135 145	300 350 380	2.5	6-9	L=600,900,1220,1520,1830 W=300,600 T=150,300	The paper or media used in these filters are made from glass micro fiber.Media and corrugated aluminium foil separators packed in a clip board or galvanized steel frame.
Hepa Ulpa	Glass Micro Fiber 	99.997 99.99	200 240	380	1.25-2.5 1.5-4.5	10-13	L=610,910,1220,1520,1830 W=300,610 T=150,300	High efficiency particulate air filters(HEPA) are designed to arrest particles ranging from 0.3 micron and above.These filters which have large filtering surface,have made from glass micro fiber media that are seperated by currugated aluminium foils in order to facilitate air flow.HEPA filters are placed after pre-filters which are designed to prolong their usuefull life.They are used largly in clean rooms,microbiological hoods,hospitals,pharmaceutical plant,industrial units producing micro-chips and as a whole in places which the atmosphere air should be clean and without germs. Ultra low penetration air filters(ULPA) which micro fiber glass paperes have a more fine nature are able to arrest fine suspended particles.ULPA filters are used in very clean places and in the industries that certain number of particles of 0.12 micron allowed to suspend in their atmosphere with regard to the internationalstandards.
Carbon Activated Filters	Carbon Active 	———	450	———	———	———	600x600x(50,100) 600x300x(50,100) 620x490x50 490x490x50 600x600x(150,300)	Activated carbon is made by the pyrogenic decomposition of suitable coal and wood in specialsretorts. Active carbon is very effective in adsorbing non-polar organic molecules,particullary solvent.In addition ,it has a large capacity to catalytically destroy ozone a major component of smog.
Air Washer	——— 	50-80		———	2-3	———	———	These type of filter is used in a high concentration of airbone particles with size range of 10 to 100 micron.Class 6 type have one bank and class 8 type have two bank.

Table 22 : Steam Grid Humidifier specification

Steam press. (bar)	Air Handling Unit Model																			
	Model 035 Thru 120									Model 160 Thru 280							Model 350 Thru 740			
	Steam Grid Models and Capacity (Kg/hr)																			
	H-1	H-2	H-3	H-4	H-5	H-6	H-7	H-8	H-9	H-10	H-11	H-12	H-13	H-14	H-15	H-16	H-17	H-18	H-19	H-20
0.35	15	18	23	28	34	38	40	42	45	48	50	60	70	80	90	100	125	150	175	200
0.70	22	28	35	42	51	58	60	63	68	73	74	88	104	118	133	155	194	235	275	315
1.00	28	35	44	54	65	73	76	80	-	-	95	115	134	153	173	188	238	287	340	390

In Special case , use of smaller humidifier possible.

Table 23:Multizone Specification

Model	Nominal Air Delivery m^3/hr	Cooling coil Spec.				Heating coil Spec.				Standard Fan		Standard Motor	
		No	Tube High	Length (mm)	Face Area (m^2)	No	Tube High	Length (mm)	Face Area (m^2)	No	Size(Dia-Width) (inch)	No	Kw *
35	3200	1	16	544	0.35	1	10	544	0.23	1	10-8	1	1.5
50	4900	1	16	824	0.53	1	10	824	0.34	1	12-9	1	2.2
70	6800	1	16	1150	0.74	1	10	1150	0.48	1	12-12	1	3
85	8100	1	16	1368	0.88	1	10	1368	0.57	1	15-15	1	4
100	9700	1	18	1476	1.06	1	10	1476	0.62	2	18-13	1	4
120	11400	1	18	1727	1.24	1	10	1727	0.72	2	18-18	1	5.5
160	14500	1	24	1686	1.59	1	14	1686	0.96	2	20-20	1	7.5
210	19400	1	32	1705	2.12	1	18	1705	1.22	2	22-22	1	11
280	25800	1	32	2268	2.82	1	18	2268	1.63	2	25-20	1	11
350	32300	2	20	2225	3.53	2	12	2225	2.19	2	20-20	2	7.5
440	40300	2	20	2774	4.4	2	12	2774	2.73	2	22-22	2	11
530	48500	2	24	2810	5.3	2	14	2810	3.19	2	25-20	2	11
630	58000	4	24	1685	6.35	4	14	1685	3.82	2	25-25	2	15
740	68000	4	24	1974	7.44	4	14	1974	4.48	2	28-28	2	15

* standard motor powers based on nominal Air delivery in 75 mm H_2O total static pressure.
For other condition refer to table 2 for Motor sizes and RPM.

Table 24 : Hot Water Heating Coils Rating In Multizone (1000 Kcal/hr)

Model Air Delivery (m^3/hr)	Fin Series	1ROW				2ROW			
		Entering Air Dry Bulb Temp(°C)							
		-20	-10	0	16	-20	-10	0	16
35	8	20H	17H	15H	11H	38H	33H	29H	22H
(3200)	14	28H	25H	21H	16H	51H	45H	40H	30H
50	8	31H	27H	24H	18H	58H	52H	45.6H	35.5H
(4900)	14	45H	40H	35H	26H	75F	67F	57F	44F
70	8	45H	40H	35H	27H	79F	71F	62F	48F
(6800)	14	65H	58H	51H	39H	108F	96F	84F	65F
85	8	54H	48H	42H	33H	96F	85F	75F	58F
(8100)	14	79H	71H	62H	47H	130F	116F	102F	79F
100	8	63H	55H	49H	38H	110F	99F	86F	67F
(9700)	14	85F	75F	71H	55H	151F	135F	119F	92F
120	8	74H	66H	57H	45H	131F	116F	102F	79F
(11400)	14	101F	90F	84H	65H	169D	99F	86F	109F
160	8	96H	85H	75H	58H	169F	159F	140F	103F
(14500)	14	130F	115F	109H	84H	217D	150F	132F	140F
210	8	124H	111H	97H	75H	220F	196F	173F	134F
(19400)	14	171F	162H	142H	109H	303F	269F	237F	184F
280	8	160F	143F	125F	96F	285D	266F	227F	183F
(25800)	14	234F	208F	182F	139F	391D	347D	304D	252F
350	8	220H	220H	196H	172H	134H	386F	345F	237F
(32300)	14	303F	303F	269F	234F	180F	386F	345F	237F
440	8	266F	236F	236F	207F	169H	470D	416D	300D
(40300)	14	387F	342F	342F	300F	230F	640D	798D	386D
530	8	315F	279F	279F	245F	189F	560D	454D	356F
(48500)	14	459F	407F	407F	356F	274F	763D	595D	460D
630	8	382H	339F	339F	298H	230H	674F	526F	409F
(58000)	14	521F	494F	494F	432H	334H	922F	722F	560F
740	8	451H	402H	402H	353H	274H	797F	624F	486F
(68000)	14	551F	551F	551F	479F	398H	1039D	857F	666F

Rating are based on, 80°C inlet water Temperature and 70 ℃ Outlet Water Temperature.
Consult Yekta Tahvieh Arvand Technical office for other conditions.
For other condition use table 12 and 15 for correcting capacity.

F:Full Circuit
H:Half Circuit
D:Double Circuit

Table 25: Multizone Steam Heating Coils Rating (1000Kcal/hr)

Model Air Delivery (m^3/hr)	Steam press. (bar)	Entering Air Dry Bulb Temp.(°C)							
		-20		-10		0		16	
		1Row	2 Row	1Row	2 Row	1Row	2 Row	1Row	2 Row
35 (3200)	0.4	28	50	26	46	24	42	20	36
	1	31	54	28	50	26	46	23	40
	2	33	59	31	55	29	51	25	45
	4	37	66	35	62	33	59	30	52
50 (4900)	0.4	42	39	69	36	36	63	30	54
	1	46	43	75	39	39	70	34	60
	2	50	47	83	44	44	77	38	88
	4	56	53	94	50	50	88	44	79
70 (6800)	0.4	59	55	97	50	50	89	43	76
	1	64	60	106	55	55	98	48	85
	2	70	66	116	61	61	108	54	95
	4	79	74	131	70	70	123	63	110
85 (8100)	0.4	71	65	115	60	60	106	51	90
	1	77	71	126	66	66	116	57	101
	2	84	78	138	73	73	128	64	113
	4	94	88	156	83	83	147	74	131
100 (9700)	0.4	80	74	132	68	68	121	58	103
	1	87	81	144	75	75	133	65	115
	2	93	88	158	82	82	147	73	129
	4	107	101	179	94	94	167	84	150
120 (11400)	0.4	97	86	154	79	79	141	68	120
	1	102	94	168	87	87	155	75	134
	2	96	103	184	96	96	171	85	151
	4	124	117	208	110	110	196	98	175
160 (14500)	0.4	122	113	200	103	103	183	88	157
	1	133	123	219	114	114	202	99	175
	2	144	135	240	126	126	223	110	200
	4	163	153	272	144	144	255	129	228

Model Air Delivery (m^3/hr)	Steam press. (bar)	Entering Air Dry Bulb Temp (°C)							
		-20		-10		0		16	
		1Row	2 Row	1Row	2 Row	1Row	2 Row	1Row	2 Row
210 (19400)	0.4	159	283	147	261	134	239	115	204
	1	172	307	160	285	148	263	128	228
	2	188	334	176	312	163	291	143	256
	4	211	376	199	354	186	332	167	297
280 (25800)	0.4	212	377	195	347	179	318	153	272
	1	230	409	213	379	197	350	170	304
	2	281	446	234	417	218	387	191	341
	4	368	501	265	472	249	443	222	396
350 (32300)	0.4	274	486	253	449	232	411	198	351
	1	279	527	276	490	255	452	221	392
	2	324	575	303	538	282	500	248	440
	4	365	646	343	610	322	572	288	512
440 (40300)	0.4	344	609	317	562	291	515	248	440
	1	373	661	346	614	320	567	277	491
	2	405	721	380	674	404	626	311	551
	4	454	810	431	763	535	716	362	641
530 (48500)	0.4	406	721	375	666	343	610	293	521
	1	440	782	409	726	378	671	327	582
	2	480	853	449	797	418	741	367	652
	4	540	959	508	903	477	847	427	758
630 (58000)	0.4	486	863	445	796	411	729	350	623
	1	527	936	490	870	451	803	392	696
	2	575	1020	537	954	500	888	439	781
	4	646	1147	609	1081	571	1014	511	907
740 (68000)	0.4	570	1012	525	934	482	855	411	730
	1	618	1098	574	1019	529	941	460	816
	2	674	1197	630	1119	586	1040	515	915
	4	757	1345	714	1268	670	1189	599	1065

Rating are based on 2.54 m/sec coil face velocity and full circuiting (except one row coil in AHU-630 and AHU-740)
For other condition use table 13 and 14 for corrrecting capacities

Coils water side pressure drop

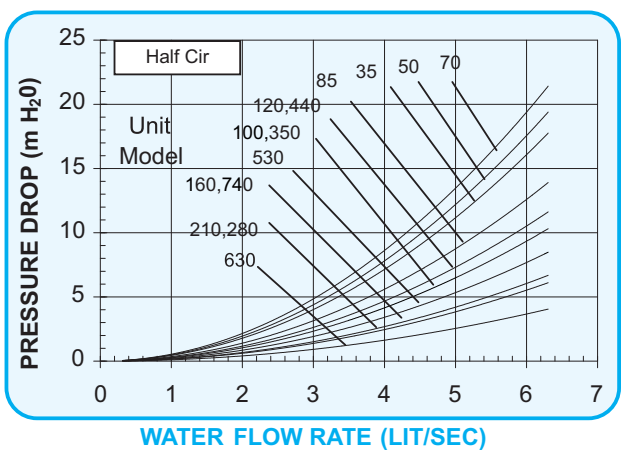
By considering total cooling (or heating) load of coils,the quantity of water flow should be determine by these formula:
Water Flow (lit/sec) = Heating or Coiling load / (3592 *ΔT_w).
And then by considering the coil circuiting of selected coils(Full,Half or Double) that designated in cooling and heating coils capacity rating tables 3,5 by F,H &D ,and by these charts,you can determine waterside flow pressure drops.

