coolmax
GROUP OF COMPANIES
The real one window solution

nqa.
ISO 9001:2015
Registered
Quality Management

UKAS
MANAGEMENT SYSTEMS
015

Customized & Hygienic
MODULAR AIR HANDLING UNITS

ECOKLIMA

The Sustainable
Engineered Air Dynamics

ABOUT US

COOLMAX International, established in 2009, is the leading Air Conditioning and Refrigeration company in Pakistan. We seamlessly work together to deliver on the promise of smart buildings and innovation. Along with our commitment to sustainability, we help our customers win at creating greater value, as we strategically focus on their projects and energy growth platforms. COOLMAX International manufactures and installs a wide range of HVAC&R systems for our various customers in Hospitals, Airports, Residential, Light Commercial Buildings, Commercial Towers, Retail, Shopping Malls, Textile, Automotive, Pharmaceutical, Packaging, Food & Beverage Industries.

COOLMAX International is making the future more productive and more sustainable by creating intelligent buildings and efficient energy solutions from the HVAC&R industry.

COOLMAX International provides services for Central Air-Conditioning, Industrial and Commercial Refrigeration, Commercial equipment, Professional Electronics and Industrial Products. Our products maintain the highest Indoor Air Quality standards (IAQ) via American Air Filters along with reliable and highly efficient ABB Motors. Alongside our comprehensive solutions, we provide installation, operation and maintenance of HVAC systems, electrical data communication products and special control valves. We also provide experienced services in sales, after sales, maintenance, project and contracting for all HVAC&R requirements. Our Engineers focus on the latest research to provide leading solutions in the field of HVAC&R.

coolmax
The real one window solution company

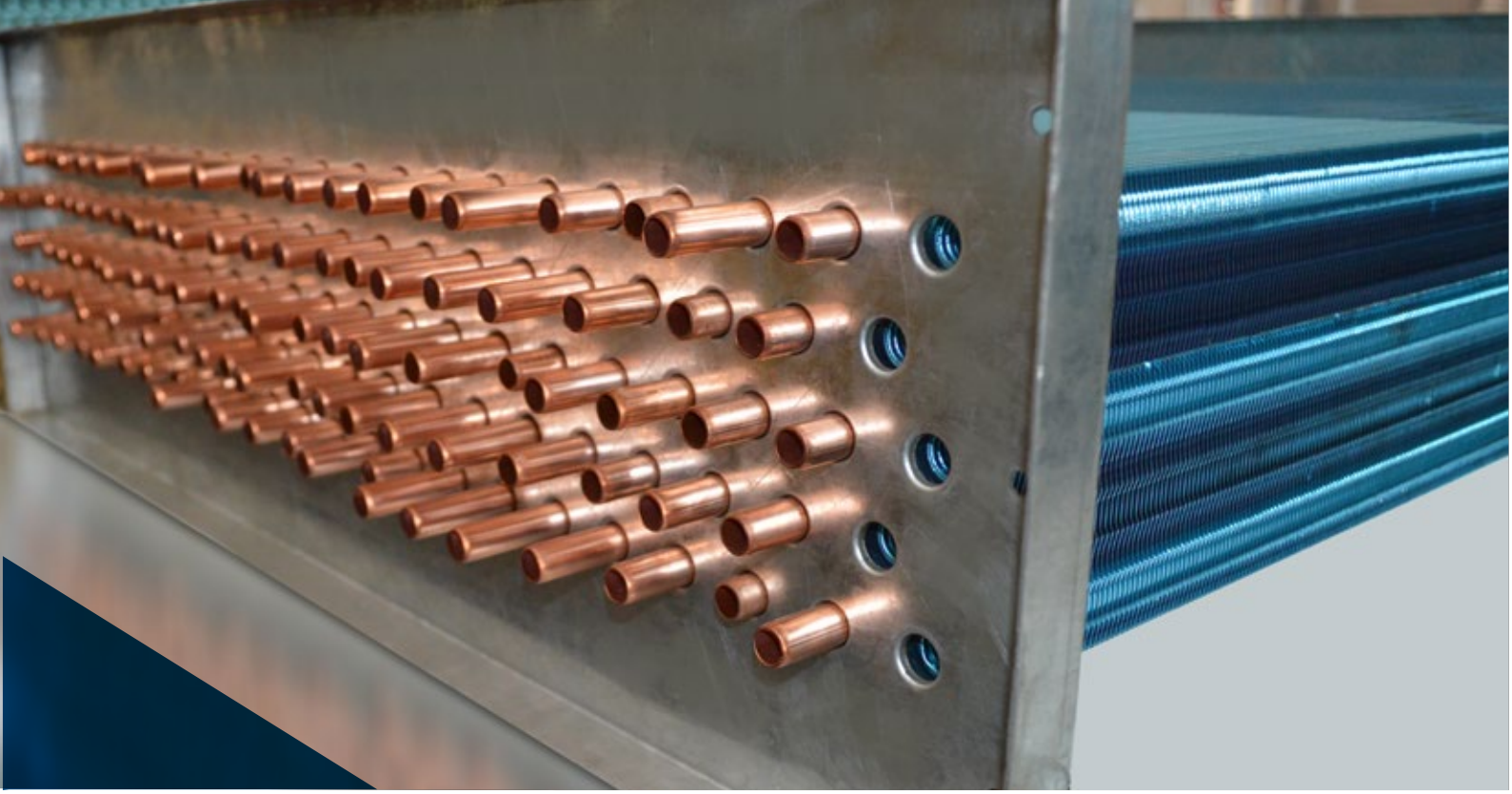
ECOKLIMA PRODUCT LINE

MODULAR AHU

HORIZONTAL DUCT TYPE SPLIT UNIT

VERTICAL PACKAGE AHU

DX MODULAR AHU

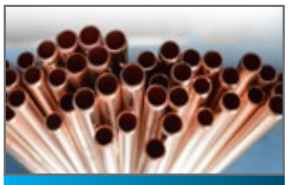


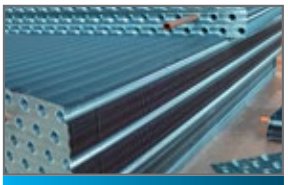
Customized & Hygienic Modular AHU

ECOKLIMA Modular Air Handling Units, in draw-through and blow-through orientations, provide air flow rates ranging from 0.38 m^3/s to 23.6 m^3/s with efficient performance at high total static pressures ranging till 1700 pascals. We use an AHU selection software for thermal design of cooling, heating and dehumidifying coils that follows the ARI Standard 410 and ASHRAE standards to produce cost effective and efficient solutions. ECOKLIMA AHUs maintain an ideal CGMP hygiene requirements of clean rooms, surgical operating rooms, food, medicine, chemistry facilities and controlled environments' Indoor Air Quality (IAQ), by protecting the area from contamination of airborne particles, maintaining the right humidity, temperature and pressure (positive pressure for clean rooms) conditions. We meet the European Union classifications of Grade A (100 0.5 µm particles/ ft^3 in operation) to Grade C (100,000 0.5 µm particles/ ft^3 in operation), FDA Aseptic guidelines (FS209E) and ISO (14644-1: Class 5 to 8) for aseptic manufacturing with focus on "in operation" conditions. Our manufactured goods comply with DIN 1946-4 and EN-13053. Our engineers focus on energy efficient solutions keeping in mind the safety of Earth's future. We comply with EUROVENT hygienic standards on manufacturing, materials, maintenance, casing performance, and component arrangements and performance. We provide solutions to prevent growth of micro-organisms on non-metallic parts. Metallic parts are treated against corrosion. All units are thoroughly cleaned after construction. The sturdy built ensures minimal leakage, effective thermal break properties, and high casing strength. All modular units are crafted from anodized extruded aluminium profiles and doors with thermal break feature, ABS plastic corners, EPDM based sealing gaskets fully enclosing thermally insulated and replaceable panels to produce a high quality product with minimal energy losses. Our Modular units are engineered in flexible configurations, catering to all sorts of project requirements.

