VersaTile
Air Quality System



The VersaTile Air Quality System:

Intelligent Air. Pure Comfort. Healthier Spaces.

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Intelligent Air | Pure Comfort | Healthier Spaces



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Healthier, Better Workplace

Modern workplaces demand cleaner and healthier office environments. In addition to temperature control, higher quality air is paramount for improved occupant health, greater workplace focus and better business performance.

Designed to deliver better quality air to the workplace, the VersaTile units are more than a floor vent. As part of the VersaTile Air Quality System, the intelligent floor-tile units control the delivery of filtered, pre-conditioned air from the floor void into the occupied space.

Each floor-tile unit is independently controlled, offering local and zonal temperature setpoints. Control of workplace air quality is further enhanced by CO_2 management via the integrated network of air quality sensors.

Intelligent Monitoring and Control

The VersaTile Floor-tile Units are supervised by an advanced control system which uses a network of air quality sensors to continually monitor the indoor environment.

Deployed throughout the occupied space, the sensor network allows the VersaTile Control System (VCS) to monitor the indoor air quality of offices, meeting rooms and open plan areas.

Where temperature adjustments are required, the Control System can modify the setpoints of the VersaTile Air Centre (VAC) and VersaTile Floor-tile Units (VFUs).

When high CO_2 levels are detected, the Control System will share the sensor data with the Building Management System, which in turn controls the fresh air central plant. At the same time, the Control System will enable the Floor-tile Unit 'purge mode' until CO_2 levels are greatly reduced.

Intelligent Air. Pure Comfort. Healthier Spaces

A healthier indoor environment can be achieved by greater control of temperature and humidity, improved ventilation and more efficient filtration.

The VersaTile Air Quality System incorporates a series of Indoor Air Quality (IAQ) sensors which continually monitor the key factors affecting quality of air in the workplace.



°C

Temperature

The optimal temperature in the workplace is between 20°C and 24°C and is essential in maintaining occupant comfort and productivity.
The VersaTile Floor-tile units help to maintain a stable, and comfortable temperature throughout the workplace. Local setpoint adjustment allows occupants to adjust temperatures to individual needs.

Humidity

Workplace humidity levels should be between 40% and 60%, and optimal levels help to maintain occupant health and reduce electronic equipment failure rates. The VersaTile air quality sensors continually monitor the workplace humidity levels, allowing better control of centralised air handling equipment.

Carbon Dioxide - CO_2

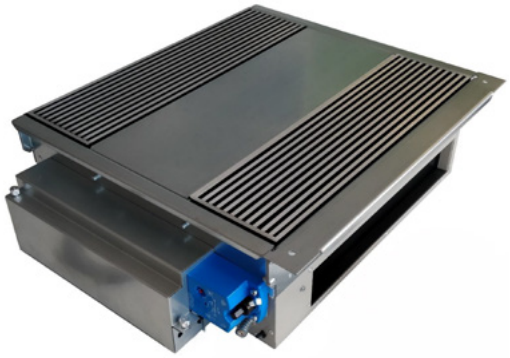
Ideal workplace CO_2 concentrations should be between 600 and 800 ppm. Excessive CO_2 levels can lead to drowsiness and 'Sick Building Syndrome'. Whereas lower levels can improve focus, clarity and energy.
CO_2 concentrations are continually monitored by the VersaTile air quality sensors. This allows the Control System to actively manage the Floor-tile Units and relay fresh air needs to the central air handling plant.

Volatile Organic Compounds - VOCs

The target range for VOCs in an indoor environment is 0 to 300 µg/m^3. Exposure to high levels of VOCs can lead to short term respiratory and sensory irritation, and long-term effects can be chronic, lasting and serious.
Volatile Organic Compounds are managed by good ventilation, and constant monitoring by the Versatile air quality sensors can help optimise the ventilation strategy.