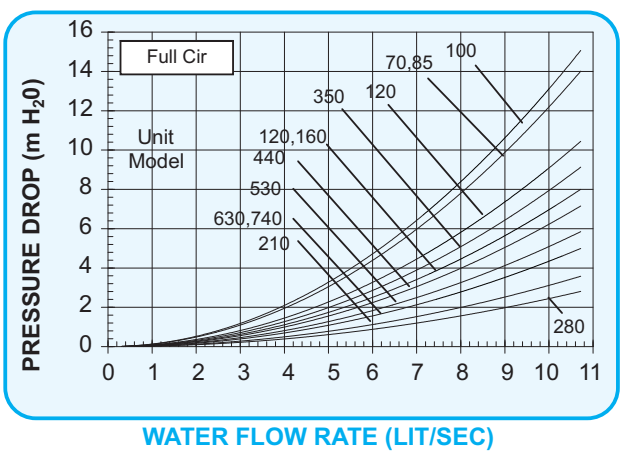
Example:

For example 1 determine the water side pressure drop.
By considering the cooling load of 93780.7 (kcal/hr) and above formula:
Cooling water flow rate(lit/sec)=93780/3592*5 °C = 5.2 lit/sec
By considering AAHU-160 with 6 rowsfull circuiting, water pressure drop obtained:
Water pressure drop = 3.0 (m H_2O)
By considering the heating load of 215431 (kcal/hr) and above formula:
Heating water flow rate(lit/sec)=215431/3592*10 °C = 6 lit/sec
By considering AAHU-160 with 3 rows full circuiting, water pressure drop obtained:
Water pressure drop = 3.5 (m H_2O)

