

Project information Post-Tower

Decentralised underfloor units, air supply type

PI/FSL/2/EN/1



The building

The Post Tower in Bonn is the highest office building in the German state of North Rhine-Westphalia, standing at 163 m. The elliptical shaped construction is equipped with a double façade. The outer full-glazed façade signals openness and the power to innovate, and is opened or closed according to pressure and temperature conditions. Large planted 'sky gardens' are designed between the two displaced halves of the Tower, which symbolise the ecology and environmental friendliness of the structure. In addition, the internal façade is constructed with full-height glazing.

Developers generally demand an optimum combination of multiple requirements for energy efficiency, flexible usage and working place comfort. In order to do justice to that, and, to be able to variably configure the offices, it was necessary to implement decentralised building-services. Through this solution, many variations in room usage were made possible without having to change the cabling or installations, and without compromising occupant comfort levels.



The ventilation-concept

The ventilation of the building is effected with a decentralised FSL underfloor units (air supply type)- (see photograph on the left side). The return air from the offices was ducted away from that point to heat the "Sky garden", and then extracted centrally. By means of these units, the outside air is introduced into the façade gap. It is then conditioned and supplied to the rooms. The air reaches the internal rooms through doors and corridors. In addition to providing ventilation, the underfloor units also regulate the office temperature. The base-load capability for heating and cooling was provided by treatment of the concrete core, while the variable load was met by the underfloor units. In both cases, ground water was used for cooling purposes.

The workstations in the perimeter offices are provided individually with fresh air with FSL underfloor units, with fully adjustable functionality including variable airflow, heating and cooling (see also page 2 – ventilation scheme).

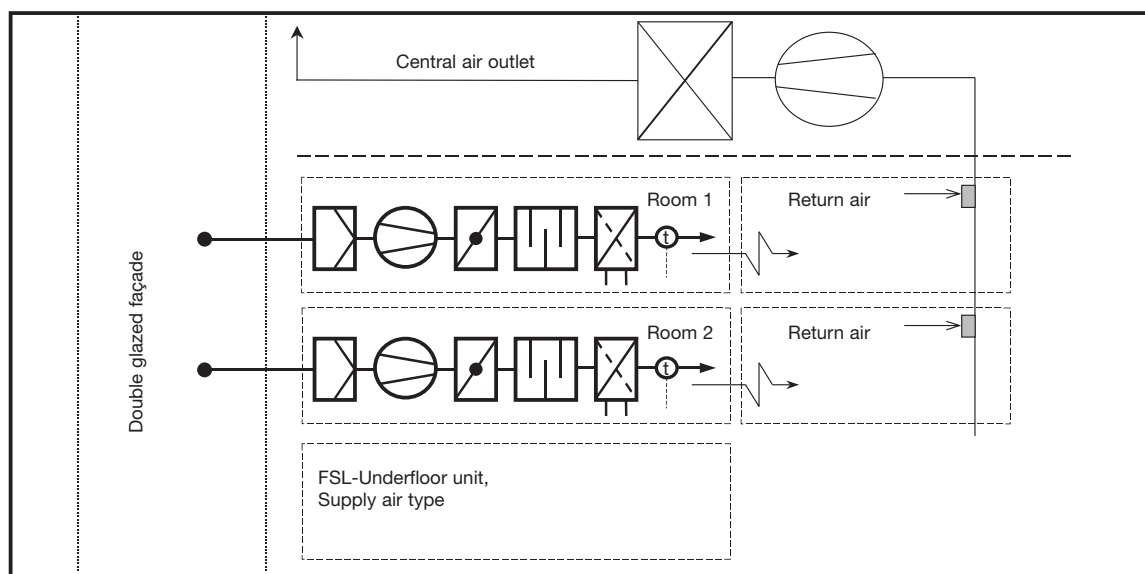
During the construction phase, only every second location was equipped with underfloor units. The remainder was equipped with dummy units, which enables a simple fit-out in future.