Section Profile

Copper Header


Copper Tubes


Aluminium Fins

MODULAR AHU

- Cooling, heating, humidification and dehumidification purposes.
- Single and double decker units based on space constraints.
- Indoor and outdoor application based finishes such as weather proof roofs.
- High sterile applications with complete Stainless steel inner surface requirements.
- On-Site assembled units: To utilize space constraints.
- From simple filtration to complex filter requirements.

Nomenclature

AHU

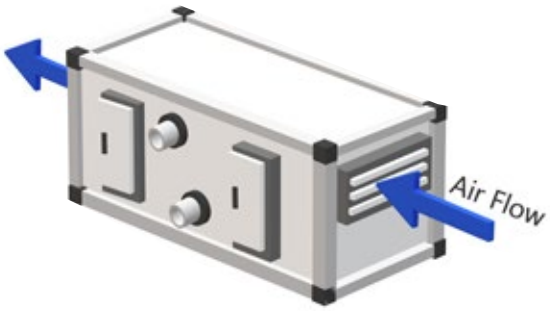
EK	150	200	M	
				MX MODULAR DX
				M MODULAR
				HX HORIZONTAL DX
				V VERTICAL
		200		WIDTH x 10 mm
	150			HEIGHT x 10 mm

Coil Unit

CU/ AL	1.817M2A	6R	36T	10FPI
	SQUARE METRE AREA	ROWS	TUBE HEIGHT	FINS PER INCHES

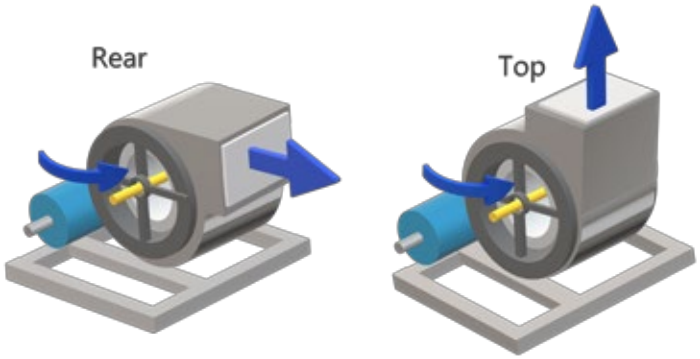
Unit Orientation

Unit orientation is determined by the location of the coil header connections, while facing the direction of Air flow. In this case, the unit is left oriented. Our door and header locations are flexible as per requirement.



Side of Discharge

All units can be configured as top, rear or side intake and top, front or side discharge. Flexible canvas cloth is attached between the fan's discharge and panels to ensure no vibration is transferred via fan's discharge.



Air Handling Unit

Horizontal Duct Type Split Unit

Best fit for ducted applications of multiple zones. Ranging from 20 kW to 40 kW cooling capacity with air volume ranging from 1.11 m^3/s to 1.94 m^3/s. It is connected to an outdoor condensing unit for heat exchange.

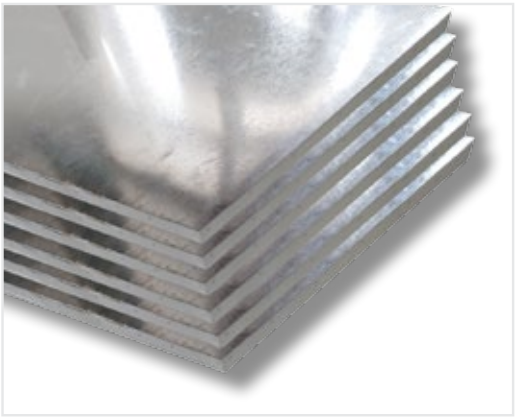
Vertical Package AHU

Designed to have a small footprint, this unit can be supplied chilled water to provide cooling via connection to the duct. Ranging from 26.5 kW to 106 kW cooling capacity with air volume ranging from 0.83 m^3/s to 3.32 m^3/s.

DX Modular Air Handling Units

ECOKLIMA offers a wide range of Direct Expansion Modular AHU's in combination with Condensing Units, which provide better performance for handling cooling loads where chilled water supply is unavailable. We also supply VRF solution combined with an AHU kit, to introduce multiple indoor units connected in series with a DX Split Type AHU (within 30% of total outdoor unit capacity) with respect to a single outdoor unit, or just a single DX Split Type AHU (within 50% to 100% total outdoor unit capacity). All condensing units are T3, High Ambient, capable of operating for 50°C. Standard R22/R410A refrigerant and hermatic scroll compressors.

Indoor Unit Capacity (USRT)	Air Flow (CFM)	Indoor Unit Motor (kW)	Outdoor Condensing Unit Input Power (kW)
3.4	1475	~ 2.2	4.00
5.5	2360	~ 2.2	6.25
7.3	2950	~ 3	8.71
8.5	3688	~ 4	10.04
11.6	4425	~ 4	13.85
14.8	5900	~ 5.5	16.98
17.6	7080	~ 7.5	19.65
22.5	8850	~ 7.5	25.89
29.6	11800	~ 7.5	33.96
35.3	14160	~ 11	39.30
44.4	17700	~ 11	51.78
53	22125	~ 11	58.95

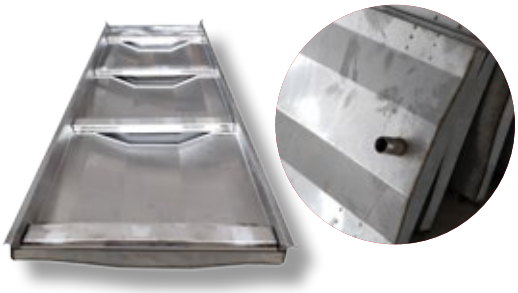


PANELS

Our panels have two fireproof and rust-resistant layers, an external sheet (0.7 mm) made of pre-plasticized steel and the internal sheet (0.71 mm) made from galvanized steel as per EN 1886. These two sheets have a layer of 42 kg/m3 density, pressure injected CFC free polyurethane foam for insulation having 0.022 W/ m2K thermal conductivity. This layer is light weight, rigid and has a low thermal conductivity co-efficient for thermal and sound insulation that prevents potential condensation. Further insulation is applied at joints and edges to reduce cold-bridge effect to increase efficiency. The panels are manufactured in two nominal thicknesses: 25 mm and 50 mm. Regardless of the type of structure, all panels on the access side can be easily dismounted for maintenance that are fixed to the frame by means of a locking system made from an extruded aluminium profile, held in place with an EPDM based sealing gasket to prevent air leakages resulting in casing air leakage of L1 .