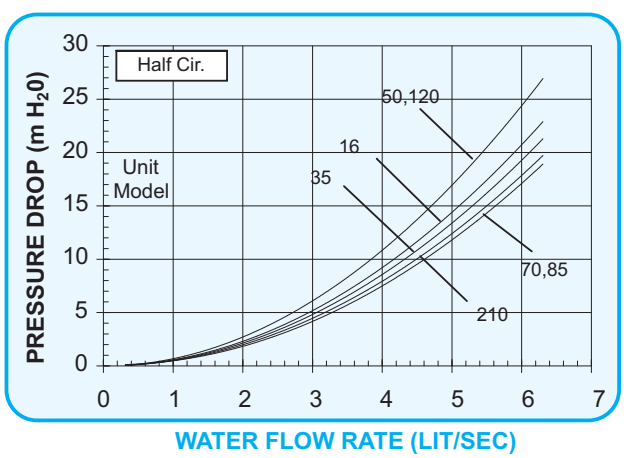
Coils water side pressure drop charts

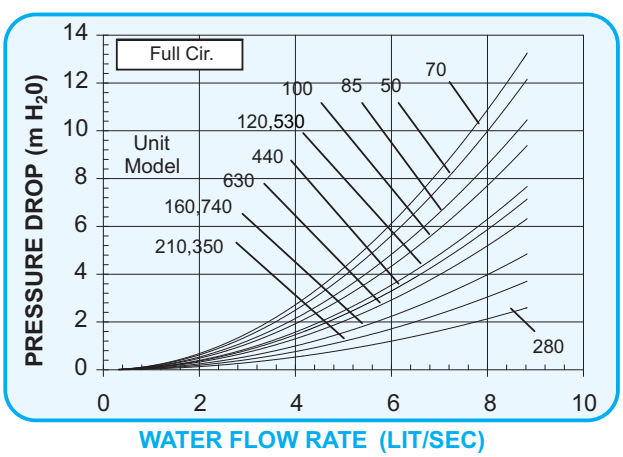
1 Row Coil



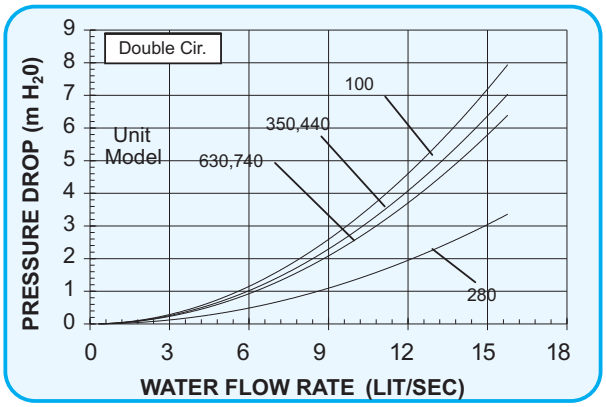


2 Row Coil

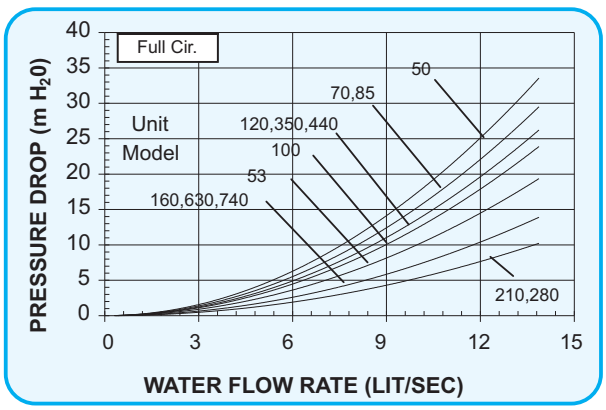


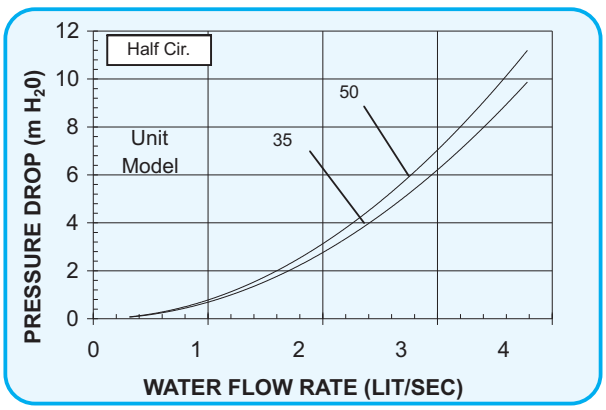


2 Row Coils (Continue)

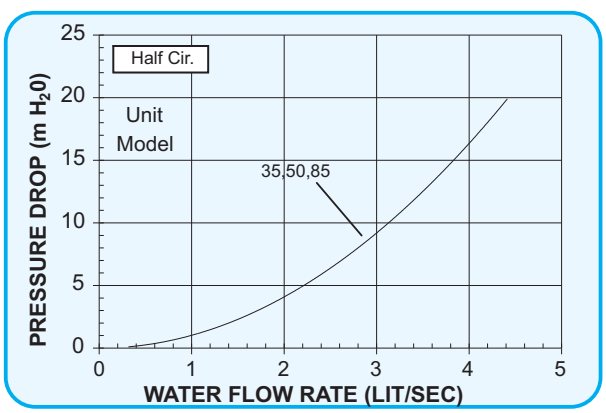


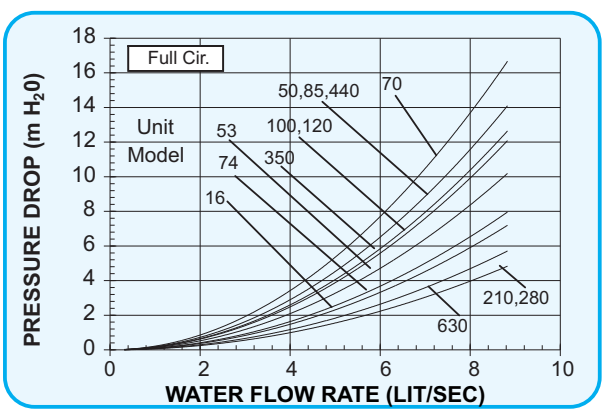
3 Row Coil

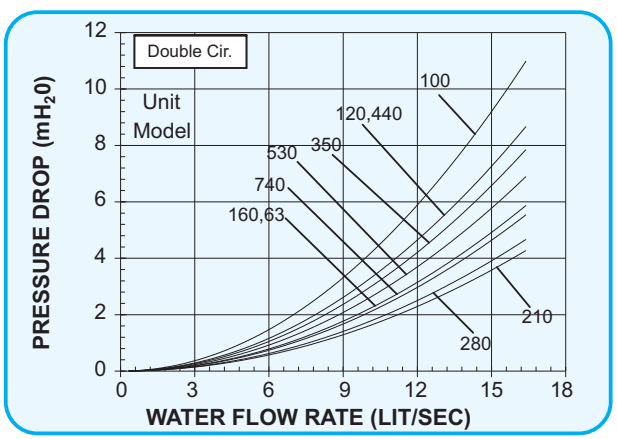




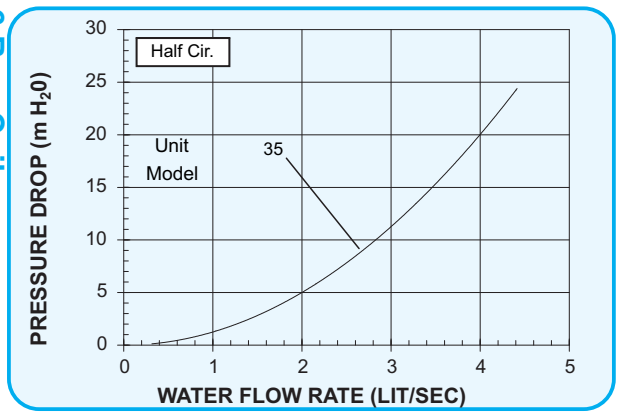
4 Row Coil

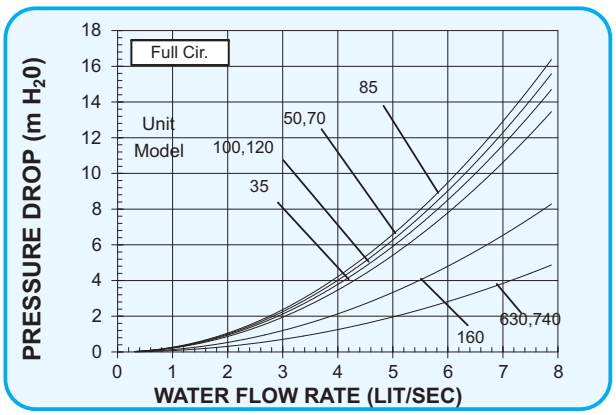


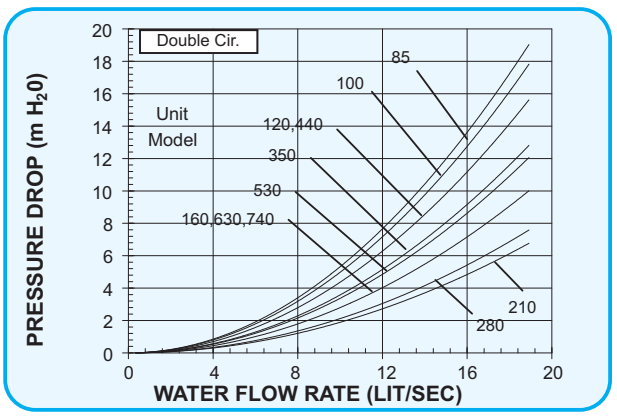




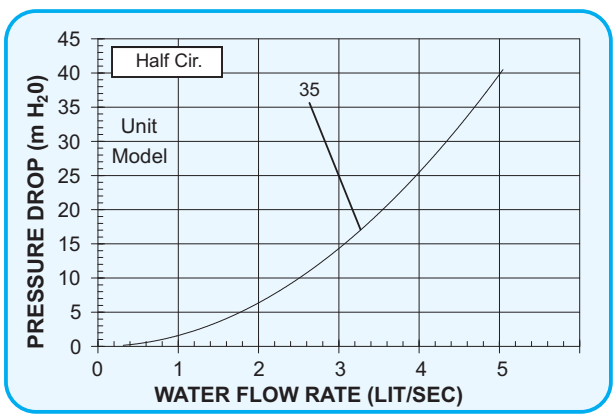
6 Row Coil

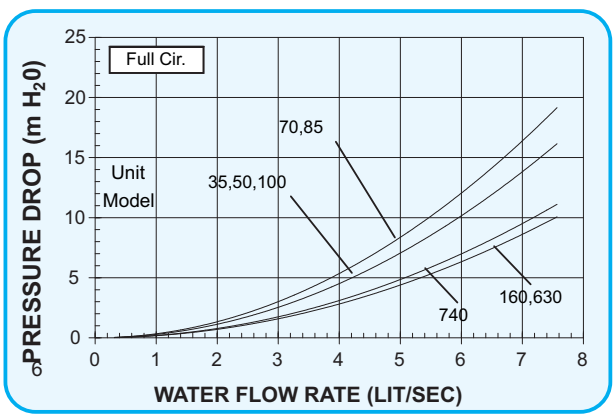






8 Row Coil





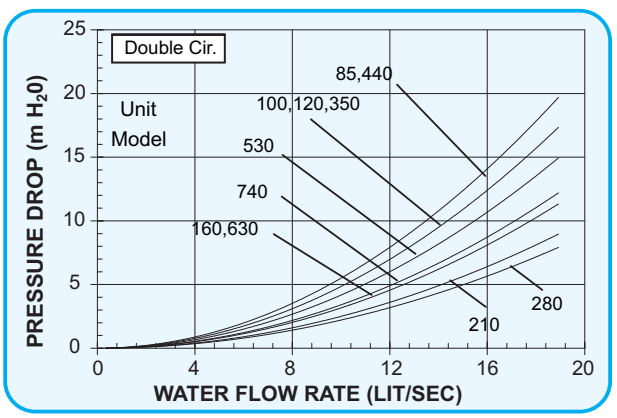


TABLE 26 : CLASS 6 AIR WASHER SPECIFICATION

MODEL	AIR DELIVERY (M^3/HR)	FACE AREA (M^2)	WATER FLOW		NO.OF NOZZLE	A	B	F	K	DISCHARGE	SUCTION	DRAIN	QUICK FILL	MAKEUP	OVER FLOW	HEAD	PUMP SPECIFICATION	
			GPM	M^3/HR		(MM)	(MM)	(MM)	(MM)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(M H2O)	KW	RPM
35	3200	0.35	8	1.8	6	850	850	300	80	1-1/4	1-1/2	3/4	1/2	1/2	1-1/2	30	1.1	1450
50	4900	0.53	19	4.3	6	850	1100	300	80	1-1/4	1-1/2	3/4	1/2	1/2	1-1/2	30	3	2900
70	6800	0.74	19	4.3	6	850	1400	300	80	2	2-1/2	3/4	1/2	1/2	1-1/2	30	3	2900
85	8100	0.88	30	6.8	12	900	1700	300	80	2	2-1/2	1	3/4	3/4	1-1/2	30	3	2900
100	9700	1.06	30	6.8	12	950	1900	300	80	2	2-1/2	1	3/4	3/4	1-1/2	30	3	2900
120	11400	1.24	35	7.9	15	950	2200	300	100	2	2-1/2	1	3/4	3/4	1-1/2	30	3	2900
160	14500	1.59	42	9.5	18	1150	2000	350	100	2	2-1/2	1	3/4	3/4	2	30	3	2900
210	19400	2.12	70	15.9	24	1450	2000	350	120	2	2-1/2	1-1/2	3/4	3/4	2	30	4	2900
280	25800	2.82	84	19.1	28	1450	2580	350	120	2	2-1/2	1-1/2	3/4	3/4	2	30	4	2900
350	32300	3.53	96	21.8	30	1800	2580	350	120	2	2-1/2	1-1/2	3/4	3/4	2	30	5.5	2900
440	40300	4.4	120	27.2	40	1800	3150	400	140	3	4	2	3/4	3/4	2	30	7.5	2900
530	48500	5.3	150	34.0	48	2080	3150	400	140	3	4	2	3/4	3/4	2	30	11	2900
630	58000	6.35	185	42.0	60	2080	3900	400	140	3	4	2	3/4	1	2	30	11	2900
740	68000	7.44	200	45.4	66	2080	4500	400	160	3	4	2	3/4	1	2	30	11	2900

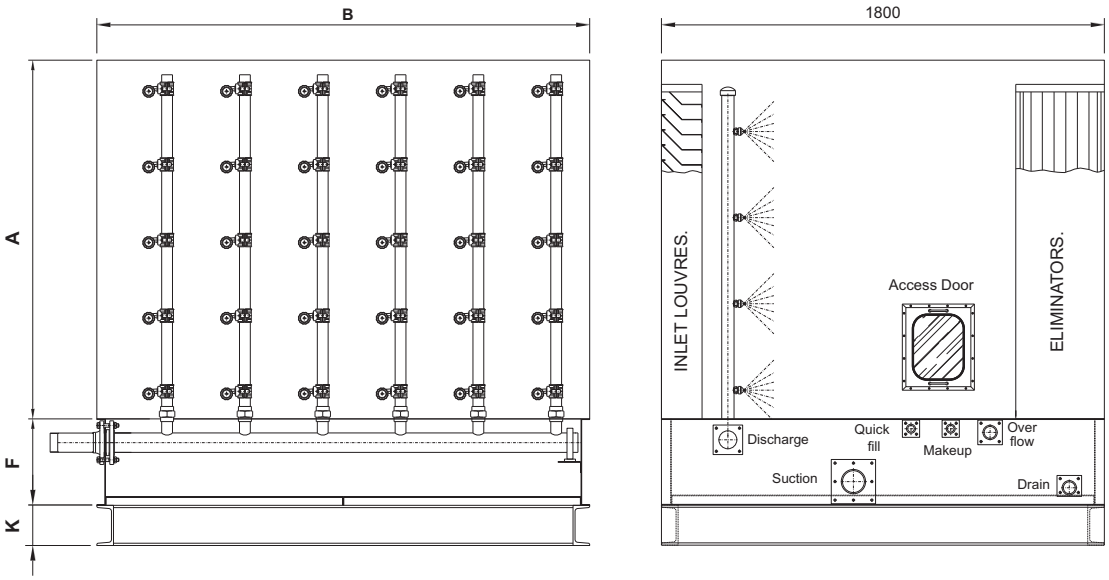
TABLE 27 :CLASS 8 AIR WASHER SPECIFICATION

MODEL	AIR DELIVERY (M^3/HR)	FACE AREA (M^2)	WATER FLOW		NO.OF NOZZLE	A	B	F	K	DISCHARGE	SUCTION	DRAIN	QUICK FILL	MAKEUP	OVER FLOW	HEAD	PUMP SPECIFICATION	
			GPM	M^3/HR		(MM)	(MM)	(MM)	(MM)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(M H2O)	KW	RPM
35	3200	0.35	28	6	12	850	850	300	80	2	2-1/2	3/4	1/2	1/2	1-1/2	30	3	2900
50	4900	0.53	28	6	12	850	1100	300	80	2	2-1/2	3/4	1/2	1/2	1-1/2	30	3	2900
70	6800	0.74	39	9	12	850	1400	300	80	2	2-1/2	3/4	1/2	1/2	1-1/2	30	3	2900
85	8100	0.88	65	15	24	900	1700	300	80	2	2-1/2	1	3/4	3/4	1-1/2	30	4	2900
100	9700	1.06	65	15	24	950	1900	300	80	2	2-1/2	1	3/4	3/4	1-1/2	30	4	2900
120	11400	1.24	80	18	30	950	2200	300	100	2	2-1/2	1	3/4	3/4	1-1/2	30	5.5	2900
160	14500	1.59	105	24	36	1150	2000	350	100	2	2-1/2	1	3/4	3/4	2	30	5.5	2900
210	19400	2.12	144	33	48	1450	2000	350	120	2	2-1/2	1-1/2	3/4	3/4	2	30	7.5	2900
280	25800	2.82	168	38	56	1450	2580	350	120	3	4	1-1/2	3/4	3/4	2	30	7.5	2900
350	32300	3.53	190	43	60	1800	2580	350	120	3	4	1-1/2	3/4	3/4	2	30	7.5	2900
440	40300	4.4	260	59	80	1800	3150	400	140	3	4	2	3/4	3/4	2	30	11	2900
530	48500	5.3	305	69	96	2080	3150	400	140	3	4	2	3/4	3/4	2	30	15	2900
630	58000	6.35	380	86	120	2080	3900	400	140	3	4	2	3/4	1	2	30	15	2900
740	68000	7.44	405	92	132	2080	4500	400	160	5	6	2	3/4	1	2	30	15	2900

Note: **1-The model of selected pumps are based on KSB centrifugal pump.**
2-In all cases,pump with 1450 RPM motors are available.

