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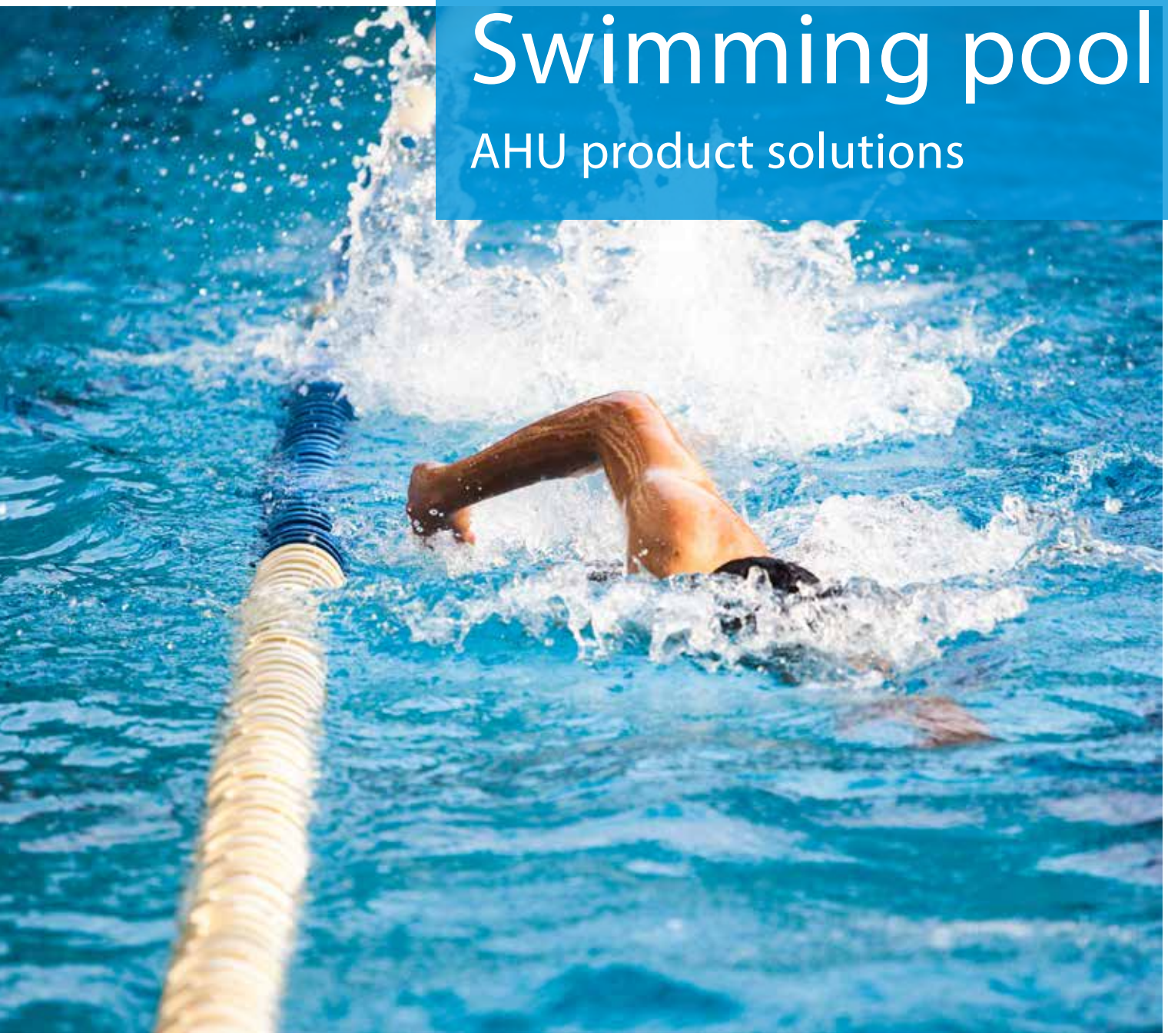
Technically better...

Swimming pool

AHU product solutions



AHUs

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High humidity

Swimming pool and leisure AHU overview

Overview

Due to the high humidity and moisture content of swimming pool and leisure applications, it is essential that robust, reliable, and resilient ventilation solutions are designed and procured to ensure that the needs of the application are met. DAPUK's Swimming Pool AHU solutions are all bespoke with careful consideration of the application, ensuring the highest quality, energy-efficient and maintainable AHU solutions that meet the ventilation and IAQ needs of the project are supplied.