FRAMES

We have International profile frames, that are configured in accordance with design parameters that meet project requirements. The low weight, corrosion resistant Aluminium alloy profile with polyamide thermal break profile is designed to provide strength, stability and energy efficiency, joined by 3D ABS rounded corners. A thermal bridge free profile is used to prevent potential condensation. The inner side of the profile is curved smoothly to prevent dust accumulation. Special insulation treatment is conducted at the inner part of the frames to prevent the cold bridge effect. The frames provide excellent thermal bridging factor of class TB1 with thermal transmittance of T3. The complete casing has a strength of D1 level as per EN 1886 : 2008. Each unit section is mounted on a 3-mm thick extruded GI base frame for sturdy placement and protection.



DRAIN PANS

Micro-organisms can flourish in drain pans when cooling-coil condensate remains during “off” or “heating” cycles. This 18 G 306 stainless-steel design with a minimum of 40 mm depth, ensures to drain all the condensed water with its multi-sloped design ensuring positive drainage, no stagnation of water and no algae formation. The drain pans are made in accordance to EN 10088-3:2014 Standard 1.4301 / AISI 30. All pan designs offer accessibility for periodic cleaning, as required by ASHRAE Standard 62-2001. Galvanized steel pipes are used for the discharge of the condensate water.

DAMPERS

Extruded Aluminium dampers blades and frames, constructed in opposed blade formation, are used for effective air control. A flanged frame is provided for a direct connection to the ductwork with plastic gears. Specific sizes are constructed with respect to the Client’s requirements of the ductwork. Dampers are suitable for both manual operation or servo motor based operation.

DOORS

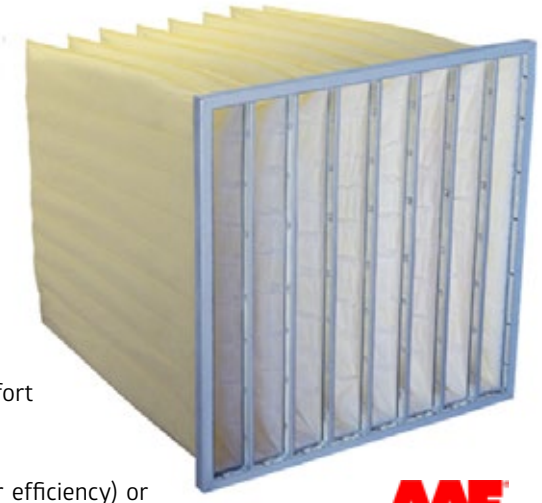
The Doors being used have gaskets lined at either inner side of the door ensuring no leakage when the doors are locked. The door frame and the door panel are lined from the center with an composite extruded plastic to introduce a thermal break in the door profile. The door panel is filled with Polyurethane insulation. Our high quality doors helps ensure high quality performance of the unit and easy access for maintenance.

FANS

We provide optimized plug fans, forward or backward double-inlet centrifugal type fans with low noise and high efficiency. The blower is selected according to the application needs in terms of required capacity, pressure head and sound level. The fan impeller and pulley are statically and dynamically balanced, and the whole fan is calibrated through the operational vibration testing, ensuring smooth fan operation. Our fan and motor arrangement is mounted on a reinforced C profile chassis with an engineered belt tensioning mechanism. COOLMAX provides one of the best International brand that is AMCA Certified: YILIDA / DETON., (ISO9001, ISO14001, DIN24163) AMCA certified.

FILTERS

AAF filters maintain the highest indoor air quality as per IAQ Standards. Easy access and removal is designed for the comfort of access for quality check and maintenance. Filter sections are designed for quick and easy withdrawal. AAF Filters are made in accordance with EN779:2012, ISO 16890 and ISO 14001:2004 Classifications. We comply with filter bypass leakage of F8.



Primary filters of Group G, Class EU2 to EU4 (coarse-dust filters), with synthetic fiber media panel filters, are comprised in galvanized steel frames or sliding rails. The zig zag pattern of the filter results in a larger filtering area, with a low air flow rate, and the service interval for replacement or cleaning is longer. The filtering efficiency is low; and therefore, the unit can be used in systems for human comfort where the atmosphere has a low level of contamination.

Main-Filters of Group F, class EU5 to EU8 (fine-dust filters), with synthetic (lower efficiency) or glass-fiber (greater efficiency) media bag filters, are comprised in galvanized steel frames with gaskets to avoid air leakage. They are particularly recommended for installations requiring extra-pure air. The bag filters are generally preceded by a prefilter section of lower efficiency. This approach extends the service life of the bag filters. Bag filters (F8 and F9) trap particles below 6 microns.

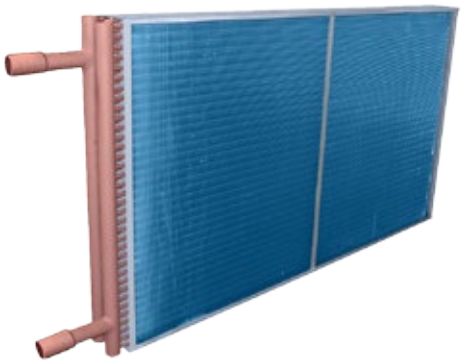
Final-filters of Group H, class EU10 to EU12 (HEPA 95 to 99% Nacl), are high efficiency compact cell filters, , fixed with brackets, nuts and bolts to a heavy galvanized steel gasket structure. They should be installed immediately before the space requiring this virtually sterile air that these filters can supply. Require careful installation that guarantees complete airtightness of all gaskets. They are designed to eliminate virtually even the smallest particles in the air.

MOTORS & DRIVES

ABB's general performance motors are best suited for our Air Handling Unit air supply application. ABB's motors are well acclaimed and are appreciated worldwide. A precise selection procedure ensures proper pulley sizing under maximum load conditions and best possible pulley to maximize operating life of the system. There are practically no limits for low-temperature operation in the fan section. In contrast, high temperatures can damage the motor. These temperature limits are clearly defined by electric motor manufacturers and must always be respected. All Motors have the TEFC IP55 rating, Class F insulation with Class B temperature rise rating. Standard motor provided are single speed (4 poles) with IE2. All motors supplied are VFD compatible.

