Architen ETFE System

Air Handling Unit

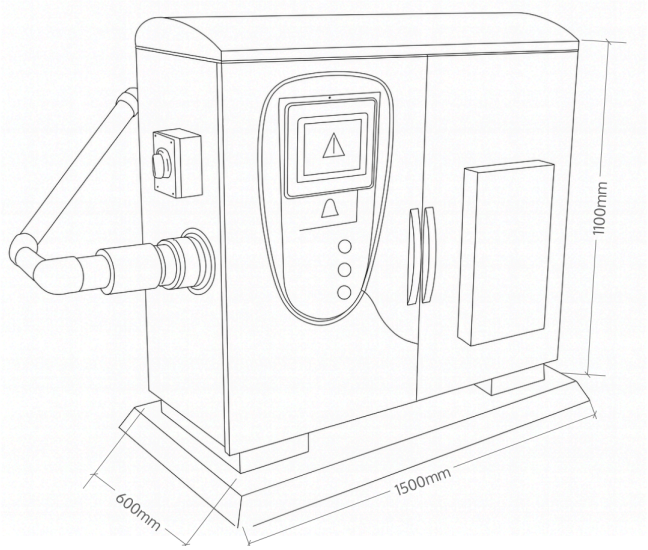
Keeps ETFE cushions at a constant, steady pressure - monitored, controlled and energy efficient.

2,500 m²
Max area per standard AHU

<60 W
Typical power use

2 fans
Load-sharing & redundancy

SIM / Ethernet
Remote connectivity





Architen ETFE System AHU

Architen Landrell ETFE cushion systems are supplied with a state-of-the-art Air Handling Unit (AHU) to maintain and monitor air pressure. Each unit comes prepared for a range of additional options that can be specified.

Handling up to 2,500 m², a standard Architen AHU contains two independent fans which are constantly monitored and controlled. This ensures that the ETFE cushions maintain pressure under all conditions and there is minimal wear on the motors, reducing maintenance costs and the need for replacement parts.

The system monitors the overall pressure of the cushions using a series of digital pressure sensors, allowing the AHU to diagnose any issues early on.

AHU fans run alternately during normal operation, with only one fan running at any given time. In the event of a drop in cushion pressure, both fans will run simultaneously if required to maintain steady pressure.

Architen AHUs can be networked together to provide a comprehensive multi-point inflation system. This allows a single AHU to 'take over' from adjacent AHUs if a failure is detected. With the Remote Monitoring options, Architen ETFE cushion systems can be monitored remotely via an integrated modem, allowing full diagnostics and control from any web browser and alerting (email/SMS) for alarm conditions.

Installation

A typical AHU has a footprint of approximately 1.5 m × 0.6 m (1.1 m high) and is ideally located near to the ETFE cushion system (internally or externally). ETFE cushion systems require the pressure to be continually maintained and are therefore permanently connected to the AHU.

The AHU requires a dedicated and secure 240 V 16 A power supply to ensure there are no interruptions in operation. At maximum inflation power, an AHU will consume a maximum of 100 W; in normal operation this is less than 60 W.

Key features

- Industrial PLC controller with touch screen interface, data logging and full diagnostics
- LCD panel and traffic light indicators for local status
- Dual fans for load-sharing and redundancy
- Dehumidifier
- BMS interface to replicate traffic light system status
- Non-return valves to reduce air loss
- Inverter-driven fans to optimise efficiency
- Stock parts for quick replacement

Optional features

- Weather station for reactive pressure control
- Remote monitoring via the internet
- UPS battery backup

Data

Power consumption (typical)	60 W (100 W maximum)
Fan output (each)	750 m³/h @ 300 Pa
Max pressure (each)	850 Pa
Connectivity	SIM / Ethernet
Power supply	Dedicated 240 V 16 A

Architen ETFE System Air Handling Unit - features, options & after-care

Standard AHU features

Dual fans: Each air handling unit (AHU) incorporates two fans which share the load of ensuring the ETFE cushions maintain their pressure. In adverse weather conditions, when a drop in pressure occurs, both fans will run until pressure can be stabilised.