Particulate Matter (PM2.5 & PM10)

As recommended by the WHO, the workplace annual average concentration of PM10 should be 15 µg/m^3, with a 24-hour average of 45 µg/m^3 for no more than 3 to 4 days. Exposure to PM10 can lead to short term respiratory and eye irritation.
For PM2.5, the annual average concentration should be 5 µg/m^3, with a 24-hour average of 15 µg/m^3 for no more than 3 to 4 days. Long term exposure to PM2.5 can lead to systemic inflammation and chronic respiratory illness.
The Versatile Air Quality System helps manage Particulate Matter through high efficiency filtration and improved ventilation control.



Intelligent Floor Tile Unit

In open plan offices, meeting rooms, cellular offices and pods, the VersaTile Intelligent Floor Tile Unit controls the local temperature by regulating the introduction of conditioned air from the floor void.

The VersaTile's onboard programable logic controller compares the temperature of the conditioned air in the floor void with the local room air temperature. The modulating damper and variable speed fans then regulate the introduction of the conditioned air to achieve the desired room temperature.

The Versatile can be configured to maintain a constant trickle of air from the floor void, ensuring a continual supply of fresh air to maintain comfortable occupancy.

Precision Cooling offers two versions of VersaTile:

- VersaTile 'Standard' - suitable for regular floor voids over 230mm deep.
- VersaTile 'Compact' – suitable for shallower floor voids up to 150mm deep.

When networked with the VersaTile Control System, the VersaTile can actively assist the introduction of fresh air and help prevent high concentrations of CO_2.

Frame

- The rigid galvanised steel frame is compatible with all raised modular floor systems and floor panel thicknesses.
- The unique design removes the need for pedestal stringers and partial floor panel.

Chassis

- The steel chassis is coated internally with a textured black coating to reduce visibility and prevent reflections from overhead lighting.

Grilles

- The inlet and outlet linear bar grilles are securely located and cushioned within the VersaTile frame, thus ensuring quiet operation under foot traffic.

Controller

- The onboard microprocessor controller has an inbuilt user interface which is used for standalone setpoint adjustment.
- RS485 communication allows integration with the VersaTile Control system which enables grouped Versatile control and greater IAQ functionality.
- Set-up and maintenance processes are conducted using NFC communication.

Fans

- The Versatile has two centrifugal plug fans, each fitted with an energy efficient, variable speed DC motor.
- The fans are assembled in specially designed cassette which reduces air turbulence and minimises noise generation.

Damper

- The 0-10Vdc modulating actuator offers precise damper positioning and feedback. The adjustable minimum closure limit allows a constant fresh air bleed according to local requirements.

Electric Heater

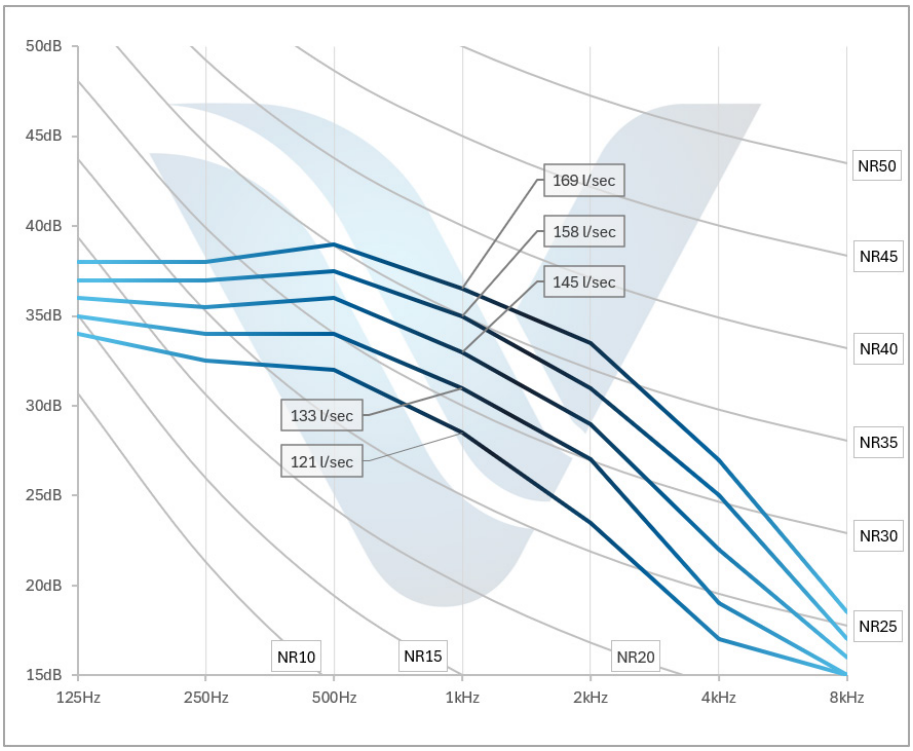
- The optional electric heater provides heating when floor void air temperatures need a boost, or the central plant heating is unavailable.