COOLING COILS

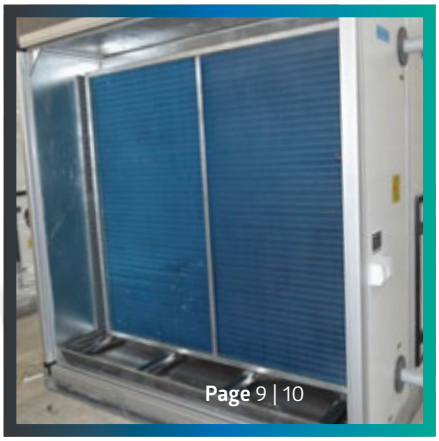
The Cooling Coils are selected with a software to provide the most efficient performance and manufactured from the highest quality copper tubes and aluminium fins. Capacity, water pressure drop and selection procedure is designed in accordance to ARI Standard 410. Copper tube and fins are used for applications with airborne corrosive chemicals to increase resistance to corrosion. Critical components such as the copper headers and connecting pipes are manufactured in house as well. Hydro-dipped, corrugated blue fins (8 to 14 FPI) in accordance to DIN 1946/4-6.5.1:2008, are used due to high resistance to corrosion and long-term disability. The copper tubes are mechanically expanded and securely bonded to aluminium fins, with respect to ARI Standard 410, finally encased in a galvanized steel frame. Coils are leak-tested at 30 Bar with a maximum design operating pressure of 16 Bar. Standard design for coil face velocity should be less than 500 FPM for Cooling Coils and 800 FPM for heating coils. It is advisable to use moisture eliminator if you require a higher coil face velocity without much of moisture carry over.



ACCESSORIES

With production of major components to be installed, we also provide accessories procured only from quality suppliers. Accessories such as marine lights, double wall inspection windows, emergency stop buttons, magnehelic gauges and various control sensors, Variable Frequency Drive as per product requirement. UVC lamps can be provided for sterile applications.

Finished Prodcuts Gallery

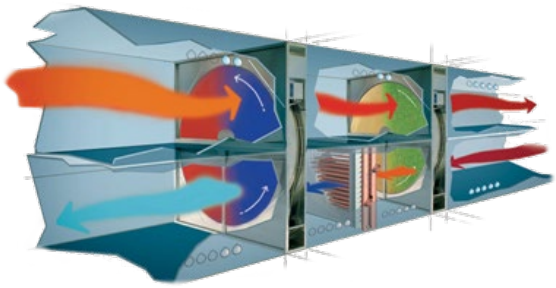


ECOKLIMA
1

Heat Recovery

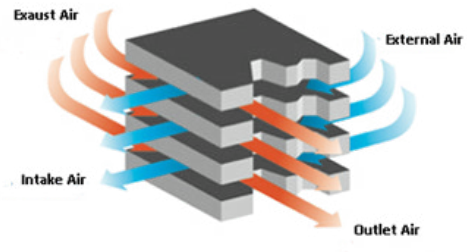
Heat recovery is used to reduce the heating and cooling requirements. The residual heat in the exhaust air is recovered, the fresh air introduced into the air conditioning system is pre-heated (pre-cooled), and the fresh air enthalpy is increased (reduced) before the fresh air enters the room or the air cooler performs heat and moisture treatment. The exhaust air is used as either a heat source or heat sink depending on the requirements. Heat recovery systems typically recover about 60–95% of the heat in exhaust air and have significantly improved the energy efficiency of buildings. Process cooling and heating, pasteurisation, large scale laundry drying and even ovens can all have heat recovery systems attached to save energy which can then be recycled to provide heating for other uses.

Rotary Heat Recovery



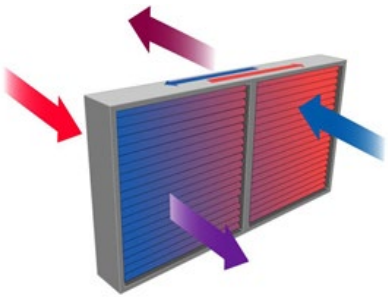
A rotating porous metallic wheel transfers thermal energy from one air stream to another by passing through each fluid alternately. With 80% efficiency, thermal wheel units also tend to be much bigger in size. They are made up of two large wheels with a honeycomb array, one half of which is drawing in stale/exhaust air, the other half drawing fresh air from outside. The wheels rotate in opposite directions to each other and the energy from the stale/exhaust air is transferred to the incoming air, heating it up. The speed of rotation of the wheels, and the amount of energy transferred, can be controlled to raise or lower the temperature of the air that is fed back into the building. The heat recovery rotor in a cabinet is rotated with a motor and pulley mechanism. Two types of rotary thermal wheel exist, heat wheels and enthalpy (desiccant) wheels. A system utilizing a desiccant wheel, the moisture in the air-stream with the highest relative humidity is transferred to the opposite air-stream after flowing through the wheel. This can work in both directions of incoming air to exhaust air and exhaust air to incoming air.

Fixed Plate



It comprises a box with a series of thin, parallel spaced plates made from metal or plastic which allows the extracted air to pass over the adjacent incoming air, transferring the energy through the plates and heating it up. The air streams are separated by the plates and never touch so one of the key factors in the efficiency of any system is how thin and conductive the individual plates are corresponding to the operational pressures and temperature ranges. Plate-type heat recovery systems are used in decked orientations. The dampers are controlled via servo motors based on the pressure differentials across the dampers. Plate heat recovery systems generally have an efficiency of around 70% in transferring sensible heat from one air stream to another.

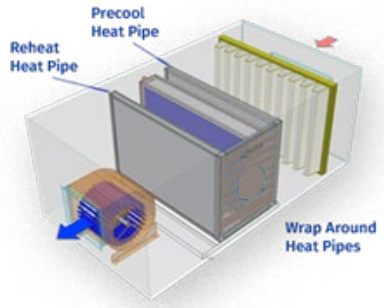
Straight Heat Pipe



Having the lowest maintenance, they can only be used where the air handling is done in one system. It uses a tube system with a refrigerant to extract the heat from the exhaust air and pass it to the supply air. Heat is transferred using an evaporator and condenser within a wicked, sealed pipe containing a fluid which undergoes constant phase change to transfer heat. The fluid within the pipe changes from a fluid to a gas in the evaporator section, absorbing the thermal energy from the warm air-stream. The gas condenses back to a fluid in the condenser section where the thermal energy is dissipated into the cooler air-stream raising the temperature. The fluid/gas is transported from one side of the heat pipe to the other through pressure, wick forces or gravity, depending on the arrangement of the heat pipe. Vertical pipes use the evaporation of the refrigerant to transfer the heat whilst horizontal ones incorporate wicks within the pipework that also allow the transfer of refrigerant. Vertical arrays are more 75% efficient as compared to the 50% efficiency for horizontal arrays.