Daikin Applied UK has been manufacturing and supplying AHUs to the UK for over 50 years, across a variety of sectors. Our engineers are well-versed in the needs of high humidity and moisture applications and can design bespoke, cost-effective AHU systems to meet your needs. We also offer the availability of full life cycle care of our products, from manufacture and supply to site support and long-term maintenance contracts.

AHU features

› 42mm/62mm (airflow dependant) anodized aluminium, thermal break framework with rounded profile for easy internal cleaning.

› Corrosion resistant precoated granite internal & external skins (double skin construction) with either 120kg/m3 density rockwool insulation to Euroclass A or 38kg/m3 density HCFC & CFC free foam insulation. SS304 & 316 skins are also available.

› All access doors complete with gasket seal & adjustable hinges to eliminate leakage.

› 500mm hinged access doors to critical components for maintenance.

› High degree of filtration to meet the needs of the space. All frame & media constructions to consider the high humidity and chloramine content.

› High efficiency energy recovery up to 90% efficient with integrated recirculation capabilities (PHE).

› High efficiency, spatially effective EC fans with IE5 motors and on-board VSD.

› Suitable base height to facilitate trap depths & section lifts. External AHU supports by others.

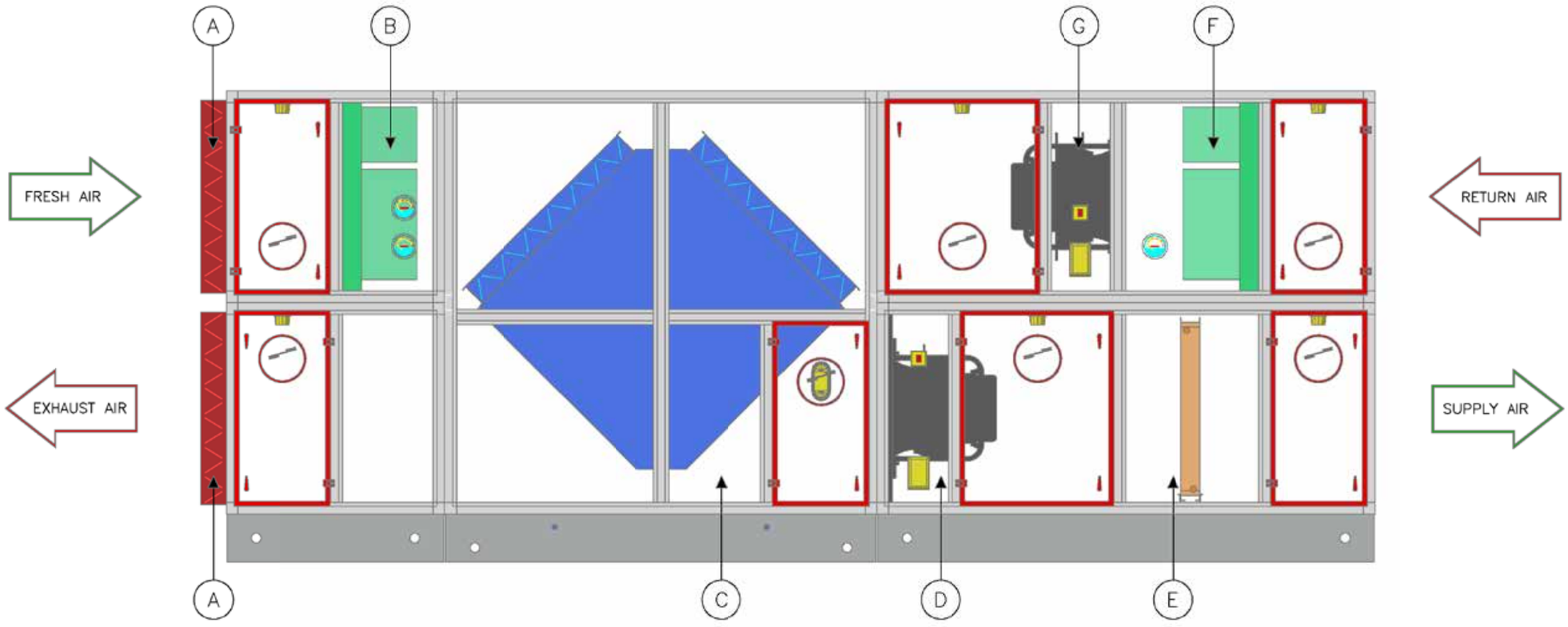
› Stainless steel and epoxy coated parts to ensure high level of protection against corrosion as a result of high chlorine & moisture content.

