

ACP AIRCONDITIONING

ECO - COOL



COOLING and
DE-HUMIDIFICATION
WITHOUT USING REFRIGERANTS



THE DAWN OF A NEW ERA

Political and ecological pressures over the past few years, have led to a change of emphasis in the design of fully air-conditioned buildings.

Sick Building Syndrome and the recommended maximum absolute humidity level in occupied buildings, has highlighted the advantages of all fresh air central station plant with full humidity control.

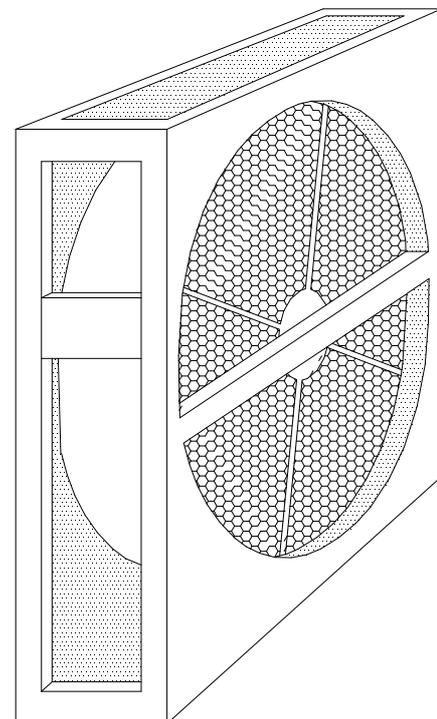
Much attention is now being focused on desiccant cooling / de-humidification systems, which can provide a substantial part of a buildings cooling requirements on a central station Air Handling Plant, and allow rigorous control of humidity. This aspect can be most important, not only from a health stand point, but is also vital for successful applications with chilled beams and ceilings

THE HEART OF THE SYSTEM.

The desiccant cooler is a rotating wheel which is capable of transferring both heat and moisture between the Exhaust and Supply air streams.

The matrix is of a honey combe structure, manufactured from silica gel in a special process, offering an extended hygroscopic surface for the adsorption of water vapour.

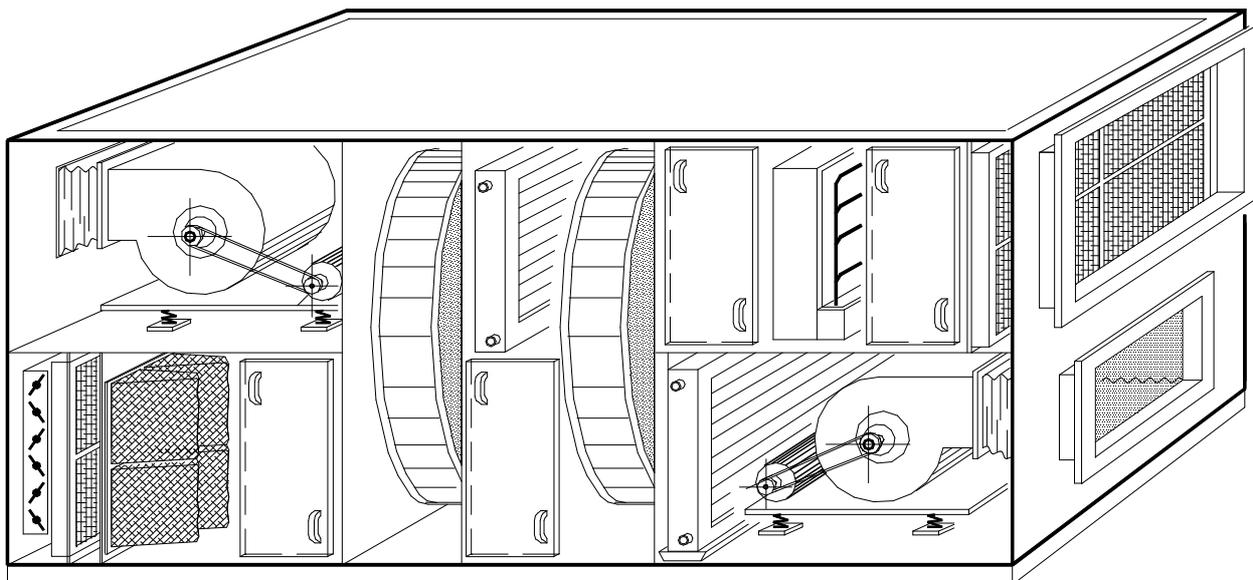
The wheel is constructed in a cassette form with rotating motor and purge section, similar in many ways to the conventional Thermal Wheel.