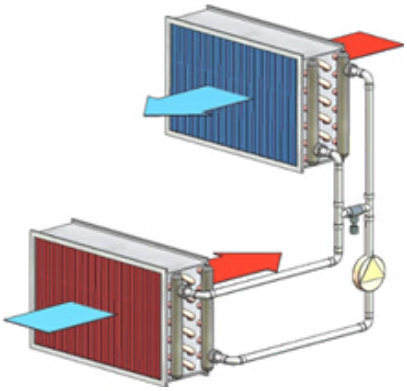
Wrap around Heat Pipe

Heat Pipes are essentially a means of transferring high rates of heat across small temperature gradients. It helps in dehumidification, heat recovery and improving indoor air quality. It is wrapped around a cooling coil. It consists of two sections, the precool (evaporator) section placed before the cooling coil and the reheat (condenser section) placed after the reheat coil. The precool section faces the incoming air stream before the cooling coil. When warm air passes over the first section, the liquid refrigerant vaporizes, moving heat to the reheat section (downstream from the cooling coil). Since heat has been removed from the air before the cooling coil, air passing through the cooling coil drops to a lower temperature, resulting in more condensate removal. The over cooled air is then reheated to a comfortable temperature and a lower relative humidity by the reheat section, using the same heat originally absorbed by the first section. The process takes place with no energy use due to the passive nature of the heat pipe. The result is an air conditioning system with the ability to remove 50 to 100% more moisture.



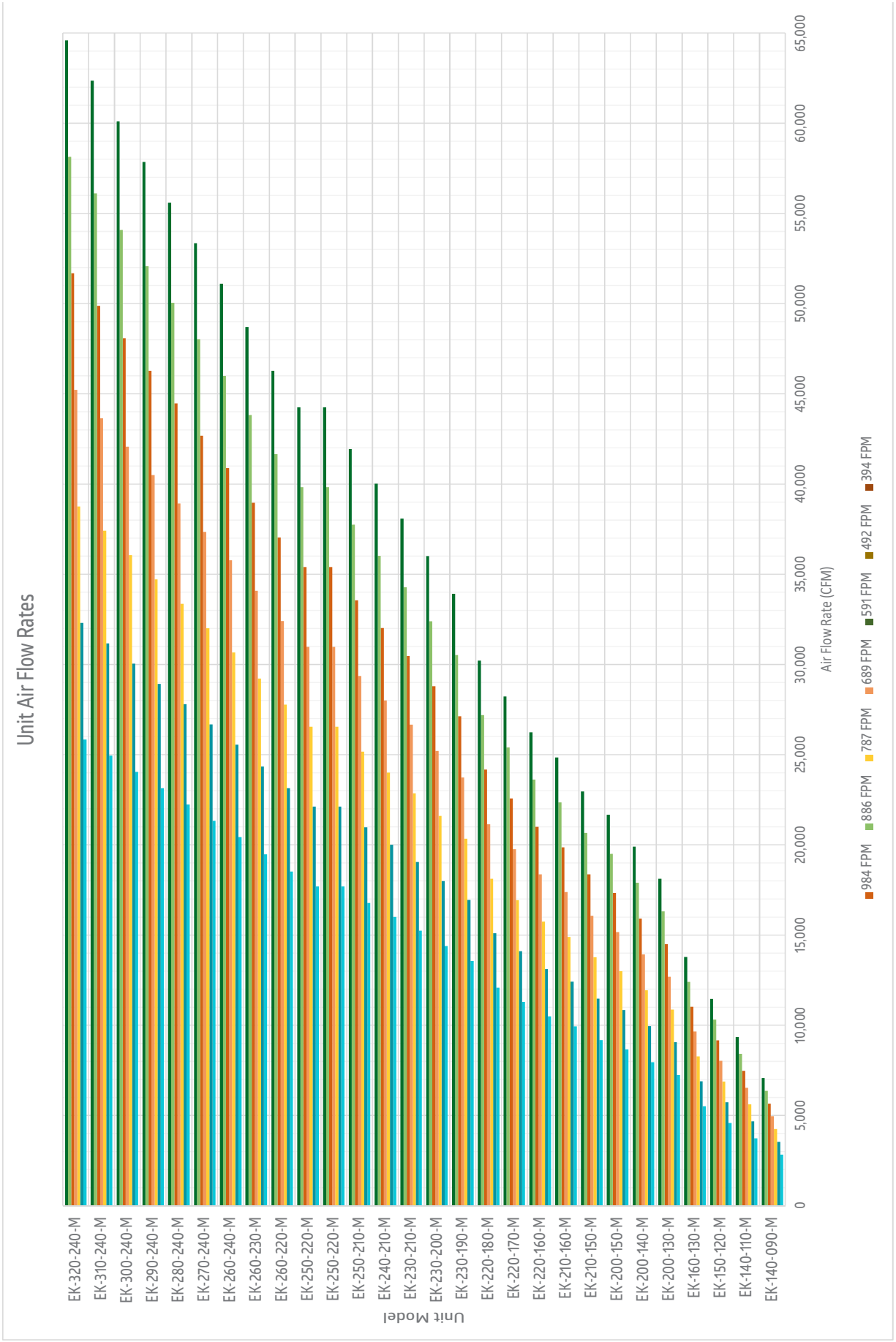
Run around Heat Pipe

Capable of recovering heat by placing one of the two heat exchangers into the exhaust unit and placing the other on the fresh air inlet, a significant distance away, by a closed loop. A fluid which is continually pumped between the two heat exchangers. Though this is an additional energy demand, using pumps to circulate fluid is less energy intensive than fans to circulate air. Water is normally used to charge the circuit, picking up the heat from the exhaust pipe and transferring it to the supply fresh air coil. It generally delivers a maximum efficiency of around 50%. Water is used as the heat conveying fluid in areas with temperature greater than 0° C with ethylene-glycol mixtures, up to 40%, to prevent freezing.



Type	Advantages	Disadvantages	Humidity Control
Rotary thermal wheel	· High efficiency · Sensible and latent heat recovery · Compact design · Frost control available	· Cross contamination possible; Requires adjacent air-streams · Mechanically driven, requiring energy input	Yes
Fixed plate	· No moving parts · High heat transfer coefficient · No cross contamination · Frost control possible · Sensible and latent heat recovery	· High pressure loss across exchanger · Limited to two separate air-streams · Condensation build up · Frost building up in cold climates	Yes
Heat pipes	· No moving parts · No cross contamination · Low pressure loss · Compact design · Heat recovery in two directions possible	· Requires close air-streams · Internal fluid should match local climate conditions	No (Straight) Yes (Wrap Around)
Run-around	· Air-streams can be separate · No cross contamination · Low pressure loss · Multiple sources of heat recovery	· Multiple pumps required to move fluid · Difficult to integrate into existing structures · Low efficiency	No