› No galvanized steel internally due to its poor corrosion resistance against chlorine.

› BS EN 1886 T2/TB2/D2/L2 compliant solution.

Swimming pool

AHU design



A: Class 4 aluminium epoxy coated opposed blade low leakage dampers.

B: Pre & Panel filtration to meet the IAQ needs of the project. Minimum Coarse 60% pre-filters & ePM1 ≥50% bag filters. All filter frames to be SS316 to ensure suitable corrosion resistance against the high concentration of chloramines.

C: High efficiency heat recovery to satisfy the latest ERP EU1253 regulations. PHE's will be epoxy coated to ensure suitable corrosion protection. Stainless steel drain pans will be fixed and on both side of the plate heat exchanger with suitable access for maintenance. Standard bypass or bypass & recirculation options are available.

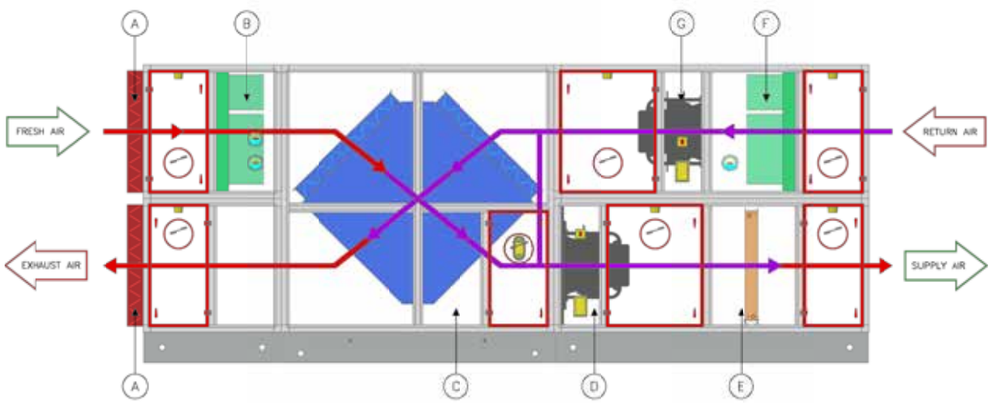
D & G: High efficiency EC fans complete with on-board VSD that runs off a 0-10v signal. All fans will be painted and mounted on a SS316 bulkhead to ensure suitable corrosion resistance against the high concentration of chlorine.

E: Re-heat coil available as either LTHW or condenser coil. Typical construction to be copper header/copper tube/aluminium vinyl fins, SS316 casing to ensure a high level of corrosion resistance.

F: Return filtration, typically ISO Coarse 60% G4 or in applications with application, ePM1 >50% F7, to ensure a high level of air quality is re-delivered to the space. All filter frames to be SS316 to ensure suitable corrosion resistance against the high concentration of chlorine.

