Swimming Pool Ventilation Guidelines - Menerga

Typical Conditions
The pool hall temperature in most public pools is maintained around 30°C. To limit the evaporation of water from the water surface, it is common to have the pool water temperature 1-2°C lower than the pool hall temperature. With respect to the comfort conditions for the bathers, it is acceptable for the humidity to remain within a range of 50% to 60%. Pool halls require more energy than any other public building (by an order of magnitude) with virtually year-round heating (in the UK). Fan motor power consumption is high because the ventilation system runs continuously. Ensuring minimum energy for the air supply has a much bigger impact than focusing on the water (which can only be heated at a rate of 0.5°C per day and once at temperature requires minimal input).

When calculating the amount of fresh air required for dehumidification, please consider the following:
- The surface area of the pool & characteristics of the pool usage
- The difference between the vapour pressure of the pool water & the vapour pressure of the saturated air in the pool hall
- The air changing rate should be between 4-6 per hour according to the air distribution principle
- CIBSE guidance currently states 10 l/s per m² total floor area (based on a public pool 25 x 13m)

To calculate the heating demands of the pool hall, the following calculations are required:
- Transmission loss
- Energy lost due to the heat required for water evaporation
- Heat energy required to cover the water evaporation

Temperature, Humidity Control & Energy Consumption
Most pool units are designed to ventilate, heat and dehumidify a space. To ensure the best performance at the lowest lifecycle cost, several key factors should be noted:
- Fully controllable eC direct drive fans – no one should be using belts in this day & age
- The ability to maintain a small negative pressure at all times – through varying usage & volume requirement, with as close to balanced air flows to maximise heat recovery
- High passive heat recovery efficiency – so there is no penalty for introducing outside air >95%
- Minimal (ideally no) metallic parts in the air paths to avoid corrosion or acid attack
- Polypropylene based recuperators, ABS grade fixtures & fittings, flexible duct connections, plastic damper cogs
- Accurate, self-contained, real time control systems – the unit must always be able to calculate the most efficient mode of operation from real time measurements of outside & return air conditions

| Annual Running Cost Comparison Pool Hall Ventilation for 25 x 15m Pool |
|---------------------------------|----------|--------|
| Conventional equipment meeting 2010 Part L | £/year  | 17188  |
| High efficiency units exceeding 2010 Part L | £/year  | 4920   |
| YEARLY Swimming pool hall vent system energy saving | £/year  | 12268  |

Assumptions made:
- 3.8m³/s air volume
- Pool hall 30°C 60% rh, year average 10°C 84% rh
- Conventional AHU SFP 2.0W l/s heat recovery efficiency 60% year average
- High efficiency AHU SFP 1.6W l/s heat recovery efficiency 90% year average

Outside Air Requirement
Under UK CIBSE guidance, a minimum of 30% outside air is required at all occupied times to supply a public swimming pool. For much of the year, this proportion of outside air is enough to dehumidify the pool hall. By maximising heat recovery efficiency there is no penalty to introducing more outside air when required, ensuring running costs are simply for top up heating to overcome fabric transmission losses within the space, and power for the constantly running fans. The ability to have full outside air bypass is critical to ensuring good conditions year-round in the UK.

This also gives you peace of mind that the required outside air can always be delivered for a healthy atmosphere. Using the controls to ensure conditions are met with no risks.

By eliminating the need for a heat pump, you can reduce electricity costs, maintenance costs and minimise the number of components that can fail.

Why pay for a heat pump and additional circulation electricity when the outside air required by law can dehumidify for you for the cost of running the fans?

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Menerga slot diffusers reduce:
- Transmission heat loss by approx 20%
- Fan motor power consumption by more than 25%