Quick Selection



Unit	Width	Height	Face Area	Air Flow (CFM)							Capacity *	Water Flow *	Header
Model	m	m	m^2	394 FPM	492 FPM	591 FPM	689 FPM	787 FPM	886 FPM	984 FPM	kW	l/s	DN mm
EK-140-090-M	1.4	0.9	0.67	2830	3538	4245	4953	5660	6368	7076	35.16	1.52	32
EK-140-110-M	1.4	1.1	0.88	3739	4673	5608	6543	7478	8412	9347	45.708	2.03	40
EK-150-120-M	1.5	1.2	1.08	4584	5730	6876	8022	9168	10315	11461	59.772	2.54	40
EK-160-130-M	1.6	1.3	1.30	5514	6893	8272	9650	11029	12407	13786	70.32	3.04	50
EK-200-130-M	2	1.3	1.71	7249	9061	10873	12685	14497	16309	18121	80.868	3.55	50
EK-200-140-M	2	1.4	1.88	7957	9946	11936	13925	15914	17903	19893	94.932	4.07	50
EK-200-150-M	2	1.5	2.04	8666	10832	12998	15165	17331	19498	21664	105.48	4.57	50
EK-210-150-M	2.1	1.5	2.17	9184	11480	13776	16072	18368	20664	22960	116.028	5.06	50
EK-210-160-M	2.1	1.6	2.34	9935	12419	14902	17386	19870	22353	24837	123.06	5.32	50
EK-220-160-M	2.2	1.6	2.48	10495	13119	15743	18367	20991	23615	26239	140.64	6.09	65
EK-220-170-M	2.2	1.7	2.66	11289	14111	16933	19755	22578	25400	28222	151.188	6.6	65
EK-220-180-M	2.2	1.8	2.85	12082	15103	18123	21144	24164	27185	30205	165.252	7.1	65
EK-230-190-M	2.3	1.9	3.20	13563	16954	20345	23736	27126	30517	33908	175.8	7.62	65
EK-230-200-M	2.3	2	3.40	14399	17999	21598	25198	28798	32397	35997	186.348	8.12	65
EK-230-210-M	2.3	2.1	3.59	15235	19043	22852	26660	30469	34278	38086	200.412	8.63	65
EK-240-210-M	2.4	2.1	3.78	16007	20009	24011	28012	32014	36016	40018	210.96	9.13	80
EK-250-210-M	2.5	2.1	3.96	16780	20975	25169	29364	33559	37754	41949	221.508	9.65	80
EK-250-220-M	2.5	2.2	4.18	17700	22125	26550	30975	35400	39825	44250	235.572	10.15	80
EK-250-220-M	2.5	2.2	4.18	17700	22125	26550	30975	35400	39825	44250	246.12	10.65	80
EK-260-220-M	2.6	2.2	4.37	18515	23144	27773	32401	37030	41659	46288	256.668	11.17	80
EK-260-230-M	2.6	2.3	4.60	19478	24347	29217	34086	38956	43825	48695	270.732	11.68	80
EK-260-240-M	2.6	2.4	4.82	20441	25551	30661	35771	40881	45991	51102	281.28	12.17	80
EK-270-240-M	2.7	2.4	5.04	21340	26675	32010	37346	42681	48016	53351	291.828	12.68	80
EK-280-240-M	2.8	2.4	5.25	22240	27800	33360	38920	44480	50040	55600	305.892	13.2	80
EK-290-240-M	2.9	2.4	5.46	23140	28925	34710	40494	46279	52064	57849	316.44	13.69	80
EK-300-240-M	3	2.4	5.67	24039	30049	36059	42069	48079	54089	60098	326.988	14.2	100
EK-310-240-M	3.1	2.4	5.88	24939	31174	37409	43643	49878	56113	62348	341.052	14.71	100
EK-320-240-M	3.2	2.4	6.10	25839	32298	38758	45218	51677	58137	64597	351.6	15.23	100

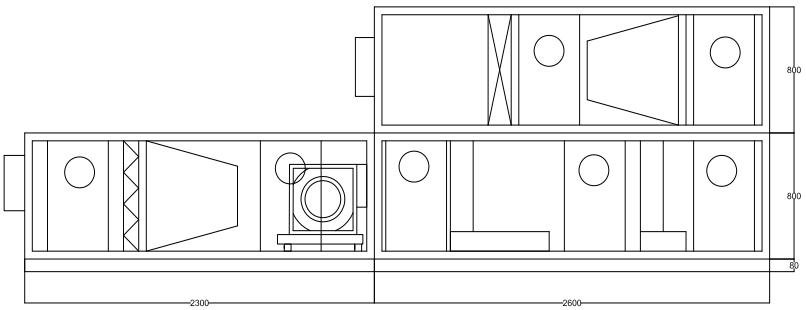
COOLING ONLY HEATING ONLY FAN ONLY

* Based on 417 FPM to 457 FPM

Selection Sample

Unit Model:	EK-160-110
Project:	Hilton Pharma, Karachi
	AHU-121, 1620 CFM
Date:	19/7/2018

Unit Dimension:



Section Dimensions			
Mixing Box	600 mm	Heating Coil Section	300 mm
Primary Filter	100 mm	Middle Section	600 mm
Secondary Filter	600 mm	Middle Section	600 mm
Fan Section	1000 mm	Secondary Filter	600 mm
Diffuser Section	450 mm	Middle Section	600 mm
Cooling Coil Section	650 mm	Final Filter	400 mm
Middle Section	600 mm	Outlet Section	450 mm

Unit Configuration:			
Panel Size	50 mm PU Injected Panels	SS Installments	Drain tray, Nuts & Bolts and Coil Supports
RA Damper	711 x 254 mm	FA Damper	305 x 102 mm
Cooling Coil	Cu/Al 0.421M2A-6R-7T-12FPI	Filters	G4, F6, F9, H13
Fan	DETON TAE-280-K (CHINA)	Unit Weight	876 kg

Casing Details:			RA Damper Selection:	
Inner Sheet	0.6 mm	Preplasticized steel sheet	Flow	0.76 m^3/s
External Sheet	0.83 mm	Galvanized sheet	Dimensions	711 x 254 mm
Insulation	PUFOAM		Air Velocity	1.37 m/s
Casing Strength	D1 (M)		Pressure Drop	19 Pa
Thermal transmitt.	T2		Driving Shaft	1
Thermal Bridging	TB3		Actuator	No

Access Door:
500 x 600 mm
500 x 600 mm
500 x 600 mm
500 x 600 mm
500 x 600 mm
Handles + Hinges + Window

ag	AAF H13 Panel			
	Avg	Clean	Final	Avg
	270 Pa	250 Pa	500 Pa	375 Pa
:	289x594 mm x 03 qty			
/:	289x594 mm x 03 qty			

ized Steel	Flow	0.76 m3/s
	Air Density	1.2 kg/m^3

Coil Face Velocity	Pressure Drop
1.81 m/s	125 Pa
Connection Size	
DN 40 mm	
DN 40 mm	