Intelligent Floor Tile Performance Data

VersaTile 'Standard'

Designed for offices where the floor void is 230mm or greater, the 'Standard' model is capable of greater air volumes than the 'Compact' model, whilst maintaining the same excellent acoustic performance.

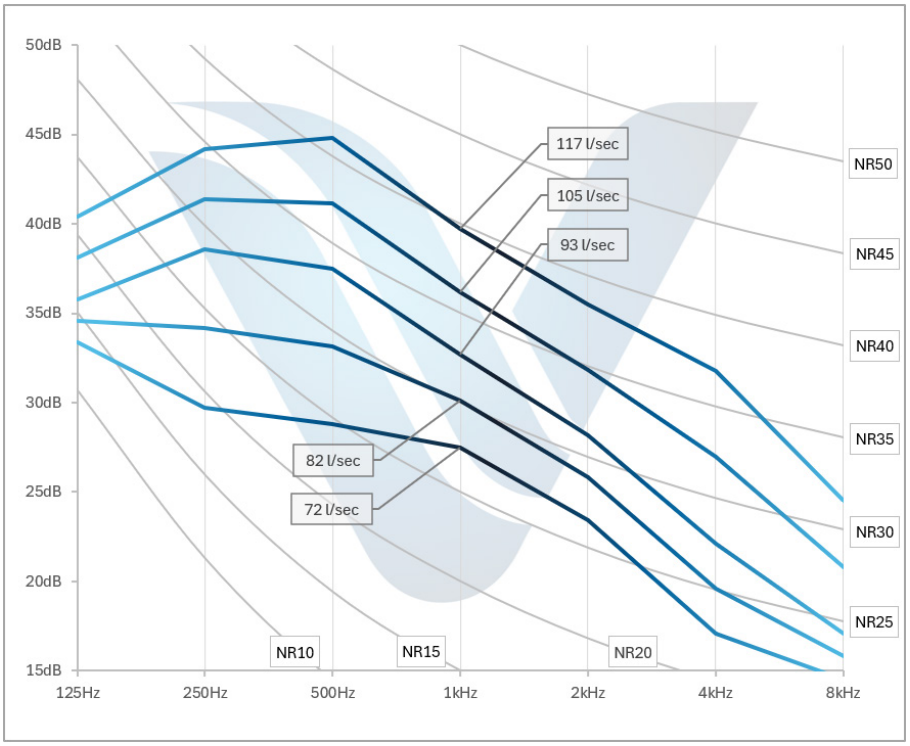
Min.Floor Depth	230 mm
Mains Power	230V/1ph/50Hz
Input Power	14 W
Current	> 1 Amp
Specific Fan Power	0.09 W/l/sec
Airflow at NR35	158 l/sec



VersaTile 'Compact'

Designed for offices where the floor void is 150mm or greater, the 'Compact' model has all the features of the 'Standard' model. The same acoustic performance is achieved at slightly lower air volumes.

Min.Floor Depth	150 mm
Mains Power	230V/1ph/50Hz
Input Power	15 W
Current	> 1 Amp
Specific Fan Power	0.15 W/l/sec
Airflow at NR35	100 l/sec





Downflow Air Handling Unit

The downflow air handling units are located around the perimeter of the office space inside riser cupboards or architectural enclosures with acoustic treatment.

The '4-pipe' air handling unit has independent cooling and heating circuits and is specifically designed for low noise operation. Internal components have been carefully selected for optimised energy efficiency.