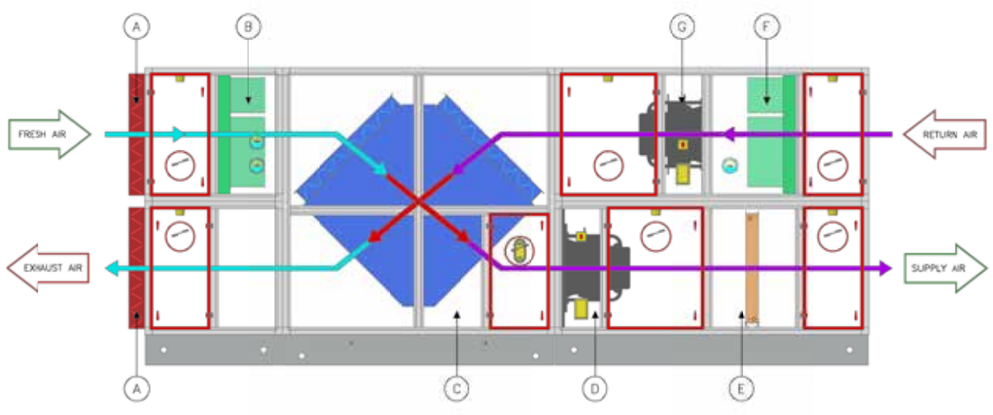
Swimming pool AHU

Operation modes



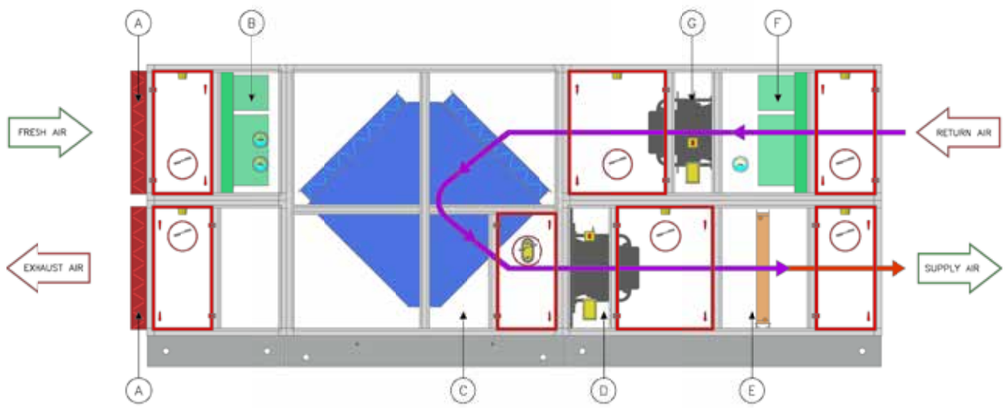
Normal mode

Normal mode utilises a mixture of fresh air and recirculated air to meet the desired set-points. Heat is recovered via fresh air and extract air passing over the plates of the plate heat exchanger. An element of air bypasses the plate heat exchanger completely and is recirculated through the integrated recirculation damper. The mixture of the heat recovered fresh air and the high temperature recirculated air boosts the supply temperature and humidity to levels closer to the desired set-points, reducing the need for additional heating via heating coil.



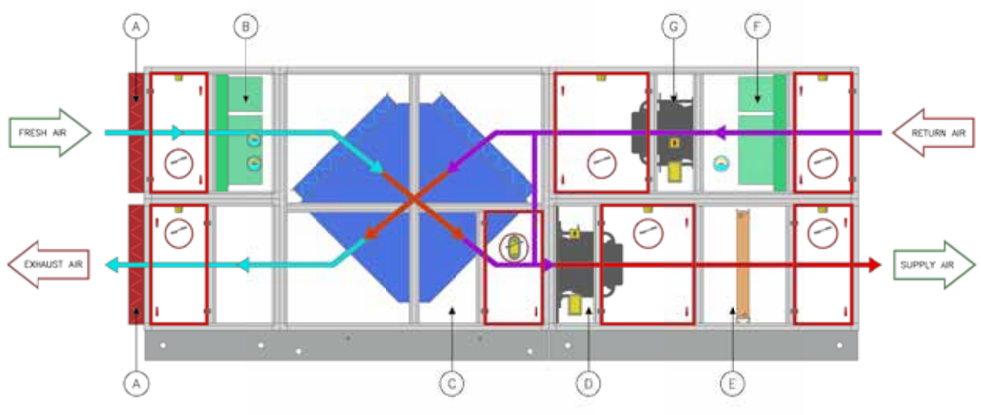
Fresh air mode

Full fresh air mode ensures there's no recirculation occurring in the system. This allows for entirely full fresh air to be tempered through means of the PHE & heating coil. This mode is often utilised in the height of summer where leisure centres & pools see an increase in humidity due to the increased number of visitors. This higher level of humidity in the space compromises the use of recirculation, so a full fresh air system must be utilised to deliver set-point.



Recirculation mode

Recirculation mode utilises the full opening of the recirculation damper of the PHE to ensure that most of the extracted air is recirculated and delivered back to the space. This mode is often utilised at night to maintain temperature & humidity levels when the pool hall is unoccupied. Fan speed is often ramped down in this mode, as the duty requirement to maintain conditions also decreases as the space remains unoccupied.