Air Washer Dimension

Class 6



Class 8

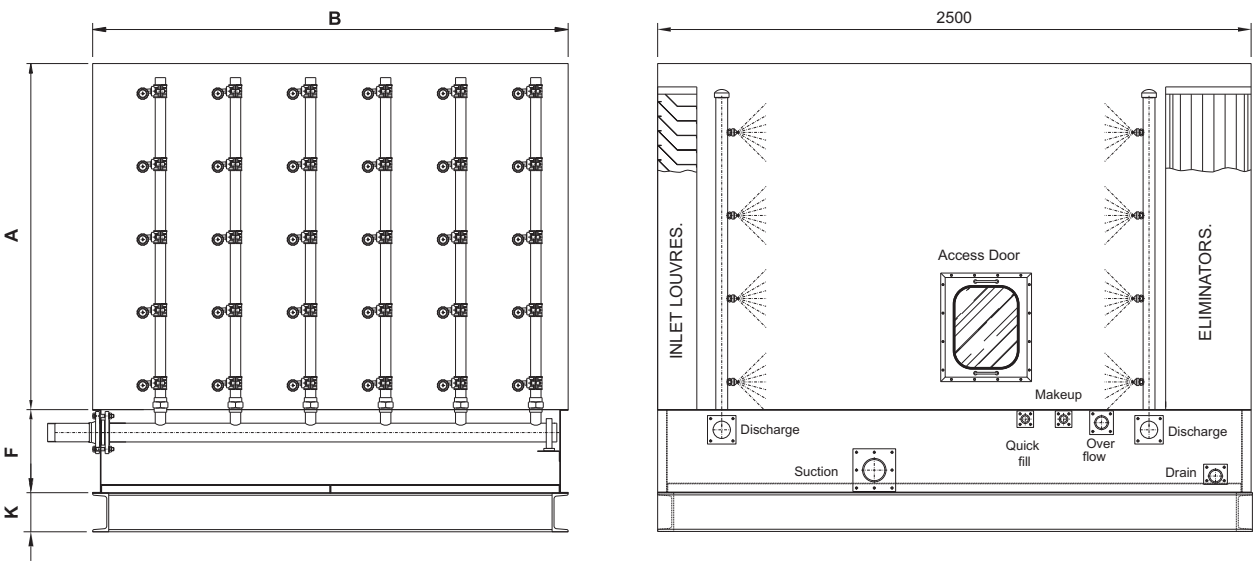


TABLE 28 :WATER FLOW ,EVAPORATION , BLEED OFF AND MAKE UP RATE OF AIR WASHER

MODEL	CLASS 8				CLASS 6			
	WATER FLOW M^3/HR	EVAPORATION RATE LIT/MIN	BLEED OF RATE LIT/MIN	MAKE UP RATE LIT/MIN	WATER FLOW M^3/HR	EVAPORATION RATE LIT/MIN	BLEED OF RATE LIT/MIN	MAKE UP RATE LIT/MIN
35	4.1	0.26	0.12	0.38	1.82	0.18	0.12	0.3
50	5.9	0.42	0.18	0.6	2.8	0.28	0.18	0.46
70	8.2	0.61	0.25	0.86	4.1	0.42	0.25	0.67
85	10	0.76	0.3	1.06	5	0.49	0.3	0.79
100	11.8	0.87	0.36	1.23	5.9	0.61	0.36	0.97
120	14	1.06	0.42	1.48	6.8	0.72	0.42	1.14
160	16.4	1.36	0.53	1.89	8.2	0.91	0.53	1.44
210	21.3	1.82	0.71	2.53	10.9	1.21	0.71	1.92
280	29.5	2.27	0.95	3.22	15	1.67	0.95	2.62
350	35.4	3.1	1.18	4.28	18.6	2.1	1.18	3.28
440	44.5	3.97	1.47	5.44	23.2	2.61	1.47	4.1
530	52.7	4.77	1.78	6.55	28.2	3.14	1.78	4.92
630	63.1	5.72	2.12	7.84	33.6	3.79	2.12	5.91
740	74.5	6.7	2.49	9.19	39	4.43	2.49	6.92

RATING ARE BASED ON DB=35^{o}C,WB=21^{o}C &AIR VELOCITY=2.5 (m/sec)

TABLE 29 : Air Washer Efficiency

Model	class 8				class 6			
	Air Velocity (m / Sec)							
	2.3	2.5	2.8	3	2.3	2.5	2.8	3
35,50	0.85	0.84	0.83	0.81	0.57	0.56	0.55	0.54
70,85	0.89	0.88	0.86	0.84	0.59	0.59	0.57	0.56
100,120,160,210	0.93	0.91	0.9	0.88	0.62	0.61	0.6	0.59
280,350	0.94	0.92	0.91	0.89	0.62	0.62	0.6	0.59
440,530	0.95	0.93	0.92	0.9	0.62	0.62	0.61	0.6
630,740	0.96	0.94	0.93	0.91	0.64	0.63	0.62	0.61

Water Treatment

Evaporation cooling is accomplished by the evaporation of a portion of the water being recirculated .As this water evaporates,the dissolved solids originally present in the water remainin the system.Thus,the concentration of dissolved solids in the circulating water increases rapidly and continues as long as the unit is in operation. If this buildup is not controled,concentrations can rapidly reach levels of 750 to 1000 times the concentration in the origional supply water. Additionally,the recirculating water is often further contaminated by airbone impurities that may be present in the vicinity of the unit such as chemical fumes in an industrial area or salt near the coastline.
If the concentration of these dissolved solids and impurities is not controled,scaleing , sludge , or corrosion can occur which will reduce the operating efficiency and shorten the life of the equipment.
To prevent an excessive buildup of impurities in the circulating water , it is recommended that a small amount of water be "bled " from the unit at a rate of 0.0022 (m^3/hr) water per 1000 (m^3/hr) air delivery, is satisfactory for the usual operating conditions in most location. In many localities, this constant bleed and replacement with fresh water will keep the concentration of impurities in the system at an acceptable level.
The evaporation rate can be determined by the following:
evaporation rate (m^3/hr) =air delivery (m^3 /hr)w_2-w_1(kg $_{moisture}$ / kg $_{dry\ air}$)/ air specific volume (m^3/kg) ρ_{water} (kg/m^3)

Example:

Given :
Air delivery ---------- 4000 (m^3/hr)
DB_{in}---------- 35°C
WB_{in} ---------- 21°C
Air velocity ---------- 2.5 (m/sec)
Air Washer---------- Class 8
Solution:
With reference to table 25 air washer efficiency=0.84 thus DB_{out}=23.22°C & WB_{out}=21°C.From psychrometric chart W_{in}=.0097 (kg $_{moisture}$/kg $_{dry\ air}$) , W_{out}= 0.01475 (kg $_{moisture}$/kg $_{dry\ air}$) & Air specific volume = 0.885(m^3/kg)
Evaporation rate(m^3/hr)=4000 x (0.01475-0.0097)/(0.885 x 1000)=0.022
Bleed off rate (m^3/hr)=(4000/1000) x 0.0022=0.009
Makeup rate(m^3/hr)=Evaporation rate+Bleed off rate=0.022+0.009=0.031

Table 28 showes the rate of Evaporation,Bleed off &Makeup water for all ARVAND AIR WASHERS.

CHEMICAL TREATMENT

If the condition of the water is such that constant bleed-of f will not control scale or corrosion ,chemical treatment may be necessary.If a water treatment program is used it must meet the following requierments:

1. The chemical must be compatible with galvanized (zinc coated) steel. Water treatment chemicals which are compatible with galvanized steel are also satisfactory for the Zinc ChromatizedAluminium finish.
2. The PH of the circulating water must be maintained between 6.5 and 8.5
3. Chemicals should be fed into the recirculated water, but not into the cold water sump,on a continious metered basis to avoid localized high concentrations which may cause corrosion.These chemicals are normally fed into the pump discharge line.
   Batch feeding of chemicals does not afford adequate control of water quality and is not recommended.
4. Acid water treatment is not recommended.

   For specific recommendations on water treatment, contact a competent water treatment supplier.

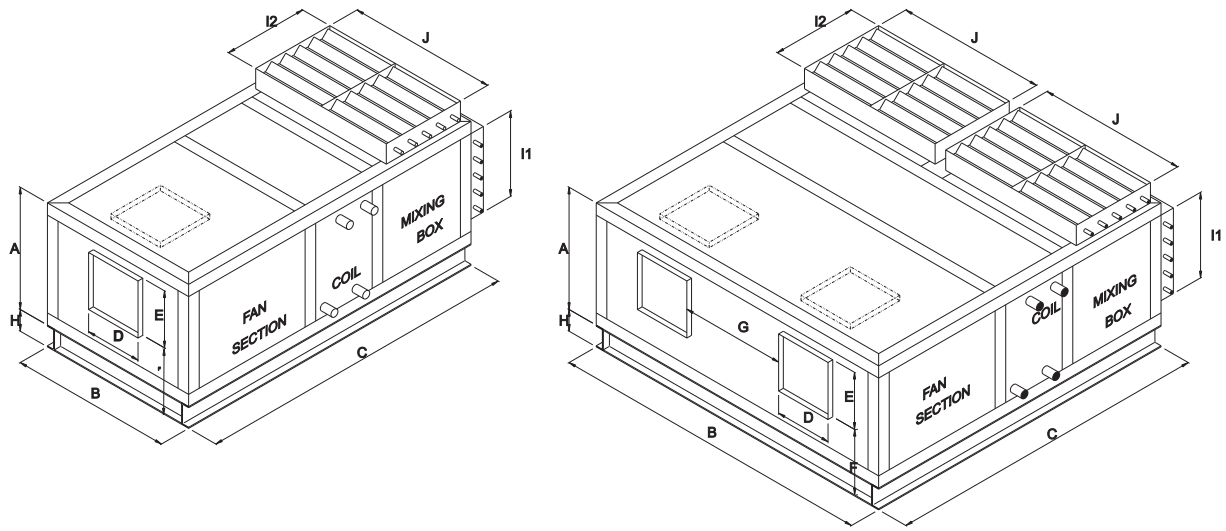
Table 30 : Horizontal Air Handling Unit Dimensions & Weights.

Model	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	F(mm)	G(mm)	H(mm)	I1(mm)	I2(mm)	J(mm)	Weight (Kg)
35	850	850	2250	275	289	395	-	80	347	231	550	380
50	850	1100	2290	395	341	443	-	80	347	231	800	470
70	850	1400	2380	395	341	393	-	80	347	231	1000	550
85	900	1700	2470	471	404	416	-	80	347	231	1300	650
100	950	1900	2520	430	478	492	-	80	347	231	1500	750
120	950	2200	2535	557	478	512	-	100	347	231	1800	815
160	1150	2000	2810	630	629	561	-	100	424	283	1600	950
210	1450	2000	2915	692	695	815	-	120	530	353	1600	1120
280	1450	2580	3255	794	797	713	-	120	530	353	2000	1480
350	1800	2580	2600	630	629	1001	600	120	662	441	2000	1800
440	1800	3150	2640	692	695	1000	820	140	662	441	2530	2150
530	2080	3150	2805	794	797	1163	720	140	739	493	2530	2550
630	2080	3900	2825	794	797	1163	1090	140	739	493	2 x 1640	3220
740	2080	4500	2910	870	870	1190	1320	140	739	493	2 x 1940	3570

Table 31 : Vertical Air Handling Unit Dimensions & Weights

Model	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	F(mm)	G(mm)	H(mm)	I(mm)	J(mm)	Weight(Kg)
35	1450	850	830	275	289	1192	-	80	578	550	370
50	1470	1100	850	395	341	1163	-	80	578	800	450
70	1520	1400	930	395	341	1313	-	80	578	1000	540
85	1650	1700	1100	471	404	1266	-	80	578	1300	630
100	1870	1900	1180	430	478	1412	-	80	578	1500	730
120	1850	2200	1000	557	478	1412	-	100	578	1800	800
160	2300	2000	1300	630	629	1711	-	100	707	1600	910
210	2680	2000	1380	692	695	2045	-	120	860	1600	1120
280	2800	2580	1600	794	797	2063	-	120	860	2180	1410
350	3000	2580	1300	630	629	2431	600	120	1012	2180	1680
440	3000	3150	1300	629	695	2385	820	140	1012	2650	2000
530	3410	3150	1500	794	797	2693	720	140	1191	2650	2400
630	3430	3900	1600	794	797	2763	1090	140	1191	3400	2850
740	3630	4500	1700	870	870	2840	1320	140	1191	4000	3100