ized Steel	Flow	0.76 m3/s
	Air Density	1.2 kg/m^3

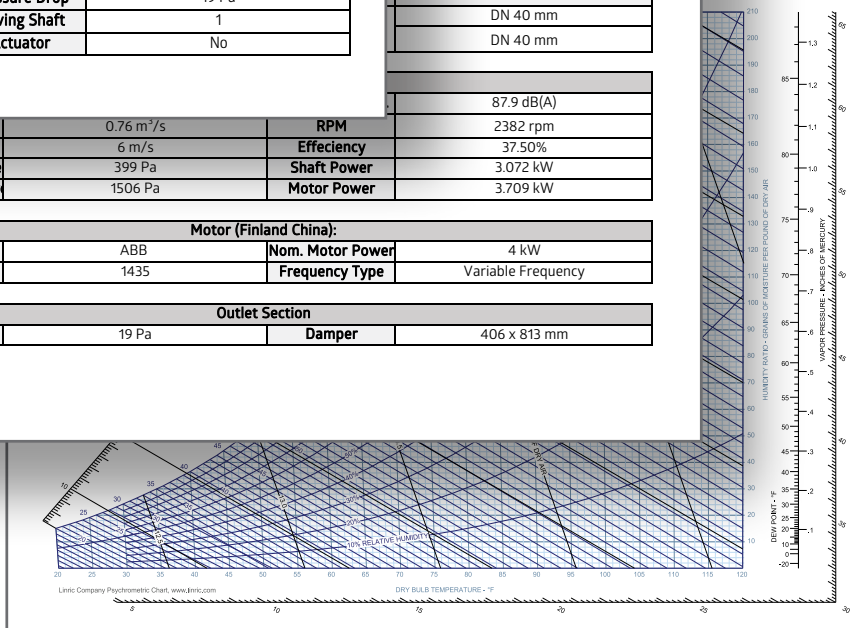
Coil Face Velocity	Pressure Drop
1.90 m/s	15 Pa
Connection Size	
DN 40 mm	
DN 40 mm	

	87.9 dB(A)

Flow rate	0.76 m^3/s	RPM	2382 rpm
Fan oulet velocity	6 m/s	Effeciency	37.50%
Ext.Static Pressure	399 Pa	Shaft Power	3.072 kW
otal Static Pressur	1506 Pa	Motor Power	3.709 kW

Motor (Finland China):			
Model	ABB	Nom. Motor Power	4 kW
Motor RPM	1435	Frequency Type	Variable Frequency