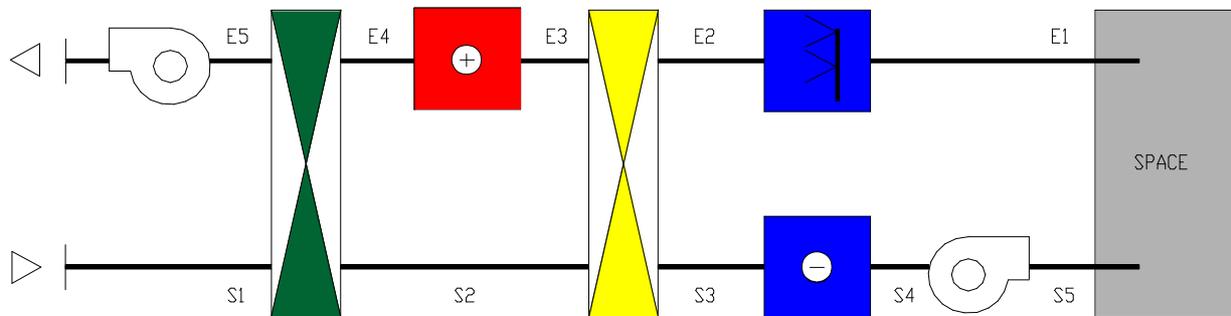




Let us Examine the Advantages

- ◆ Desiccant cooling allows control of space humidity level to be maintained plus provides a substantial part of the sensible cooling requirement at summer conditions.
- ◆ The system is ideal for chilled beam or ceiling installations where as well as absolute humidity levels, surface dewpoints must also be strictly controlled to prevent condensation.
- ◆ Energy input for regeneration reaches a peak at summer design conditions. Conveniently available building boiler plant can then be used, without additional capital cost, as boiler output is usually well within the ECO - COOL requirement when selected to satisfy heat demand at winter conditions.
- ◆ It is important to recognise that the largest energy use in U.K installations is for the winter heating cycle. The Eco - Cool system enables a remarkable 85% or more of the sensible heat and moisture to be recovered, drastically reducing heating and humidification costs.





How Does It Work ?

Exhaust Side

Air returning from the space at (E1) is filtered before passing through a humidifier which increases the moisture content and reduces the db of the air. With the adiabatic cooling process condition (E2) is reached.

Exhaust air then passes through a thermal wheel where dry bulb temperature increases (E3),

Next the air passes through the regenerator which increases the dry bulb temperature without change in moisture content (E4).

The air then enters the desiccant cooler and exchanges energy with the cooler supply air. Moisture is extracted from the supply side and absorbed by the extract air before being rejected to atmosphere (E5).

Supply Side

Ambient air (S1) is filtered before reaching the desiccant cooler. The moisture content is reduced and dry bulb temperature increased (S2).

This warm dry air then exchanges heat with the colder exhaust air (E2) to provide condition (S3).

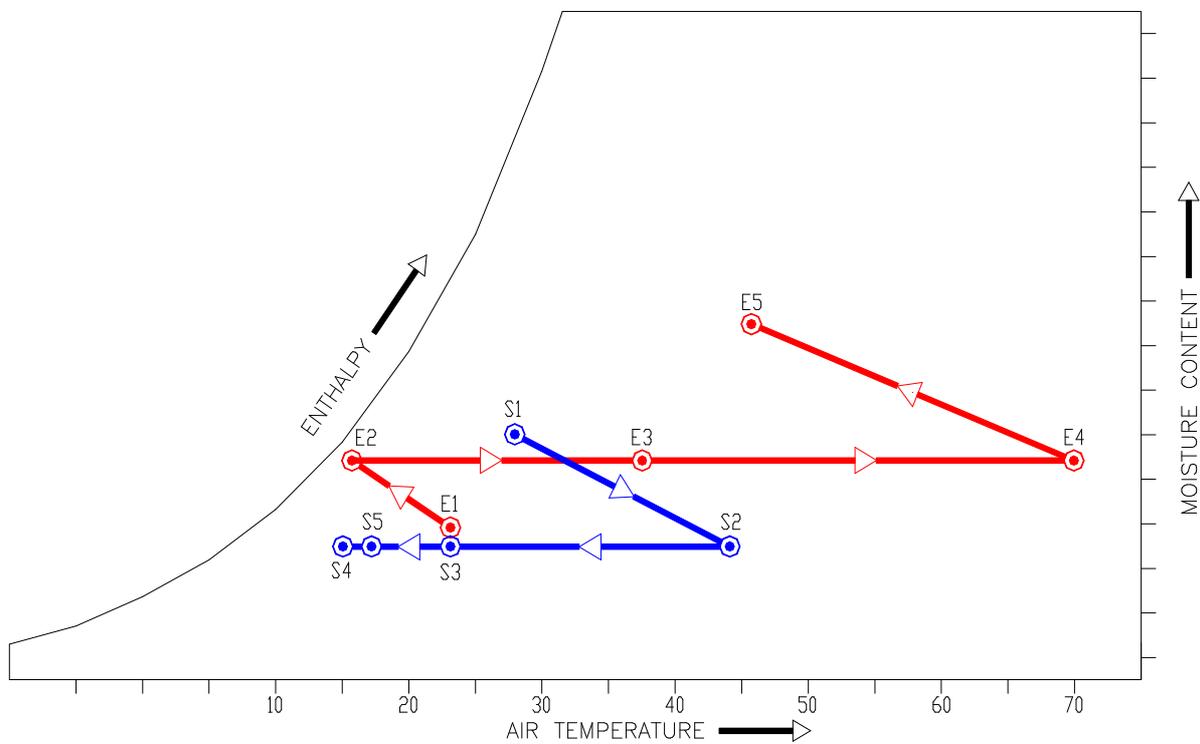
Supply air then passes across a cooling coil where conventional cooling reduces the temperature to (S4).