Typical Horizontal Air Handling Unit



Typical Vertical Air Handling Unit

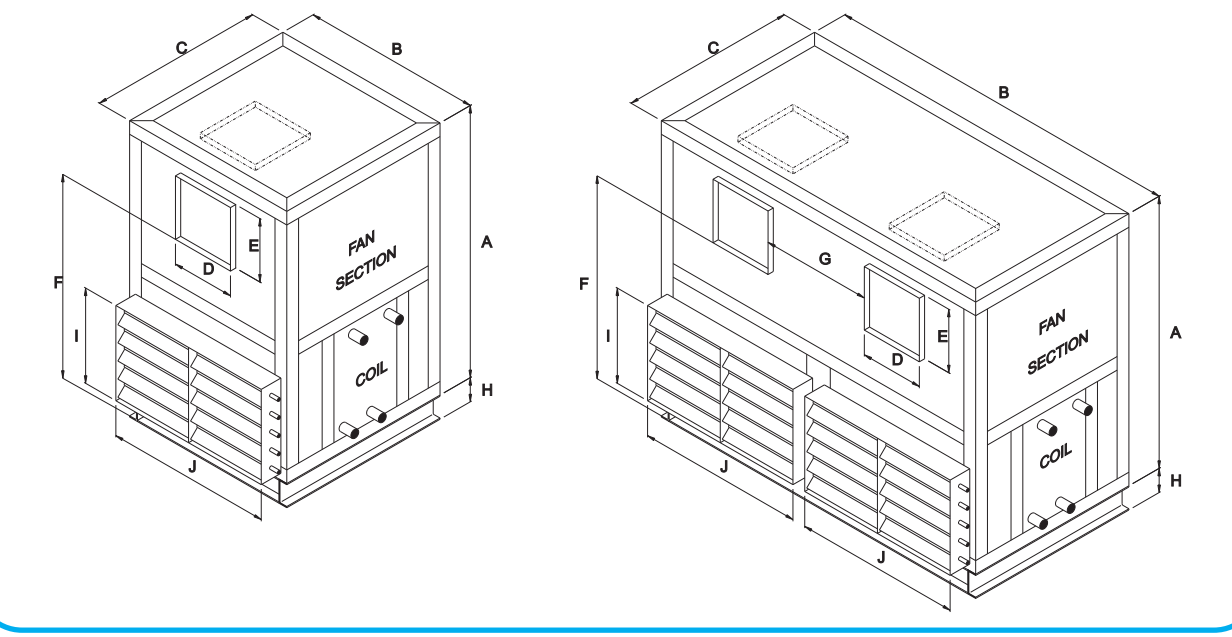


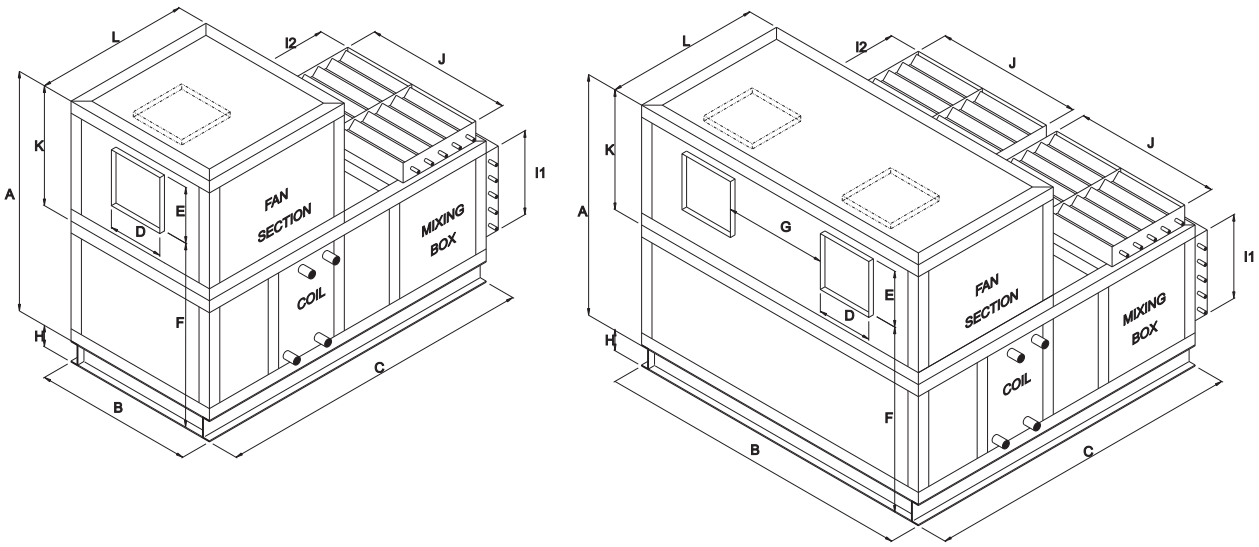
Table 32 : L-Type Air Handling Unit Dimensions and Weight

Model	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	F(mm)	G(mm)	H(mm)	I1(mm)	I2(mm)	J(mm)	K(mm)	L(mm)	Weight (Kg)
35	1450	850	1605	275	289	1195	-	80	347	231	550	600	854	440
50	1550	1100	1690	395	341	1243	-	80	347	231	800	700	930	520
70	1550	1400	1760	395	341	1243	-	80	347	231	1000	700	1000	590
85	1710	1700	1855	471	404	1326	-	80	347	231	1300	810	1100	740
100	1890	1900	1680	430	478	1432	-	80	347	231	1500	940	945	850
120	1900	2200	1735	557	478	1462	-	100	347	231	1800	950	1000	890
160	2300	2000	2210	630	629	1711	-	100	424	283	1600	1150	1380	1000
210	2680	2000	2315	692	695	2045	-	120	530	353	1600	1230	1430	1240
280	2800	2580	2485	794	797	2063	-	120	530	353	2000	1350	1600	1510
350	3000	2580	2260	630	629	2431	600	120	662	441	2000	1200	1330	1850
440	3000	3150	2380	692	695	2385	820	140	662	441	2530	1200	1450	2190
530	3410	3150	2635	794	797	2693	720	140	739	493	2530	1330	1640	2600
630	3430	3900	2595	794	797	2713	1090	140	739	493	2 x 1640	1350	1600	3120
740	3630	4500	2625	870	870	2840	1320	140	739	493	2 x 1940	1550	1630	3400

Table 33 : Multizone Air Handling Unit Dimensions and Weight

Model	A(mm)	B(mm)	C(mm)	H(mm)	I1(mm)	I2(mm)	J(mm)	K(mm)	L(mm)	M(mm)	Weight (Kg)
35	1200	850	2610	80	347	231	550	350	896	315	460
50	1200	1100	2630	80	347	231	800	350	896	315	550
70	1200	1400	2700	80	347	231	1000	350	896	315	640
85	1250	1700	2800	80	347	231	1300	350	900	308	750
100	1300	1900	2900	80	347	231	1500	350	900	308	850
120	1300	2200	2915	100	347	231	1800	350	915	308	940
160	1550	2000	3360	100	424	283	1600	400	1110	358	1095
210	1900	2000	3650	120	530	353	1600	450	1295	408	1350
280	1900	2580	3980	120	530	353	2000	450	1295	408	1650
350	2400	2580	3640	120	662	441	2000	600	1570	558	2050
440	2550	3150	3770	140	662	441	2530	750	1610	708	2470
530	2980	3150	3905	140	739	493	2530	850	1830	808	2900
630	2980	3900	3935	140	739	493	2 x 1640	900	1860	858	3430
740	3030	4500	4335	140	739	493	2 x 1940	950	1960	908	3710

Typical L-Type Unit



Typical Multi-Zone Unit

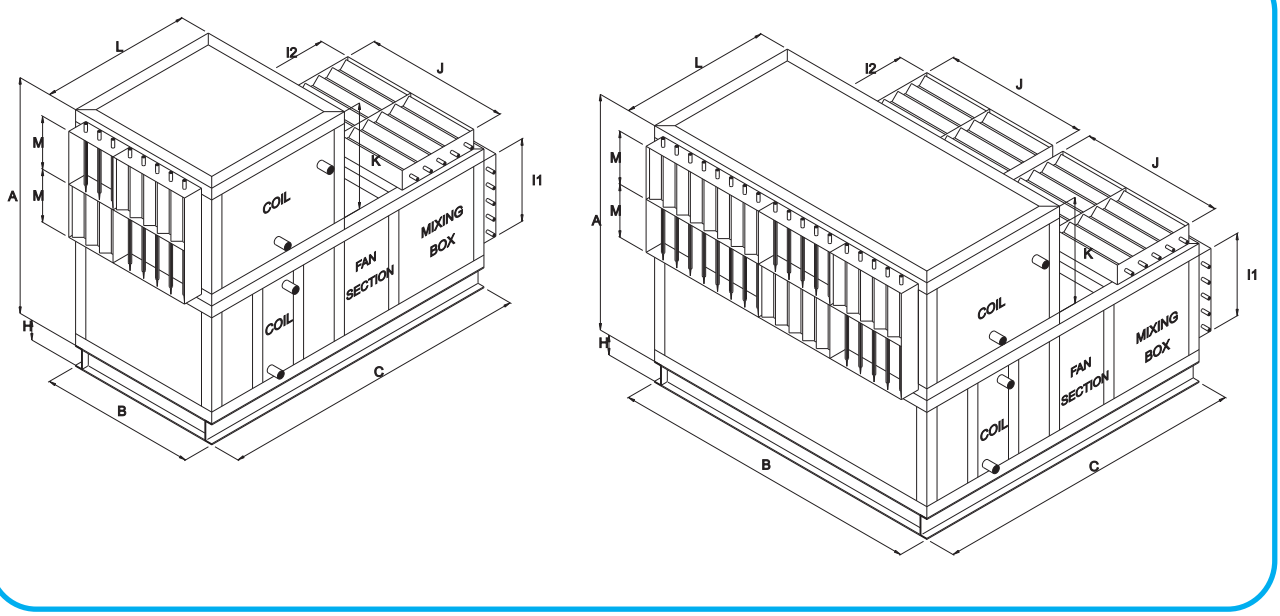
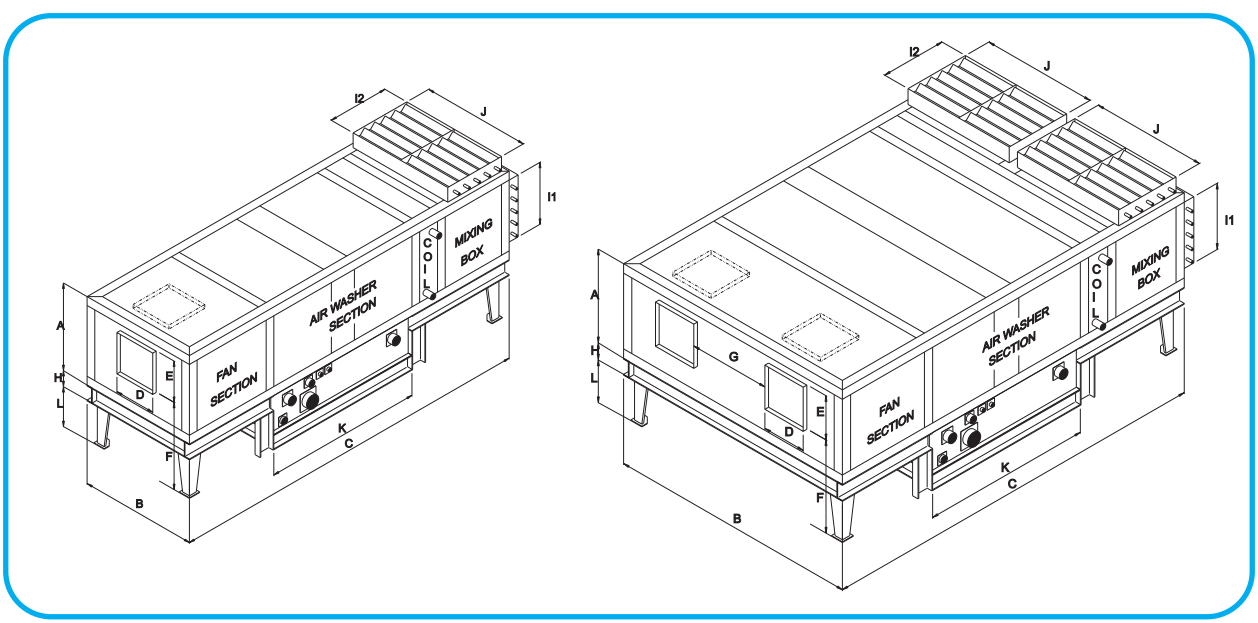