Pressure control: As the structural stability of an ETFE cushion roof comes from the air pressure at which the cushions are maintained, all systems include a dual pressure sensor and pressure control. Systems include a minimum of two sensors, which continuously monitor the air pressure, feeding information back to the control system. Pressure control allows us to adapt the fan speed to compensate for increases and decreases in pressure to maintain a steady level.

Power inlet: Supplied with a standard 16 A C-form power inlet, the AHU can be disconnected from the main power supply and easily connected to an auxiliary power supply, e.g. a generator, if required.

LCD interface with run/error lights: The AHUs have an LCD screen mounted on the front of the unit which displays the current system pressure and pressure set point along with operation status. In addition, a set of simple traffic lights identify the status of the system at a glance.

Filter monitor: By comparing pressure inside and outside the AHU, our system can assess the performance of the filter, giving early notification of a blockage, obstruction or requirement for a filter change.

Volt-free output to BMS: For those who want to integrate the ETFE cushion system into a BMS, our AHUs are supplied with a volt-free output. This output gives a data point which, upon connection, allows the main BMS to detect the system's running state and our AHU to automatically notify the main BMS of any changes.

Dehumidifier: In order to maintain visual clarity and the intended aesthetic of the ETFE roof, only dry air must be pumped into the cushions. Therefore, in humid environments and where AHUs are located inside a building, we recommend that a dehumidifier is included to extract any atmospheric moisture.

Additional features

Wind and snow monitors: Wind and snow affect the pressure and stability of ETFE cushions, and our systems can be manually or automatically adjusted to compensate for these conditions. To automatically control pressure in relation to climate, we can install wind and snow sensors located externally on the side of the AHU to detect changes. For AHUs located inside a building, cables can be run to the roof where the sensors must be mounted.

Remote GSM monitor: The power and running status of an AHU can be monitored and an automatic SMS message sent when unexpected changes within a cushion occur. By using a GSM monitor we can establish a permanent, wireless connection using a cellular network; however, this is dependent on cellular coverage and therefore should not be relied on as the sole method of monitoring.

Siren/buzzer: An alternative way to alert staff to an error state: the AHU can incorporate a beep or a buzzer which attracts the attention of those in close proximity to the unit.

UPS: Without power, any AHU will cease to function and over time the ETFE cushions will deflate and become structurally unstable. Should power be cut off, the AHU traffic light system and LCD screen will show an error state. The addition of a UPS can add some security, ranging from just a battery to send out an error signal before power cuts out to, at the other end of the scale, keeping the fans and control system running for up to an hour after sending an alert.

Photovoltaic and wind power: To maximise energy efficiency, photovoltaic panels or a wind turbine can be mounted on an adjacent roof and, with a power inverter held within the AHU, the system can become self-sufficient. Electricity generated from the environment will power the AHU when possible, with mains power ensuring the system maintains operation when solar or wind energy is not viable.

Automatic solar glare control: Teamed with the Architen Intelligent Printed ETFE System, our control system can allow the level of light transmitted to the space below to be altered. Controlled automatically, the layers of ETFE are adjusted up and down using a light sensor located externally with pre-set information to detect the angle and intensity of the sun. When glare is likely and light exceeds a predefined level, the layers will move to bring the printed surfaces together, cutting out maximum light and minimising the amount of solar energy entering the building envelope.

Actuated rooflights: Whether for ventilation or smoke control, ETFE cushions can incorporate actuators to open and close certain areas. Actuated panels can be manually controlled with a digital input, allowing users to close or open the rooflights from a switch or through the BMS interface. Alternatively, they can be combined with environmental sensors, day and night timers or smoke detectors which send signals to the AHU control system to open or close the rooflights when necessary.

After-care services

Remote diagnostics: Combined with our GSM monitor, our systems can be checked and adjusted remotely. Whether something seems wrong, there's bad weather coming or you just want to carry out regular checks, the system can be accessed and adapted from anywhere in the world via a web interface. Where a remote GSM monitor has been included, 12 months' monitoring is supplied as standard, and ongoing monitoring can be offered as part of a maintenance package. For this option an annual subscription will apply.

Auto alarm notification: As a budget option with no requirement for a remote GSM monitor or Ethernet link, a simple, self-contained auto alarm notification can be included that will flag up system power failure to a designated person. For this option an annual subscription will apply.