Return air is drawn in at the top of the unit where it is filtered and conditioned by the cooling and heating coils. A high efficiency, low noise fan is located after the coils and discharges into the supply air plenum in the floor void.

Precision Cooling uniquely designs each supply air plenum according to individual project requirements. The supply air plenum integrates with the raised modular floor and introduces the conditioned air to the floor void.

The onboard microprocessor seamlessly integrates with the VersaTile Control System to allow centralised monitoring and setpoint adjustment by the Central Controller.

Frame

- The galvanised steel frame is self-supporting and clad with steel skinned panels lined with acoustic insulation.
- The front access panels are hinged for easier and safer maintenance.
- Internal components are arranged to reduce air turbulence, improve airflow and reduce noise generation.

Fans

- The 'Air Centre' uses single inlet, centrifugal fans with backward curved impellers and high efficiency, direct coupled, variable speed external rotor motor.
- Fans are designed to run at low speeds to minimise air velocities, turbulence and acoustic impact.

Filtration

- Air is filtered using G4 pleated panel filters. Optional M5 or F7 filters can be fitted for enhanced filtration.

Cooling & Heating Coils

- Cooling is achieved using a chilled water coil which is designed with a large surface area to increase the sensible heat ratio and reduce air velocity.
- Heating is achieved using a low-pressure hot water coil fitted after the cooling coil.
- The coils are manufactured using expanded copper tubes within an aluminium fin block. The aluminium fins have a hydrophilic treatment to prevent water carryover and improve drainage.
- A stainless-steel tray captures any condensation which is drained by a flexible hose with integrated siphon.

Control & Functionality

- The onboard microprocessor controller regulates fan speed and cooling/heating output via the modulating control valves.
- The user interface allows setup of the controls and interrogation of the operating conditions and alarm status.
- RS485 connectivity allows integration with the VersaTile Control System and greater IAQ functionality.

VersaTile Control System

The VersaTile Control System enhances the functions of the Floor Tile Units and Air Centre to create a holistic system of indoor air quality monitoring and control.

Integration with the main Building Management System allows the client or building services manager an overview of the internal environmental conditions which can then be used for additional central plant and environmental control.

The Versatile Control System is not limited to operation with the Versatile Air Centre. Any local or centralised cooling, heating and AHU plant, using the Modbus communication protocol, can be integrated with the VersaTile Control System, IAQ sensors and Floor-tile Units.



Central Controller

At the heart of the VersaTile Control System is the Central Controller.

When all the VersaTile components are networked via RS485, the Central Controller acts as a mini head-end by monitoring & controlling the VersaTiles, Room Interfaces, IAQ Sensors and Air Handling Units.

The Central Controller's main features and functions are as follows:

- Time clock control of VersaTiles and Air Handling Unit
- Monitoring of the room and floor void temperatures via the VersaTile temperature sensors
- Monitoring of the Indoor Air Quality via the network IAQ sensors
- Setpoint adjustment of the VersaTiles and Air Handling Unit
- Enable/disable the VersaTile CO_2 purge functions
- Integration with the main BMS

The Central Controller is accessed and configured using a 10" touch screen user interface and can be integrated with the main BMS using Modbus RTU, BACnet TCP/IP and BACnet MSTP.



Local User Interface & IAQ Sensor

Desk or wall mounted user interfaces can be positioned in meeting rooms and cellular offices to provide local adjustment of temperature setpoints and to display current room conditions.

In addition to inbuilt temperature and humidity sensors, the user interface also contains an air quality sensor which is used to calculate CO_2 levels within the space.

The user interface is connected to the VersaTile network and is monitored by the Central Controller. When high CO_2 levels are detected, the Central Controller will enable/disable the VersaTile CO_2 purge function.



IAQ Sensors

Indoor Air Quality sensors are networked with the VersaTile Control System and allow monitoring of the indoor conditions.

The IAQ sensors have the following monitoring functions:

- Temperature (°Cdb)
- Relative Humidity (%RH)
- Carbon Dioxide (CO_2)
- Volatile Organic Compounds (VOC)
- Particulate Matter <10µm (PM10)
- Particulate Matter <2.5µm (PM2.5)





Air Source Heat Pumps

Precision Cooling's range of high efficiency air source heat pumps perfectly compliment the VersaTile Indoor Air Quality System.