Table 34 :Class 6 Air Washer Dimensions & Weights

Model	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	F(mm)	G(mm)	H(mm)	I1(mm)	I2(mm)	J(mm)	K(mm)	L(mm)	Weight(kg)	
														Shipping	Operating
35	850	850	3830	275	289	881	-	80	347	231	550	1800	300	800	1250
50	850	1100	3880	395	341	829	-	80	347	231	800	1800	300	950	1530
70	850	1400	3950	395	341	829	-	80	347	231	1000	1800	300	1100	1850
85	900	1700	4040	471	404	816	-	80	347	231	1300	1800	300	1300	2170
100	950	1900	4150	430	478	792	-	80	347	231	1500	1800	300	1500	2500
120	950	2200	4150	557	478	792	-	100	347	231	1800	1800	300	1260	2430
160	1150	2000	4390	630	629	861	-	100	424	283	1600	1800	300	1620	2700
210	1450	2000	4450	692	695	1165	-	120	530	353	1600	1800	350	2100	3150
280	1450	2580	4600	794	797	1063	-	120	530	353	2000	1800	350	2500	3890
350	1800	2580	4490	630	629	1070	600	120	662	441	2000	1800	350	2700	4050
440	1800	3150	4610	692	695	1203	820	140	662	441	2530	1800	350	2600	4950
530	2080	3150	4770	794	797	1290	720	140	739	493	2530	1800	400	4000	5660
630	2080	3900	4970	794	797	1290	1090	140	739	493	2 x1640	1800	400	4600	6700
740	2080	4500	5140	870	870	1320	1320	160	739	493	2 x 1940	1800	400	4700	7100

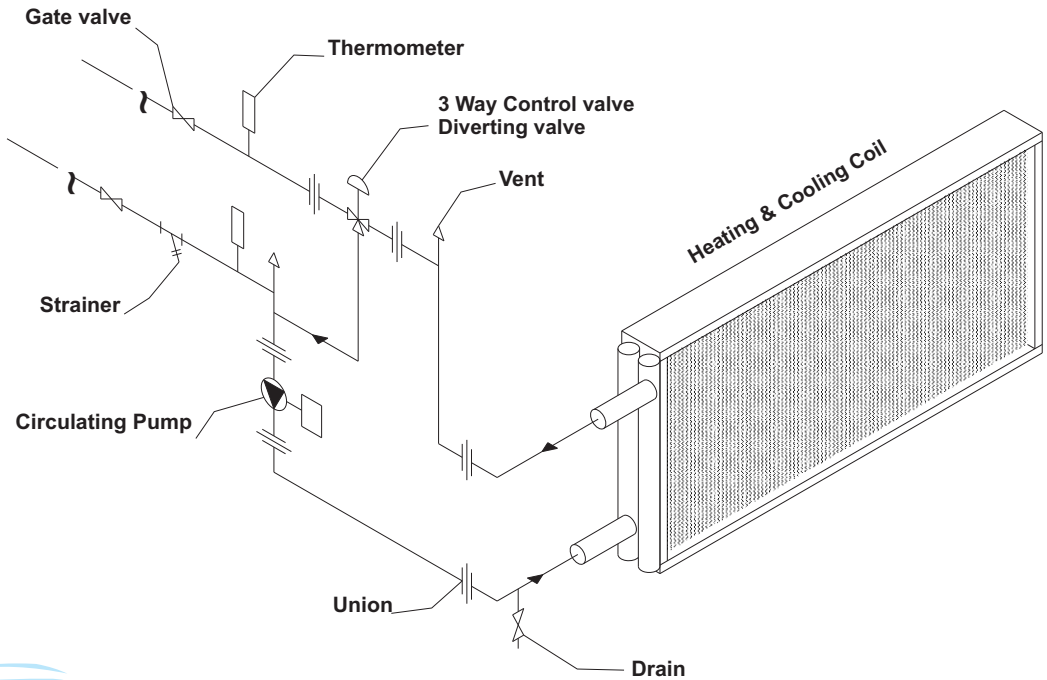
Table 35 :Class 8 Air Washer Dimensions & Weights

Model	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	F(mm)	G(mm)	H(mm)	I1(mm)	I2(mm)	J(mm)	K(mm)	L(mm)	Weight(kg)	
														Shipping	Operating
35	850	850	4530	275	289	881	-	80	347	231	550	2500	300	970	1600
50	850	1100	4580	395	341	829	-	80	347	231	800	2500	300	1150	1960
70	850	1400	4680	395	341	829	-	80	347	231	1000	2500	300	1350	2380
85	900	1700	4710	471	404	816	-	80	347	231	1300	2500	300	1550	2800
100	950	1900	4850	430	478	792	-	80	347	231	1500	2500	300	1800	3220
120	950	2200	4850	557	478	792	-	100	347	231	1800	2500	300	1500	3000
160	1150	2000	5090	630	629	861	-	100	424	283	1600	2500	300	2000	3500
210	1450	2000	5150	692	695	1165	-	120	530	353	1600	2500	350	2500	4000
280	1450	2580	5300	794	797	1063	-	120	530	353	2000	2500	350	2600	4500
350	1800	2580	5190	630	629	1070	600	120	662	441	2000	2500	350	3000	5000
440	1800	3150	5310	692	695	1203	820	140	662	441	2530	2500	350	3900	6250
530	2080	3150	5470	794	797	1290	720	140	739	493	2530	2500	400	4800	7100
630	2080	3900	5670	794	797	1290	1090	140	739	493	2 x1640	2500	400	5300	8200
740	2080	4500	5840	870	870	1340	1320	160	739	493	2 x 1940	2500	400	5500	8870



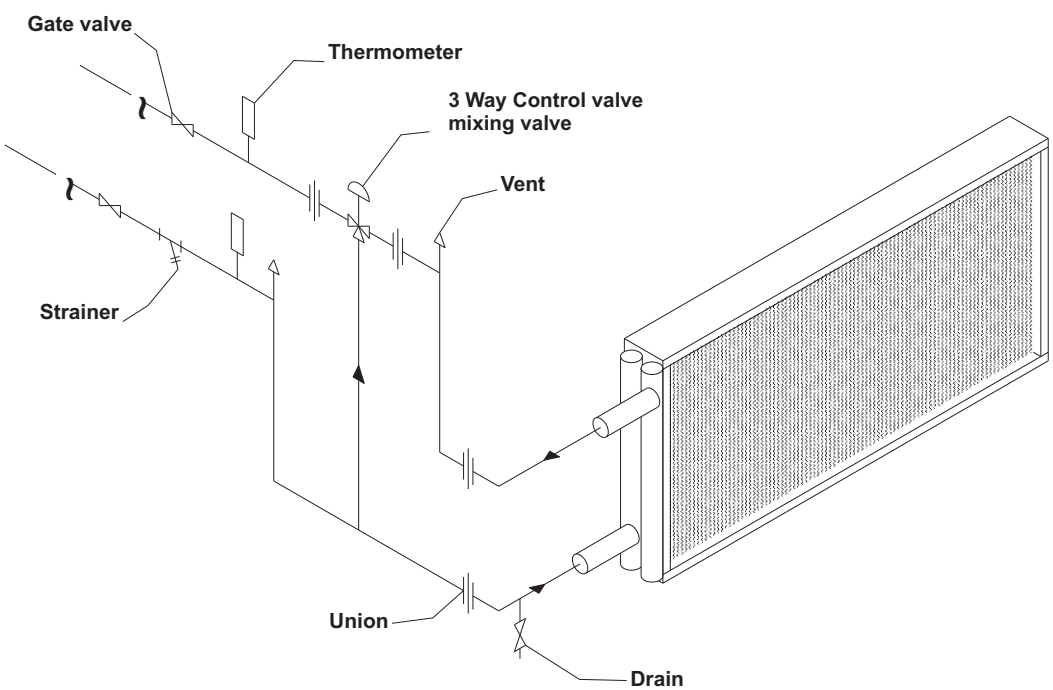
Typical Hot &Chilled Water Coil Piping Diagram

-With Main & Auxillary Recirculating Pump.



-With Main Pump.

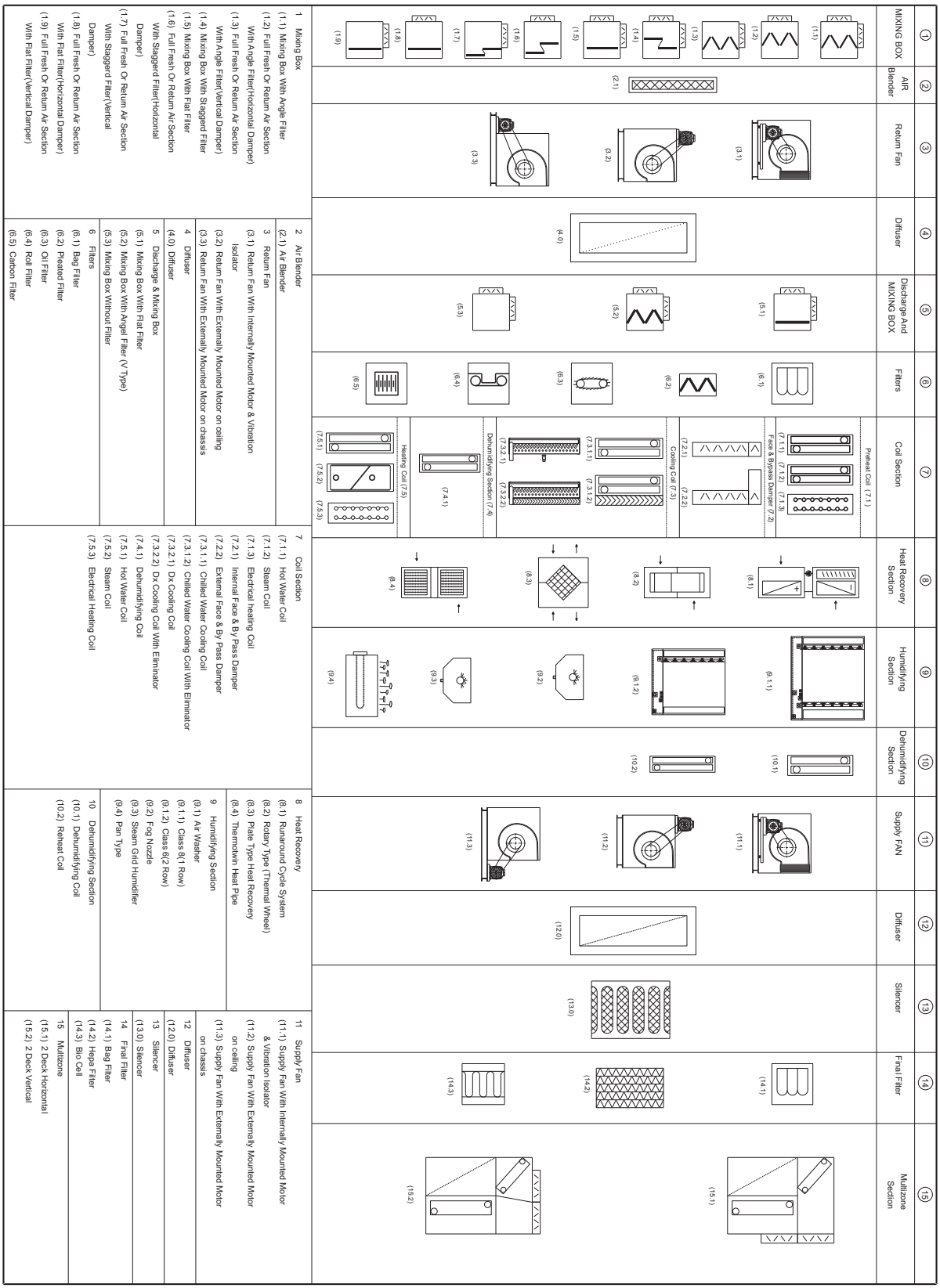
When Several Air Handling Unit in Different Distance are Connected to One Water Supply Unit (Engine Room) . It is Recommended to Use an Auxillary Pump Near each Air Handling Unit.



