



Automatic Floor Pressurisation System (AFPS)

Modern IT Environments suffer in the early days of their working life from the problems associated with “Low Start Build-Up”.

The client’s representative, normally the IT Manager, is handed a “Built Environment” that will comfortably meet all of his/her future needs. Unfortunately, on Day 1 or even Day 365, the amount of equipment actually installed in the space is significantly less than the 100% occupancy anticipated by the Consultant Design Engineer.

This “Low Start Build-Up” presents a number of difficulties to the Mechanical and Electrical plant both in terms of maintaining control of the temperature of the “Built Environment” and doing so in a reasonably energy efficient manner. There is little benefit in controlling 10% of the load whilst having an electricity bill for running 100% of the plant.

Difficulties may also occur in the disruption caused by expanding the IT Build from 10% to 100% into a live air-conditioned environment, which may contain sensitive areas already on-line.

Underfloor Cooling

The majority of modern IT environments use underfloor cooling to maintain conditions within the “Built Environment”. The principle is simple and long established, and involves the pressurisation of the floor space to ensure that cool air is available wherever an air outlet (normally a floor grille) is positioned.

The secret to good air distribution within the “Built Environment” is good floor pressurisation. The secrets to good floor pressurisation are:

- A sufficiently deep floor void
- A well-sealed floor void for both leakages around floor grilles and into adjacent rooms.
- AC units capable of producing sufficient pressurisation
- AC units capable of producing pressurisation throughout the space particularly in the “Near Zone” adjacent to the AC units.
- Correctly selected floor grilles
- Floor grilles with volume adjustment
- The correct number of grilles to match the load

Low Start Build-Up effect on Underfloor Cooling

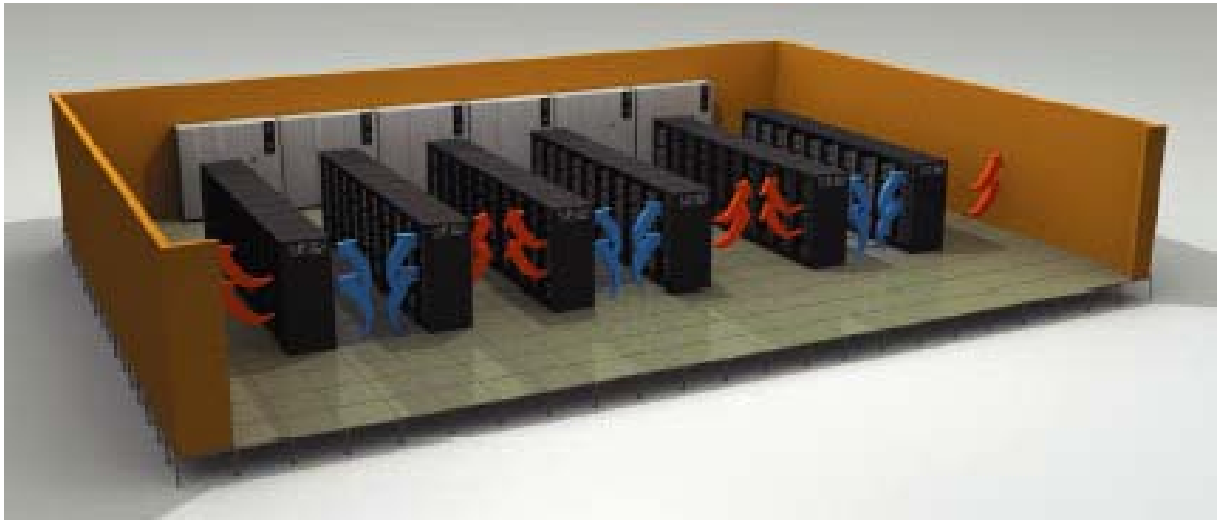
Given that the “Built Environment” requires good floor pressurisation, and that good floor pressurisation requires the IT Manager to select the “correct number of grilles to match the load” a number of problems arise under Low Start Build-Up conditions.

On Day 1 IT Managers have 100% air flow from the AC Units - but only 5%-10% of the load. At this time the air volume is too high so either 90% of the AC units must be switched off/slowed down or 100% of grilles must be opened.

Consequently, the IT manager must pay for the AC unit specialist to re-set the units or pay a large electricity bill for excessive use of the AC Units for a considerable period of time. If the units are not switched off/slowed down, the excessive airflow causes short cycling back to the AC Units and loss of thermal control.

Each time the amount of equipment increases in the room the exercise must be repeated. Each time equipment in the room is removed, replaced or re-located the exercise must be repeated. Each time the exercise is repeated the IT Manager must coordinate with the AC unit specialist.

Every time the floor void is disrupted or floor tiles removed and replaced, there is a risk of air starvation to pre-existing equipment.



However, there is now a solution in the form of Uniflair's Automatic Floor Pressurisation System (AFPS).

Automatic Floor Pressurisation System (AFPS)

Uniflair's new Automatic Floor Pressurisation System (AFPS) is a unique solution which provides the following benefits:

- AFPS guarantees airflow levels to all equipment in the "Controlled Space".
- AFPS guarantees airflow levels irrespective of the number of floor grilles.
- Continues to guarantee levels as floor grilles are opened, closed or re-located.
- Reduces energy bills as the fan motor power will exactly match the required airflow in low load conditions.
- Reduces FM bills as the AFPS system is self balancing and self commissioning.
- Provides fail-safe solutions in the event of failure of any component in the AFPS system.
- AFPS has already been fully tested and approved by a number of multi-national companies including Fidelity Investments, Goldman Sachs and Telefonica.



The solution is particularly applicable for Chilled Water installations where the air flow can be adjusted to a very low minimum level (20% on cooling only units). AFPS can also be used on installations for DX systems (air or water cooled) which include multiple Uniflair units.

AFPS also includes the following additional features;

- Adjustable constant under-floor pressurisation from each unit
- Control to the average pressure as measured by any group of Uniflair units connected in LAN.
- Revert to independent control should any Uniflair unit measure excessive ΔP .
- Each Uniflair unit operates at maximum speed should its microprocessor fail (all others in LAN will reduce speed automatically).
- Each Uniflair unit will operate at maximum speed should any sensor be damaged (all others in LAN will reduce speed automatically).
- Revert to independent control should the LAN fail.
- Up to 10 units on one LAN

Please note that AFPS can only be used in conjunction with Uniflair units fitted with EC type fans.

High Level Spot Loads

In these instances, Uniflair recommends the use of “Active Floor” an enhanced solution to provide high intensity spot cooling from a conventional raised floor (please contact info@uniflair.co.uk for further information) supplying up to 1.2 m³/s from a 600mm x 600mm grille.

When used in conjunction with AFPS, an increase in air volume through the Active Floor system will not adversely affect the airflow through any other systems supplied from the same floor void.