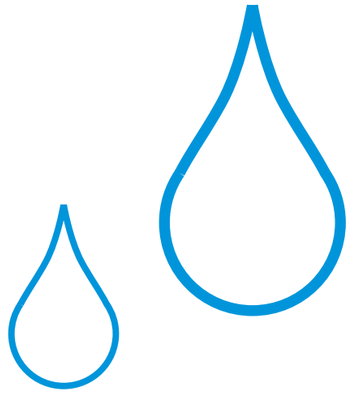


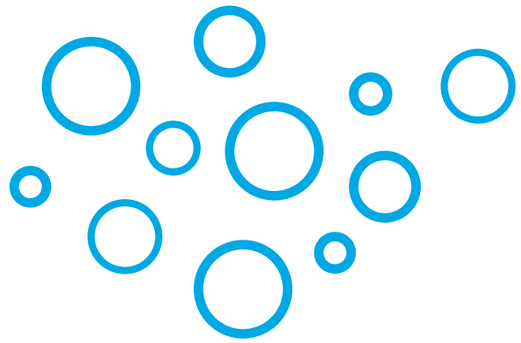
Winter mode

Winter mode operates under a very similar principle to normal mode whereby there is a mixture of fresh air and recirculated air being supplied to the space. The difference being, that there is a significant increase in the amount of recirculated air vs the amount of fresh air being supplied. For instance, in winter, it is not unusual to see up to 75% of the air being recirculated, with only 25% being fresh air. This is because, the colder outdoor temperatures in winter yield a lower temperature off the heat recovery into the supply air, so in order to maintain set-point the LTHW must provide the majority of the heating, reducing the energy efficiency and increasing the running costs of the system. By utilising a higher level of recirculation, that temperature and humidity level, mixes with the lower air conditions off the PHE to raise the air temperature and humidity closer to set-point, significantly reducing the load requirements of the LTHW coil.

Material and construction

Critical considerations for AHUs





Challenge: Chloramine corrosion

AHU effect: Internal material consideration

› Most UK swimming pools have a chlorine concentration between 1-3 ppm. High concentrations of chlorine such as this cause the formation of chloramines; a type of gas formed in the air above chlorinated water. High concentrations of chloramines are detrimental to air quality, which is why it is particularly important to ensure that swimming pools are sufficiently ventilated via an AHU to ensure that the air quality meets the needs of the users. The extraction of air with a high concentration of chloramines means that the internal AHU material is susceptible to pitting and corrosion. Careful consideration needs to be made for the internal AHU components to minimise corrosion, uphold AHU life expectancy, and maintain high indoor air quality.

› Epoxy painting of heat exchangers and dampers provides an additional level of protection resistant to chemicals such as chlorine. It is often cost effective and extremely durable.

› Pre-painted sheet steel internal skins provide additional corrosion resistance to chemicals such as chlorine/chloramines. Tested to satisfy C5 pitting corrosion resistance.

› SS316 to coil casings, internal sheet steel and drain pans provides protection against chloramines. SS316 has been utilised in applications where exposed to chlorine concentrations of up to 3-5ppm due to its high chemical corrosion resistance. Its important that SS316 is considered above SS304 due to the enhanced properties of SS316, with SS304 performing poorly for corrosion resistance for such applications in comparison.

› Vinyl coated fins on coils, provides a protection to the exposed coil fins to prevent chloramine corrosion.

Challenge: Humidity and moisture

AHU effect: Internal material consideration, drainage and filtration

› Swimming pools and sauna applications include for high temperature and humidity due to the continuous evaporation of water at the pool surface. The air is extracted by an AHU and as it meets fresh air via heat recovery, a large amount of condensation can form. This can also occur on the supply side when recirculation is taking place.

› Many material and design solutions that protect against moisture and condensation, and chloramine corrosion are the same. However, its important to note that drainage shall be provided on both the supply and extract side of the PHE due to this being the focal point for all mixed air conditions.

› Filtration must be suitably considered to ensure the high humidity does not cause the filter media to wet out and compromise its function.

Challenge: Temperature

AHU effect: Thermal transmittance and bridging considerations

› Pool halls and saunas have high temperature conditions. Set-points must be maintained so air of an equivalent temperature is resupplied to the space through consideration of the supply side operation of the AHU.