Available in a range of capacities and configurations, '4-pipe' air source heat pumps are a flexible solution to simultaneous cooling and heating requirements; and solve the problem of increasingly stringent legislation towards refrigerants in occupied spaces.

Refrigerant based comfort air conditioning systems have large volumes of refrigerant which circulate between the outdoor condensing unit and indoor fan coils, via a network of high-pressure pipes and manifolds. Whereas equivalent capacity heat pumps have an internally packaged refrigeration circuit with a much small refrigerant charge; and instead of refrigerant, thermal transfer is achieved by independently circulating cooling and heating water throughout the building.
Removing refrigerant from the occupied space offers several advantages:

- Simplified installation of the internal pipework and equipment.
- Maintenance of the indoor equipment becomes less specialised.
- Mandatory F-Gas leak checks are eliminated.
- Refrigerant leak detection systems are not required.
- Components are standardised and equipment life is extended.
- Central plant is flexible and scalable.
- Less susceptible to future regulatory changes.

Water Source Heat Pumps

The Precision Cooling range of high efficiency water source heat pumps offer the same benefits as air source heat pumps but with additional flexibility when positioning the plant.
Water source heat pumps use building water loops, ground water loops, or environmental water sources to reclaim and reject heat, meaning they do not need bulky heat rejection coils and fans. This results in the heat pump having a smaller footprint for an equivalent capacity and allows the heat pump to be located in plantrooms or other internal spaces.
Both air and water source heat pumps are available in 2-pipe and 4-pipe configurations:

- 2-pipe reversible heat pumps can provide cooling OR heating.
- 4-pipe multifunction heat pumps can provide simultaneous cooling AND heating.

Air and Water source heat pumps are available with a range of low GWP, A1 and A2L refrigerants, including R744 (CO2) and R290 (Propane).

Dry and Adiabatic Coolers

Precision Cooling offers a comprehensive range of dry and adiabatic water coolers in flat-bed and V-bank configurations. During peak loads, these systems can operate alongside a water source heat pump to reject surplus heat.

Why Specify VersaTile?

- **Health-Focused by Design**
  VersaTile improves the delivery of better-quality air where people work and interact.

- **Targeted Comfort**
  Designed for optimum performance with a low acoustic profile, the VersaTile operates efficiently and discretely.

- **Space-Efficient**
  A compact form factor allows installation within floor voids as shallow as 150mm.

- **Architectural Advantage**
  Eliminates the need for high level ductwork, HVAC services and air terminals, allowing greater flexibility for architectural visuals and lighting design.

- **Planning Flexibility**
  Reduced reliance on overhead services supports lower floor-to-floor heights.

- **Flexible & Future-Ready**
  VersaTiles are compatible with most raised access flooring systems and without wet connections, can be easily moved when tenants and office layouts change.

- **Low Maintenance**
  With just and electrical and network connections, the floor tile units eliminate the risk of moisture leakage, do not require high level access equipment, nor specialist attendance for servicing and F-Gas compliance.

- **Cost Effective**
  VersaTiles are quickly and easily installed, without the need for pipework and duct connections resulting in a simplified design and reduced installation costs.

- **Adaptable Controls**
  Using Modbus communication protocols, the VersaTile control system is easily adapted to the ever-changing workplace layout.

- **Made in the UK**
  The VersaTile Floor-tile Units and VersaTile Control System are proudly designed and manufactured in the UK. Each order is tailored to project requirements and assembled using top-tier components.

A Complete Air Quality Strategy

With measurable performance of temperature, humidity, carbon dioxide (CO_2), volatile organic compounds (VOCs) and particulate matter (PM2.5 & PM10), it is possible to make a targeted approach to indoor air quality control.

By combining the Versatile Air Quality System with the main building management system, an integrated approach to the indoor environment can be achieved, leading to a healthier, more efficient workplace.

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To learn more about the **Versatile Air Quality System**
contact your **Precision Cooling** representative
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