The air is supplied to the space at condition (S5).



EXAMPLE PSYCHROMETRIC DATA

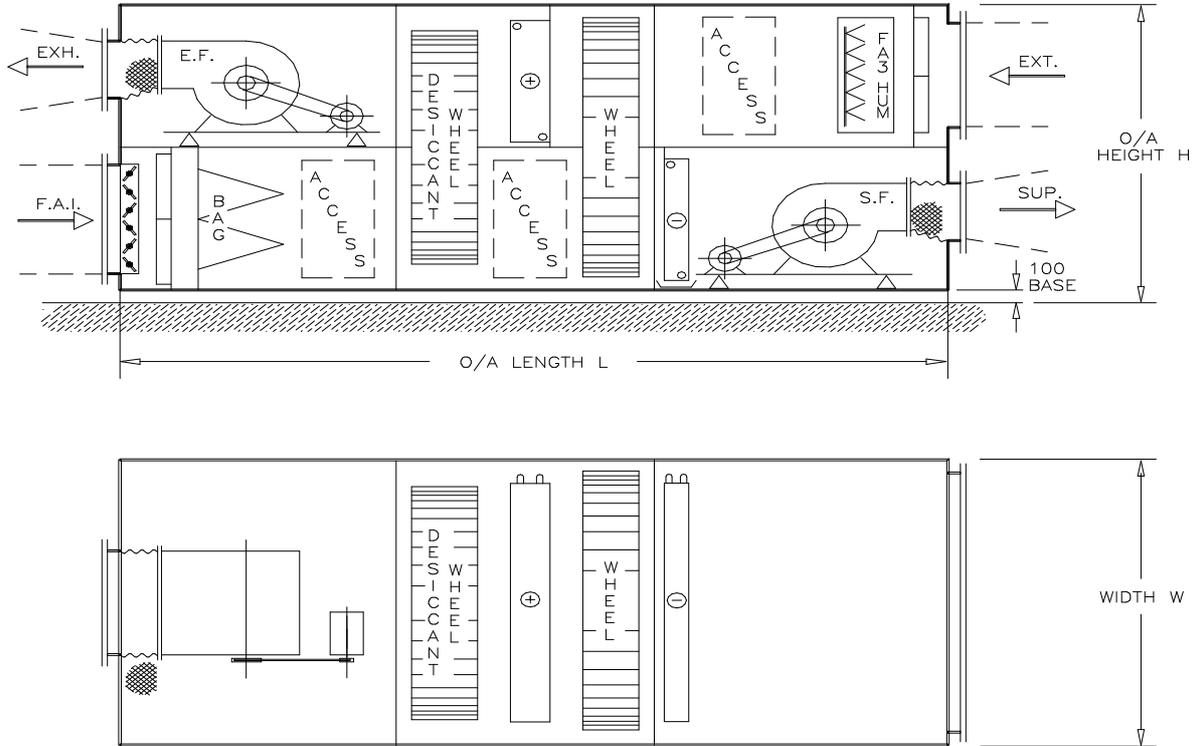
E1	Exhaust air entering AHU	23 C 6.8 g/Kg
E2	Exhaust air leaving humidifier	15.81 C 9.76 g/Kg
E3	Exhaust air leaving thermal wheel	37.27 C 9.76 g/Kg
E4	Exhaust air leaving regeneration heater	70 C 9.76 g/Kg
E5	Exhaust air leaving desiccant wheel	46 C 16 g/Kg
S1	Fresh air entering AHU	28 C 11g/Kg
S2	Supply air leaving desiccant wheel	44.4 C 6.1 g/Kg
S3	Supply air leaving thermal wheel	22.9 C 6.1 g/Kg
S4	Supply air leaving cooling coil	15 C 6.1 g/Kg
S5	Supply condition	16.5 C 6.1 g/Kg