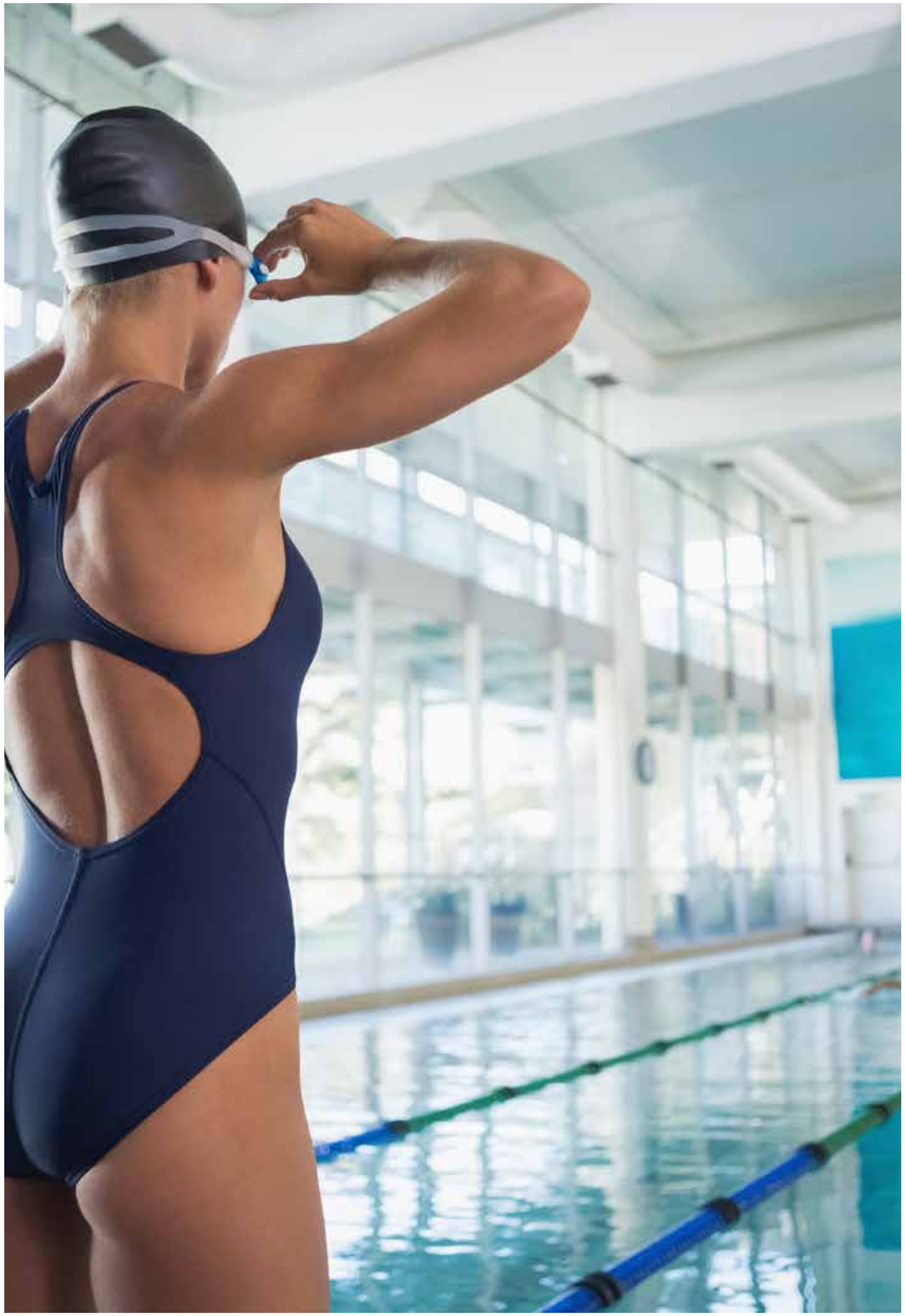
› When the temperature differential between the internal AHU air conditions and the external ambient air is significant (during winter), design for suitable thermal transmittance or bridging must be considered, and careful consideration must be made for the AHU framework and panel design to avoid significant heat loss and condensation forming around the framework and panels. Over time, this can have a significant wearing effect on the materials and pooling around the AHU. The minimum construction recommendation is BS EN 1886 T2/TB2.