Outlet Section			
Pressure Drop	19 Pa	Damper	406 x 813 mm



Applications

Pharmaceuticals

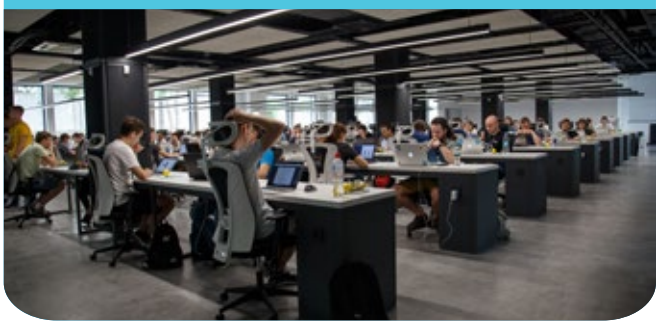
Clean Rooms

Industrial

Hospitals

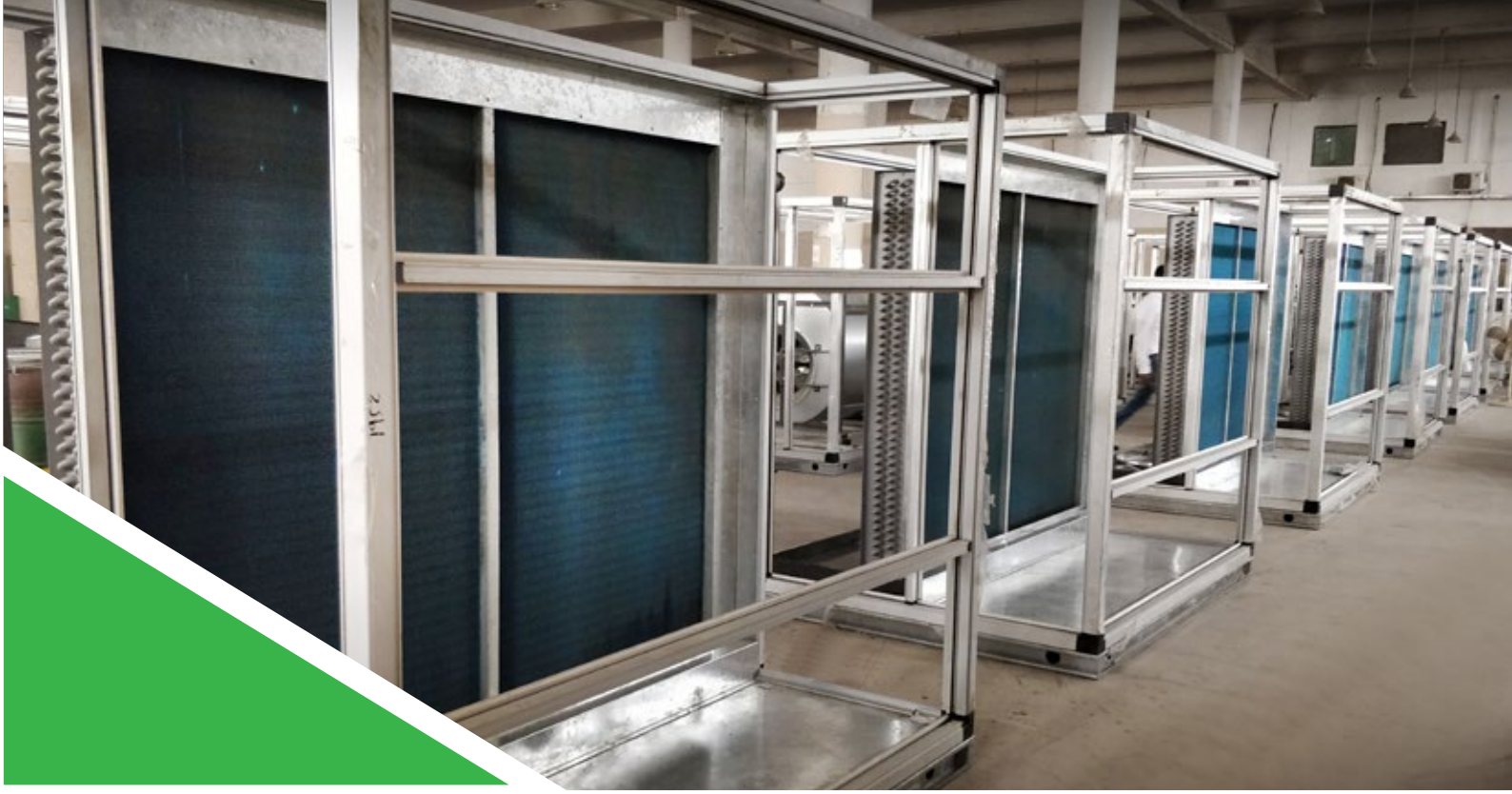
Hotels & Restaurants

Commercial Office



Server Room

Shopping Mall



Installations, Precautions, Maintenance & Service

1) Horizontal foundations need to be constructed with respect to unit dimensions and drainage access, being a minimum of 200mm above the ground level.
2) Before commissioning, the interior of the unit should be thoroughly cleaned for debris.
3) Air filter are delivered separately and should be installed at the time of commissioning of the unit.
4) No excessive force should be applied while connecting the coil connections to ensure no damage is done to the coil and its circuiting.
5) U-shaped drain pipe must connect the condensate discharge pipe to the external drain pipe. The drain pipe should be inspected for any initial blockages before commissioning.
6) The coil fins should be cleaned with a high pressure air pipe or vacuum cleaner and then nylon brush. The internal area should be cleaned by washing after 2 to 3 years of coil operation.
7) The unit and ducting should be connected with a flexible connection to ensure no vibrations is transmitted.
8) The unit's electrical wiring should be connected the power supply with over-load protection and grounding protection. The minimum start-up voltage of the unit must be kept above 90% of the rated voltage, the voltage during operation must be within ±10% of the rated voltage and the voltage difference among all phases shall be within ±2%. Unstable power supply, and under-voltage will damage the unit's motor.
9) The fan rotation should be checked to be in the right direction to ensure the wiring is done correctly.
10) The belt tightness should be readjusted after one week of operation and should be inspected regularly at intervals of one month.
11) Unit maintenance should only be conducted once the unit's power supply is turned off.
12) The filters should be inspected twice each month regularly and should be changed once the differential pressure gauges resistance exceeds the following limits:

Filter efficiency	Final resistance (Pa)
G4	150-250
F6	250-300
F9	400-500
H13	400-600

Psychometric Chart

Basic Calculations

Face Area (sq. ft.) = Dehumidified Airflow (cfm) / Face Velocity (fpm)
Water flow Rate (GPM) = Btuh / 500 x (Delta T)

Chilled Water Coil Selection Example

Given Details:

- Volume flow rate: 10,000 cfm
- Entering Coil: 80.6°F DBT / 66.2°F WBT
- Leaving Coil: 53.6°F DBT
- Inlet Water - Outlet Water: 44°F – 54°F

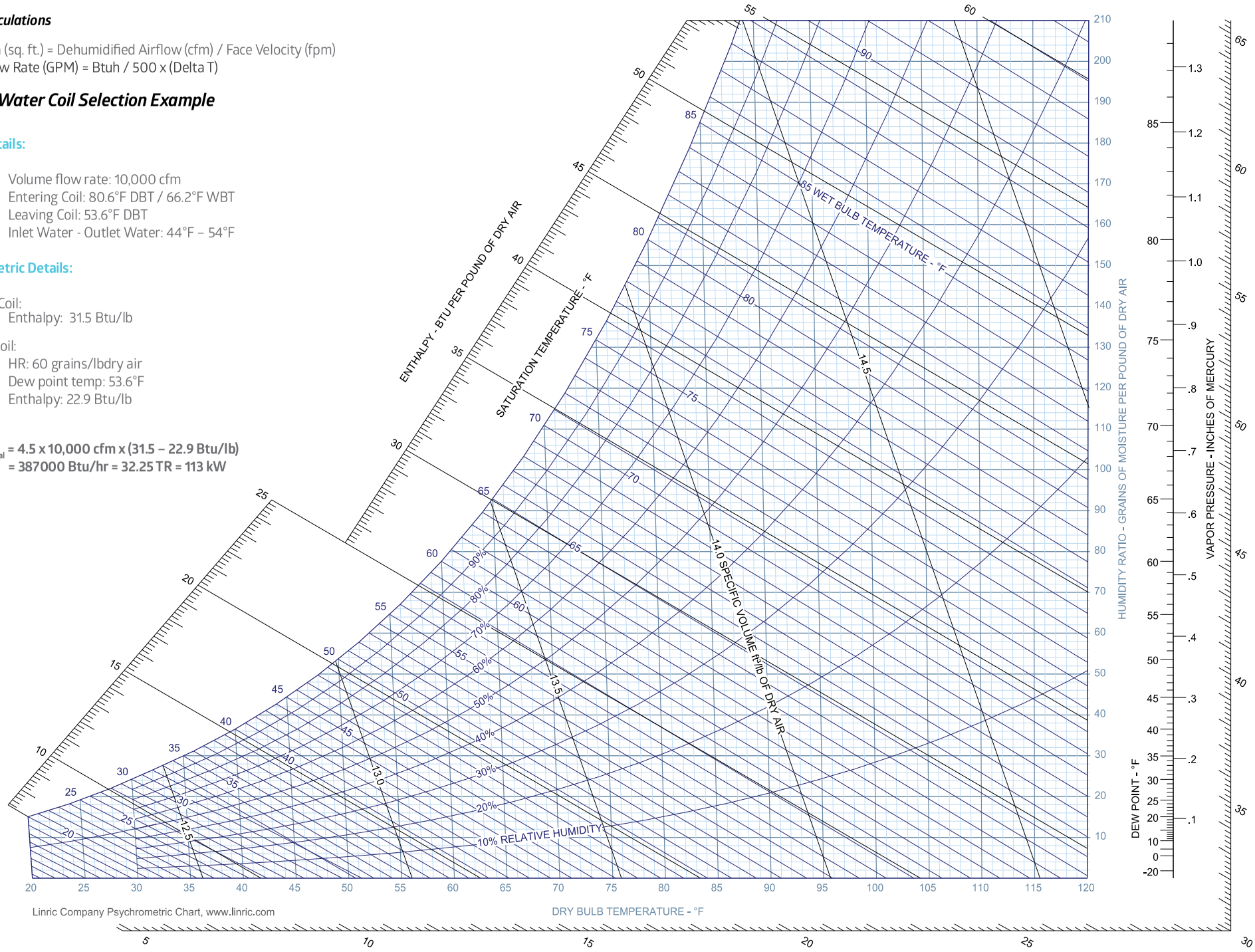
Psychometric Details:

Entering Coil:
- Enthalpy: 31.5 Btu/lb

Leaving Coil:
- HR: 60 grains/lbdry air
- Dew point temp: 53.6°F
- Enthalpy: 22.9 Btu/lb

Result:

Q_{total} = 4.5 x 10,000 cfm x (31.5 – 22.9 Btu/lb)
= 387000 Btu/hr = 32.25 TR = 113 kW



COOLMAX Airconditioning (Pvt) Ltd.

HEAD OFFICE

D-22, Sultan Salahuddin Ayubi Road Phase-1, SITE-2,
Ahsanabad Superhighway - Karachi - Pakistan
Tel (92-21) 36411550
Email info@coolmax.com.pk

LAHORE OFFICE

160-D, Faisal Town,
Lahore, Pakistan
Tel (92-42) 35227876
Email info@coolmax.com.pk

ISLAMABAD OFFICE

House # 1, Street 16, Sector-H, DHA
Phase - II, Islamabad, Pakistan.
Tel (92-51) 2311798 | GSM 0331-5231617
Email info@coolmax.com.pk

www.coolmax.com.pk

nqa. ISO 9001:2015 Registered Quality Management

UKAS MANAGEMENT SYSTEMS 015

MADE IN PAKISTAN

Arsan Adv. 021-34531176-86