Eco-Cool

Refrigerant Free Cooling and De-Humidification



DIMENSIONS				
MODEL	MAX AIR VOL M3/S	H	W	L
REFERENCE				
ACEC 95	0.8	1150	1150	5000
ACEC114	1.3	1350	1350	5000
ACEC131	1.7	1500	1500	5000
ACEC146	2.2	1670	1670	5400
ACEC162	2.7	1850	1850	5400
ACEC203	4.4	2200	2200	5400
ACEC254	7.1	2900	2900	5700
ACEC304	10.3	3300	3300	6500
ACEC370	14.8	3900	3900	7000

Additional cooling available; Chilled Water or DX.

Regenerative heat source options; LPHW, Steam, Electric, Gas or Oil

Filtration options; EU3 to EU14

Controls options; Full air side and power controls, built in packages available



The component parts of any full ECO - COOL package are standard from our range of "CONSORT 2000" Advanced Air Handling Equipment, for full technical description of individual elements, please refer to publication "Consort 2000".

1. Desiccant Cooler.

The principle component in the ECO - COOL system is the desiccant cooler. Essentially this consists of a rotating wheel within a metal housing, with central drive shaft, motor and bearings. This arrangement provides a huge extended surface of hygroscopic and thermal storage material to the air flow. Extract and supply air streams pass in opposite directions through each half of the wheel, with a purge sector incorporated, and the rate of heat and moisture transfer can be controlled by the speed of rotation, and regeneration temperature adjustments.



2. Thermal Wheel.

This component of the ECO - COOL system provides the means of transferring heat energy between the extract and supply air streams. It is similar in construction to the desiccant wheel. The thermal wheel also consists of a central drive shaft, motor and bearings. The core of the wheel is constructed of alternative layers of plain and corrugated aluminium, with supply and extract air streams passing in opposite directions through each side of the wheel. A purge sector is included and the rate of heat transfer is regulated by controlling the speed of operation.

3. Humidifier.

A basic component of the ECO - COOL system is the adiabatic cooling of the supply air by the extract air. The humidifier consists of water sprayed onto, or trickling down, an extended surface positioned across the exhaust air stream. The close contact causes 85% or more saturation to be achieved, at the same time reducing the dry bulb temperature.

The humidifier contains drain tray, circulating pump and spray pipework system, necessary for certain duties and applications.

CABINET SPECIFICATION.

FRAMEWORK:

Each AHU or AHU section is fabricated with a framework of 50mm extruded aluminium boxed section with die cast aluminium or nylon corner joints and accessories.

OPTIONS: Anodised finish, nylon corners and accessories, extensions for valves, bulkhead lights wired to outside switch, enclosures for control panel, enclosure with internal walkway (on larger units).

PANELS:

The frame is clad with 25mm thick double skinned insulated panels, which fit into the rebated edges of the corner or intermediate section, to form a continuous flush surface.

Minimum metal thickness is 0.9mm and outer skin is plasticised steel sheet. Inner skin is self-finish galvanised steel sheet. Standard colour finishes are available.

All access panels are sealed against framework with "rubber" gasket.

On 50mm framing, a tubular rubber gasket can be mechanically fitted to a preformed groove in the section for extra quality seal.

OPTIONS: 50mm panel thickness, increased metal skin thickness, range of alternative colour finishes, range of acoustic constructions - high density board, perforated inner skin, septum plates, thicker panel skins, etc.

ACCESS PANELS:

Panels secured in place by compressive hand operated locks.

Complete with pull-off grips or grab handles (depending on panel size).

OPTIONS: Lift off doors, hinged doors, tool operated lockable handle, key operated lockable handle, single half turn compressive hand operated latch, double handle with internal release, inspection windows, electrical interlock switches fitted.

INSULATION:

25mm thick mineral wool slab, minimum density 45 Kg/m³

EXTRAS: High density acoustic infill.

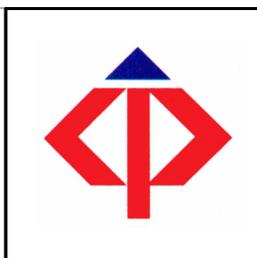
BASES:

Each AHU (or AHU section) is normally fitted underneath with a base frame.

After fabrication the base is cleaned, primed and finished in black hammerite paint or anodised on aluminium bases.

EXTERNAL AHU: Fitted with pitched weather roof overhung all round as standard. All fixed panels mastic sealed in place and additional gaskets used on removable panels.

PRESENTED BY



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