YEKTA TAHVIEH

Arvand IND.

TABLE 36:OPTIONAL ACCESSORIES



1 Mixing Box
(1.1) Mixing Box With Angle Filter
(1.2) Full Fresh Or Return Air Section With Angle Filter(Horizontal Damper)
(1.3) Full Fresh Or Return Air Section With Angle Filter(Vertical Damper)
(1.4) Mixing Box With Staggerd Filter
(1.5) Mixing Box With Flat Filter
(1.6) Full Fresh Or Return Air Section With Staggerd Filter(Horizontal Damper)
(1.7) Full Fresh Or Return Air Section With Staggerd Filter(Vertical Damper)
(1.8) Full Fresh Or Return Air Section With Flat Filter(Horizontal Damper)
(1.9) Full Fresh Or Return Air Section With Flat Filter(Vertical Damper)

2 Air Blender
(2.1) Air Blender

3 Return Fan
(3.1) Return Fan With Internally Mounted Motor & Vibration Isolator
(3.2) Return Fan With Externally Mounted Motor on ceiling
(3.3) Return Fan With Externally Mounted Motor on chassis

4 Diffuser
(4.0) Diffuser

5 Discharge & Mixing Box
(5.1) Mixing Box With Flat Filter
(5.2) Mixing Box With Angal Filter (V Type)
(5.3) Mixing Box Without Filter

6 Filters
(6.1) Bag Filter
(6.2) Pleated Filter
(6.3) Oil Filter
(6.4) Roll Filter
(6.5) Carbon Filter

7 Coil Section
(7.1.1) Hot Water Coil
(7.1.2) Steam Coil
(7.1.3) Electrical heating Coil
(7.2.1) Internal Face & By Pass Damper
(7.2.2) External Face & By Pass Damper
(7.3.1.1) Chilled Water Cooling Coil
(7.3.1.2) Chilled Water Cooling Coil With Elimnator
(7.3.2.1) Dx Cooling Coil
(7.3.2.2) Dx Cooling Coil With Elimnator
(7.4.1) Dehumidifying Coil
(7.5.1) Hot Water Coil
(7.5.2) Steam Coil
(7.5.3) Electrical Heating Coil

8 Heat Recovery
(8.1) Runaround Cycle System
(8.2) Rotary Type (Thermal Wheel)
(8.3) Plate Type Heat Recovery
(8.4) Thermotwin Heat Pipe

9 Humidifying Section
(9.1) Air Washer
(9.1.1) Class 8(1 Row)
(9.1.2) Class 6(2 Row)
(9.2) Fog Nozzle
(9.3) Steam Grid Humidifier
(9.4) Pan Type

10 Dehumidifying Section
(10.1) Dehumidifying Coil
(10.2) Reheat Coil

11 Supply Fan
(11.1) Supply Fan With Internally Mounted Motor & Vibration Isolator
(11.2) Supply Fan With Externally Mounted Motor on ceiling
(11.3) Supply Fan With Externally Mounted Motor on chassis

12 Diffuser
(12.0) Diffuser

13 Silencer
(13.0) Silencer

14 Final Filter
(14.1) Bag Filter
(14.2) Hepa Filter
(14.3) Bio Cell

15 Multizone
(15.1) 2 Deck Horizontal
(15.2) 2 Deck Vertical

Table 37: Sectional dimension

HEIGHT Model	A(mm)	WIDTH B(mm)	Mixing Box (N)**			PRE FILTER	PRE HEATING COIL (Q) , (7.1)		Cooling Coil (R) , (7.3)			Heating Coil (S) , (7.5)			
			1.1*	1.2	1.3	(B) , 6.1	1ROW	2ROW	4ROW	6ROW	8ROW	1ROW	2ROW	3ROW	4ROW
35	930	850	775	575	675	700	210	250	330	410	490	210	250	290	330
50	930	1100	775	575	675	700	210	250	330	410	490	210	250	290	330
70	930	1400	775	575	675	700	210	250	330	410	490	210	250	290	330
85	930	1700	785	590	685	700	210	250	330	410	490	210	250	290	330
100	1030	1900	770	570	670	700	210	250	330	410	490	210	250	290	330
120	12050	2200	770	570	670	700	210	250	330	410	490	210	250	290	330
160	1250	2000	860	730	760	700	210	250	330	410	490	210	250	290	330
210	1570	2000	915	705	760	700	210	250	330	410	490	210	250	290	330
280	1570	2580	915	735	815	700	210	250	330	410	490	210	250	290	330
350	1920	2580	960	830	865	700	210	250	330	410	490	210	250	290	330
440	1940	3150	960	830	960	700	210	250	330	410	490	210	250	290	330
530	2220	3150	965	830	965	700	210	250	330	410	490	210	250	290	330
630	2220	3900	965	830	965	700	210	250	330	410	490	210	250	290	330
740	2220	4500	965	830	965	700	210	250	330	410	490	210	250	290	330

HEIGHT Model	A(mm)	WIDTH B(mm)	Mixing Box (N)**			Fan Section (U)			Silencer v(max)	Final Filter		Multizone Section	
			9.1.1*	9.1.2	9.5	11.1	11.2	11.3		14.1	14.2	15.1	15.2
35	930	850	2500	1800	900	989	649	999	1200	700	400	896	896
50	930	1100	2500	1800	900	1029	729	1079	1200	700	400	896	896
70	930	1400	2500	1800	900	1119	729	1129	1200	700	400	896	896
85	930	1700	2500	1800	900	1185	835	1235	1200	700	400	900	900
100	1030	1900	2500	1800	900	1250	940	1370	1200	700	400	900	900
120	12050	2200	2500	1800	900	1250	940	1370	1200	700	400	915	915
160	1250	2000	2500	1800	900	1450	1080	1530	1200	700	400	1110	1110
210	1570	2000	2500	1800	900	1500	1150	1600	1200	700	400	1295	1295
280	1570	2580	2500	1800	900	1810	1300	2025	1200	700	400	1295	1295
350	1920	2580	2500	1800	900	1110	1110	1560	1200	700	400	1570	1570
440	1940	3150	2500	1800	900	1150	1150	1600	1200	700	400	1610	1610
530	2220	3150	2500	1800	900	1310	1310	2060	1200	700	400	1830	1830
630	2220	3900	2500	1800	900	1330	1330	2080	1200	700	400	1860	1860
740	2220	4500	2500	1800	900	1415	1415	2165	1200	700	400	1960	1960

*Please reffer to table 36 for information about AAHU section and related codes .
**These caracters reffer to dimension on page 57 about service area requirement.

SERVICE AREA REQUIREMENT

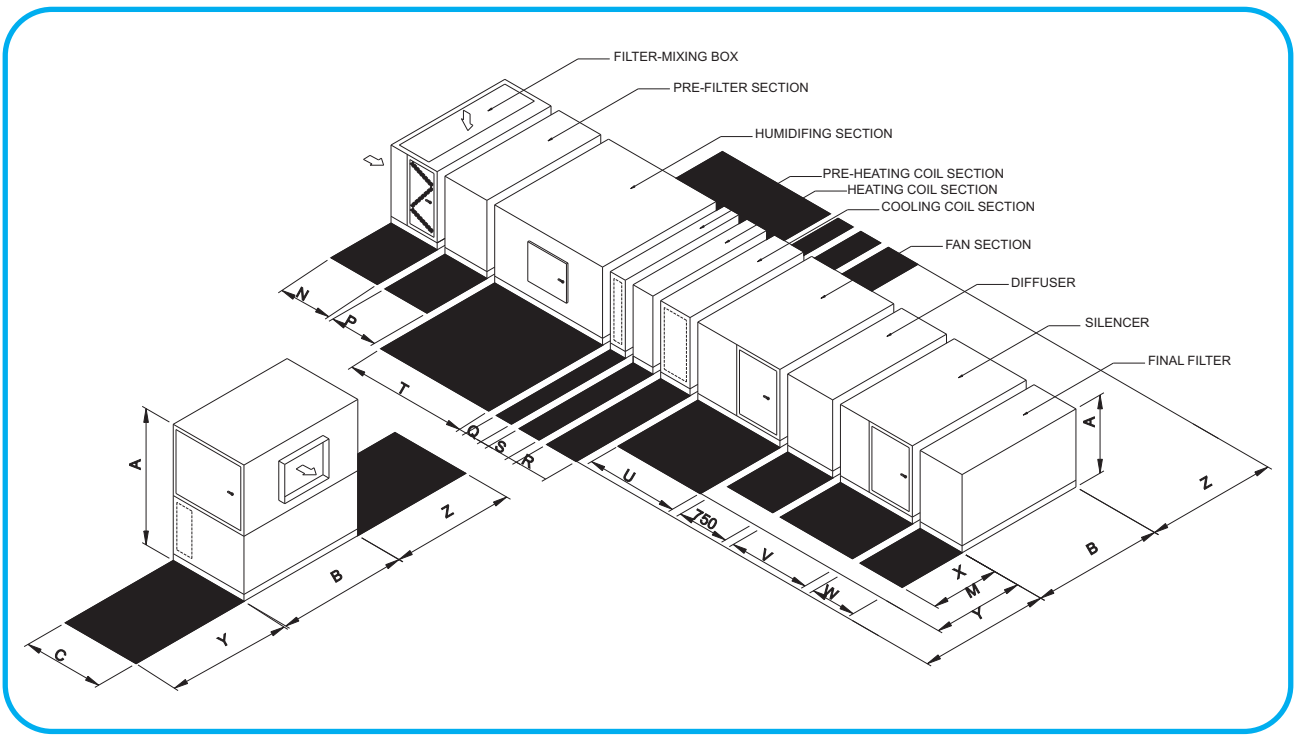


TABLE 38: SERVICE AREA DIMENSION

MODEL	35	50	70	85	100	120	160	210	280	350	440	530	630	740
X	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Y	800	1070	1350	1600	1700	1400	1670	1950	2520	2200	2490	3040	1930	1670
Z	-	-	-	-	-	-	-	-	-	-	-	-	1930	1970
M	595	770	980	1190	1330	1540	1400	1400	1805	1805	2205	2205	2730	3150

Note : Please refer to table 37 for indicating AAHU unit dimension.