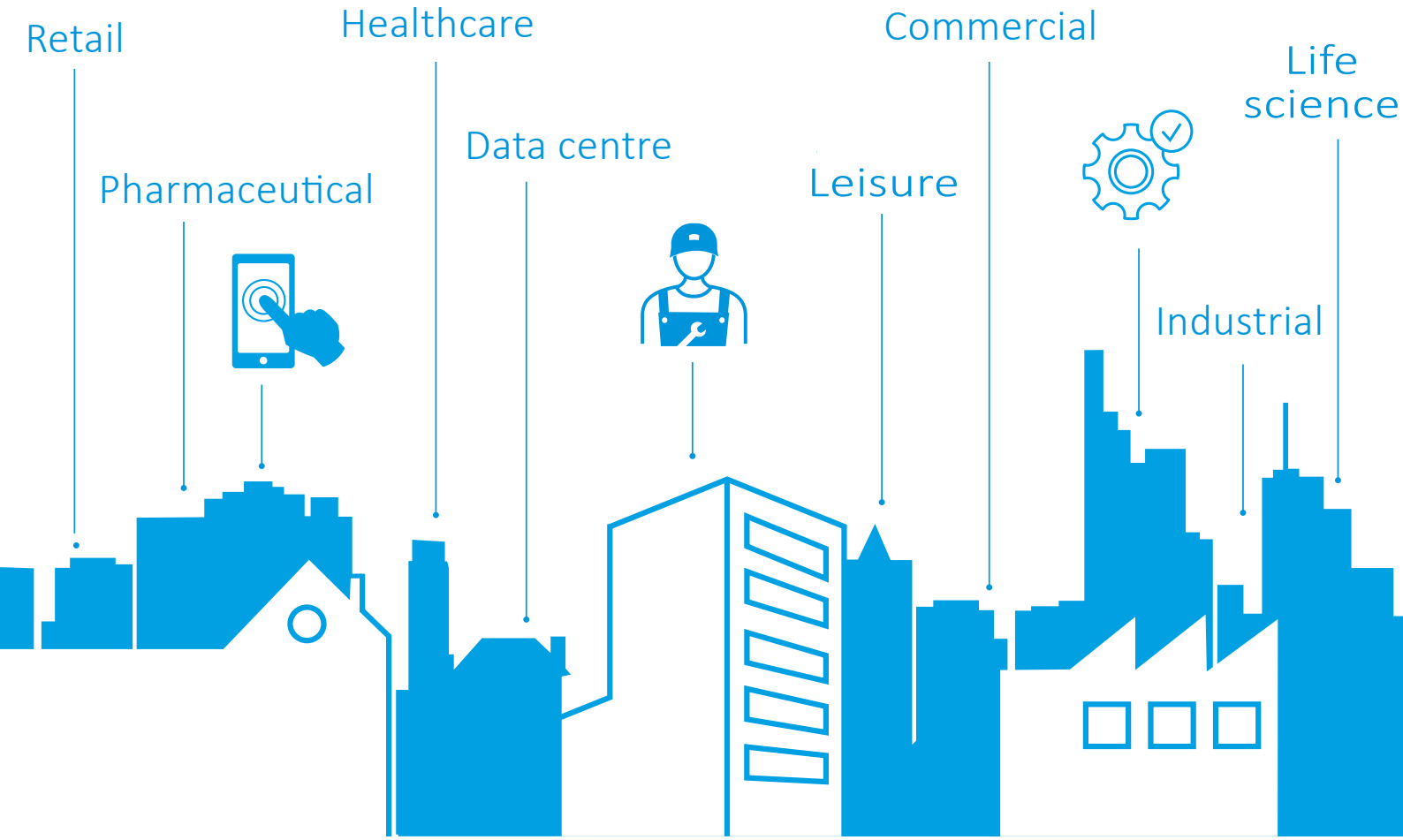
› All of DAPUK's AHU's satisfy BS EN 1886 T2/TB2, and have been Eurovent certified to this standard.

Swimming pool AHU

Item material list

Item	Material
External Panel Skins	Pre-coated Steel
Internal Panel Skins	Pre-coated Steel
Dampers	Epoxy Coated Aluminium
Coil Slides/Mounts	SS316
Fan Bulkheads	SS316
Block off plates	SS316
Drain Trays	SS316
Filter Frames	SS316
Coil Tubes	Copper
Heating Coil Fins	Aluminium Vinyl Coated
Cooling Coil Fins	Aluminium Vinyl Coated
Coil Casings	SS316
Plate Heat Exchanger	Epoxy Coated Aluminium
Thermal Wheel	Epoxy Coated Aluminium
Fan Frame	Powder Coated Steel
Fan Support Plate/Inlet Nozzle	Painted Steel





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