Engineering guide specification

General Description

Configuration _ Fabricate with (fan) (fan and coil section) plus accessories , including :

- Heating coil section
- Mixing box section
- Combination filter / mixing box section
- Economizer section
- Blender section
- Filter section
- Face and bypass damper section
- Multi - zone damper section
- Access section
- Cooling coil section
- Humidifier section
- Attenuator section
- Diffuser section

Performance base ____Sea level : (_____) conditions.

Fabrication ____Conform to ARI 430.

Casing

Construction _ Fabricate of channel posts and panels assembled with screws (optional base rail) galvanized steel finish. Assemble sections with bulb type and flat gaskets and bolts .

- Structure : Made of multi bend in 4 model and different thickness (from 1.5 to 3 mm) Hot dip galvanized steel , Standard No. DIN EN 10142 - DX52D + Z275 - N - A - C according to DIN standard or equal (G90 galvanized steel) or extruded aluminum profile.
- Out side casing : made of hot dip galvanized steel in 1 to 2 mm thickness
- Optional inside Casing : made of hot dip galvanized steel in 0.6 to 1 mm thickness or 0.6 mm thickness stainless steel on request .
- Floor plate : made of hot dip galvanized steel in 1.5 to 2 mm thickness or stainless steel on request.

Insulation - 25mm thick, polystyrene, in double skin panel, or 40mm thickness rockwool, (80 kg/m^3 density) with reinforced aluminium foil in exterior surface on request.

Finish - All unit have standard electro powder baked enamel RAL 7032 on structure and RAL 7032 on exterior surface of panel. epoxy enamel or baked epoxy coated enamel with primer coating (Total thickness of painting are approximatly 40-60 micron meter) are prefared in very corrosive condition.

Access Doors - Made of galvanized steel , flush mounted to cabinetry , with gasket hinged to structure with , latch and handle assembly , optional inspection windows.

Lights - Provide in accessible sections .(on request)

Drain Pans - Construct from galvanizes steel (stainless steel on request) and pitch to drain connection . Provide drain pans under cooling coil section interior of drain pan provided with antimicrobial coating .

Fans

Type - [Forward curved , double width , double inlet , centrifugal] [Back ward curved double width , double inlet , centrifugal]. Fans dynamically balanced before and after installation in fan cabinet section . Maximum fan rpm below the first critical speed fan .

Bearings - Self - aligning , grease lubricated , ball or roller bearing with extended copper lubrication lines to access side of unit . Grease fittings attached to fan base assembly near access door .

Mounting - Locate fan and motor internally on steel base on isolators. Factory mounted motor on slide base . belt tension easily done by this mechanism. motors location are depends on request , left hand, righthand , top ,or internaly mount. provide access door on fan section for motor, pulleys, bearings and fans. fan and motor assembly secured to cabinet structure for external motor mounting, in this case unit install on

rubber isolators .in internal motor mounting fan and motor assambly mounted on rubber or spring isolators inside cabinetry.

Fan accessories - Forward curved fan with optional inlet vanes will have heavy duty linkage connecting both vane assemblies. The inlet vane actuating mechanism permanently lubricated and interconnected by a solid steel shaft through oil impregnated bronze bushing assemblies mounted in the fan housing .

Airfoil fan with optional variable inlet vanes controlled with a center hub linkage for accessibility . Vanes fabricated from steel with baked enamel finish capable of withstanding entering air temperature up to 950C . Inlet vane actuating mechanism is permanently lubricated and interconnected by a solid steel shaft through oil impregnated bronze bushing assemblies mounted in the fan housing.

Bearings and Drives

Bearings - Basic load rating computed in accordance with AFBMA-ANSI standard , (L - 50 life at 200,000 hours) , (L - 50 life at 500,000 hours) , (L - 50 life at 1.000.000 hours) . heavy duty pillow block type , self - aligninig , grease - lubricated ball bearings.

Shafts - Solid , hot rolled steel , ground and polished , keyed to shaft , and protectively coated with anti corvosive coating.

V-belt Drive Tapared Bush - Cast iron, dynamically balanced , bored to fit shafts and keyed , fixed sheaves , matched belts , and drive rated as recommended by manufacturer . Optional variable and adjustable pitch sheaves selected so required rpm is obtained with sheaves set at mid- position . Standard drive service factor [1.1 (0-18Kw - 5.5Kw)] [1.3 (7.5Kw and larger)] times fan brake horsepower . Optional customer specified service factor Serviceability of pulleys are very easy without pulley puller mechanism .

Belt Guard - Enclosed on all four sides , wire screen or steel perforated sheet welded to steel angle frame or equivalent , prime coated. Secure to fan or fan supports without short circuiting vibration isolation , with provision for adjustment of belt tension , lubrication , and use of tachometer guard in place .

Electrical Characteristics and Components

Electrical Characteristics - 380 - 3 - 50 or 220 - 1 - 50 (volts - phase -Hertz).

Motor - all motors are totally enclosed with external cooling fan TEFC , with IP 45 and class B for windings and on request motor IP55 with class F are available . all motors in case of internal mounting are IP55 and class F . 2 speed motor are also available on request.

Coils

Casing - Provide access to coils from (both connection side) (opposite connection side) of unit for service and cleaning . Enclose coil headers and return bends fully within unit casing . Coil connections , vents , and drains to extend beyond unit casing . Coils removable through side panels and/or top panels of unit without removal and disassembly of entire section .

Drain Pans - (coated galvanized steel or Stainless steel on request) drain pan located underneath and extending downstream of coil, and intermediate drain pans required for cooling coil banks more than one coil height .

Eliminators - Three break construction of galvanized steel , mounted over drain pan. (New exturded aluminium profile on request).

Ratings - Certified capacities , pressure drops , and selection procedures in accordance with ARI 410 .

Fabrication

Tubes : 5/8 “ (16mm) OD or 1/2” (12.7mm) seamless copper expanded into fins , brazed joints .

Fins : Aluminium hydraophobic coated aluminium or copper new enhanced louvred v-waffle type fins .

Casing : Formed channel frame of galvanized steel . optional stainless steel , copper , or aluminium

Water Coils - Fins have 0.15mm thickness with full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer . Tubes mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates . Bare copper tube shall not be visible between fins. This new type on fins (ENHANCED LOUVRED V-WAFFLE) has a very special pattern with sine wave bend in fins that there are a breaked louvre in fins to improves heat transfer coefficient affected by increase turbulence in air side flow of heat exchanger .

Water coils provided with headers of seamless copper tubing with intruded tube holes to permit expansion and contraction without creating undue stress or strain . Coil connectoins (carbon steel) (copper) with connection size to be determined by manufacturer based upon the most efficient coil circuiting . Outlet connections provided at the highest point to assure proper venting . Inlet connections provided at the lowest point to insure complete drainage and prevent freezed - up .

Working pressure shall be 20 bar at 93°C . For cooling coils and 12 bar at 200°C for heating coils . all coils shall be drainable and easily ventable and have nontrapping circuits.

Refrigerant Coils - Coils designed for use with refrigerant (R-22)(R-134a)(R-407c). Fins have 0.15mm thickness with full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer . Tubes mechanically expanded into the fins to provide a continuous primary - to - secondary compression bond over the entire finned length for maximum heat transfer rates . Bare copper tube shall not be visible between fins. Refrigrant coils provided with round seamless 5/8"(16mm) O.D on 38mm rectangular pitch copper tubes or 1/2" (12.7mm) O.D on 33mm rectangular pitch, staggered in the direction of airflow . All joints brazed.

Sweat type copper suction connections located at the bottom of the suction headers for gravity oil drainage coils circuited to (row) (face) (row and face) control capacity reduction coils tested with 21 bar air pressure under warm water and suitable for 250 psig working pressure . Coil performance shall be certified in accordance with ARI standard 410".

Steam Coil - There are 2 type of steam coils , high pressure model with staggered spiral fins around steel pipe SCH 40 , in 8 to 10 fin per inch with 0.3x 10mm aluminium coil strip that mechanically bonded to pipe for high pressure type steam coil up to 15 bar operating pressure and the other one are made from aluminium plate enhanced louvred type v-waffle fin with 5/8" copper or copper nickel alloy tube . This type is low pressure model up to 4 bar operating steam pressure .

Electric Heating Coil - Electric heating elements shall be open wire type 80% nickel , 20% chromium. that wounded in spring type electric insulated by floating ceramic bushings and supported in a galvanized steel frame. Bushings shall be recessed into embossed openings and stacked into supporting brackets spaced on not more than 100mm . Centers the other type of electric heating coil shall be made by tubular heating elements inside the 16mm steel tube with spiral fins at outer surface for improving heat transfer to improve corrosion resistance all tube after fabrication send to hot dip galvanizing .therefore because of eliminating air gap between fins root and outer surface of tube , the heat transfer rating increase also.

Filters Section

Filter Box - Section with filter guides . Hinged and latching access doors on either , or both sides loading of filters.

Flat Filter - Shall be capable of receiving 50mm thick filters of standard sized , sections to be complete with side access slide rail and access panel on one side (or both side on request) , in case of use flat filter box , type EU- 3 or EU -4 synthetic (non - woven) pre filters are prefered .

Angle Filter -Shall be similar to flat type , but with 50mm filters . arranged in horizontal V formation . Hinged access doors shall be provided on one side (both side on request). The filters shall be metalic washable pre filters or fibre glass in EU - 3 grade.

Filters

Bag Filters - Shall be capable of accepting standard 50mm thick. Pre-filters EU-3 or EU- 4 (fibre glass or synthetic (non - woven) and a combination of 595595 and 295 595 mm standard bag filters in 50% to 95% efficiency . bag filter length up to 900 mm (filters depth). Bag filters mounted on standard full air.Air tight metal rigid frame , with special quick clips for very fast and easy maintenance . Bag filter sections shall install on opstream or down stream of fan depend on request .

Final Filter -This section shall be capable of with standing 250mm H_2O total static pressure on discharge side of fan . They shall accept a combination of bag fillters same as above and also a combination of 595 595 300 (or 150 depth) and 595295300(or 150 depth) . HEPA and ULPA very high efficiency filters up to %99.997. Control of media advance mechanism to be by pressure differance measured accross the media filter .

Other Filter - Other filter such as roll filter , oil filter with moving blade , are available on request .

Mixing Boxes - Shall have opposed blade , interconnected outside air and return air dampers , dampers blade are constructed from extruded aluminium blade that interconnected to each other by plastic gears that rotate on nylon bushing with steel connecting rod to motor dampers . Dampers shall be sectionalized to limit blade lenght to 1200 mm. In order to prevent excess blade warping and to assure tight closure . Blades have a neoprence strip on tips for air tightness on closing postion, When two blade are over lapped.

Return Air Discharge Sections - Shall have exhaust damper similar to mixing box and be mounted between the return air fan and mixing box sections.

Face and by pass sections - Shall have opposed acting damper blades such as mixing box dampers.

Low Leakage Damper - Rated low - leakage dampers , having leakage rate not to exceed 2% of air quantity calculated at 10 meter per second air velocity through damper and 100 mm H_2O pressure difference shall be furnished . Damper blade shall be gasketed and perimeter sealing strips shall be provided.

Access sections - Shall be installed where indicated on the drawings and shall have hinged and latched on one side (both side on request) .

Zoning Damper Sections - Shall have hot and cold air damper blade mechanically secured at 90 degree angles to each other on a common steel rod rotating in nylon bushings and mounted in rigid flanged aluminium made damper frame . Dampers seats firmly against neoprene gasketed stops to minimize air leakage . Parralel acting dampers are to be inter connected by a single bar and field adaptable to the number of zones required.