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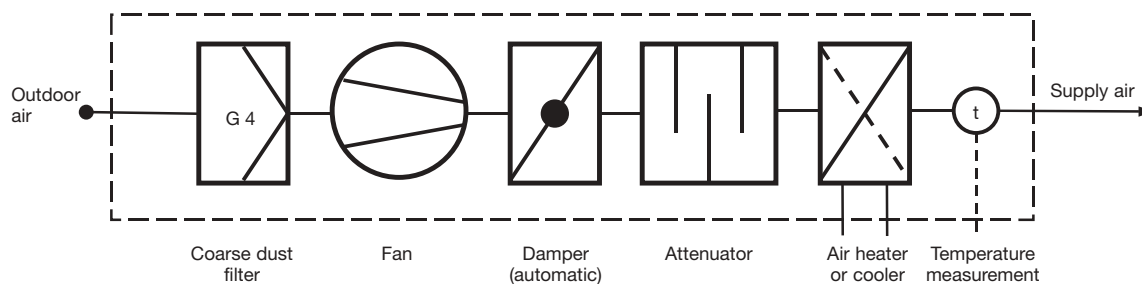
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Underfloor units as an integrated part of the overall ventilation system



Ventilation schematic diagram for the decentralised underfloor unit, supply air type



The decentralised underfloor unit

Layout and principle of operation

The FSL underfloor units are installed in the false floor. The unit's housing is made of powder coated galvanised steel sheet. For acoustic cladding and thermal insulation, mineral wool faced with glass fibre fabric is used. Further key elements of the unit are the radial fan, filter, non-return damper, coils, as well as the electrical cabling including the junction box.

A radial fan draws in the outdoor air through the intake spigot, and then through the air filter of class G 4 installed in the inlet to the unit. The filter is so designed that it is only necessary to undo two quick release fasteners to change the filter pad. The fan is controlled by the building management system using various supply voltages. The fan is fitted into a housing and be simply dismantled for maintenance purposes by undoing only one screw. A non-return damper

with magnets, fitted after the fan, prevents the air flowing back out of the room if the atmospheric pressure outside the façade is very low. Furthermore, the magnets ensure that, with the fan stationary and an overpressure of up to 60 Pa on the façade, no air can enter the building through the unit.

To meet the critical acoustic requirements, a splitter made of mineral wool laminated with glass fibre fabric is integrated into the unit. By means of the arrangement and alignment of the splitter, optimum air distribution over the all coils is achieved. The latter are located downstream of the attenuator section.

Using the 2-pipe coils, both heating and cooling can be performed by changing the operating mode. The connection to the piping is made using the flexible hoses fitted to

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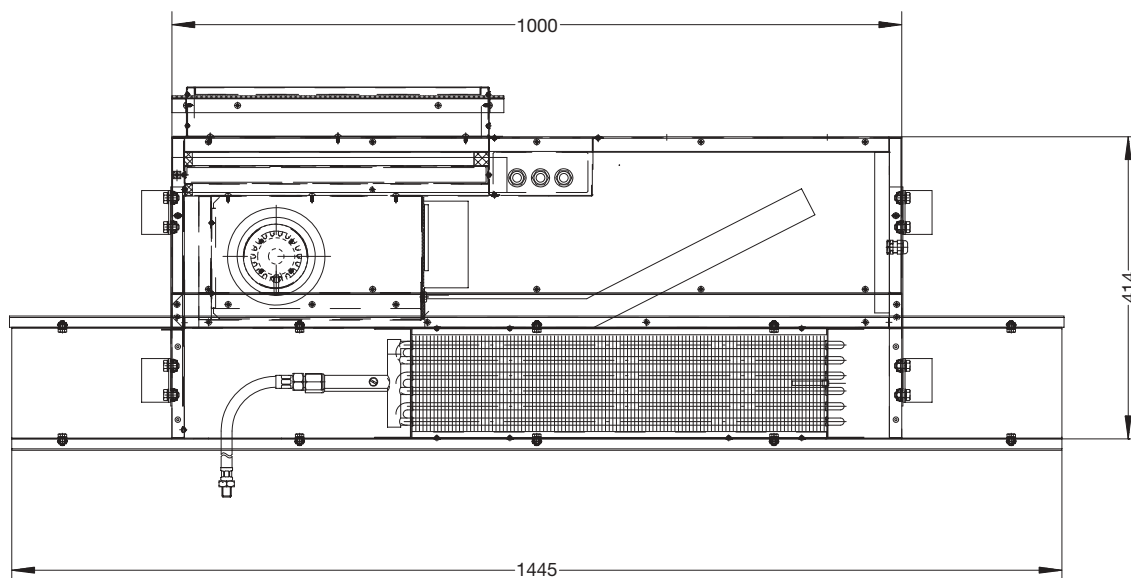
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the coils in the factory. The underfloor unit is designed for dry cooling. If condensation is produced for a short time due to extreme outdoor conditions, the condensate flows into the drip tray below the coils.

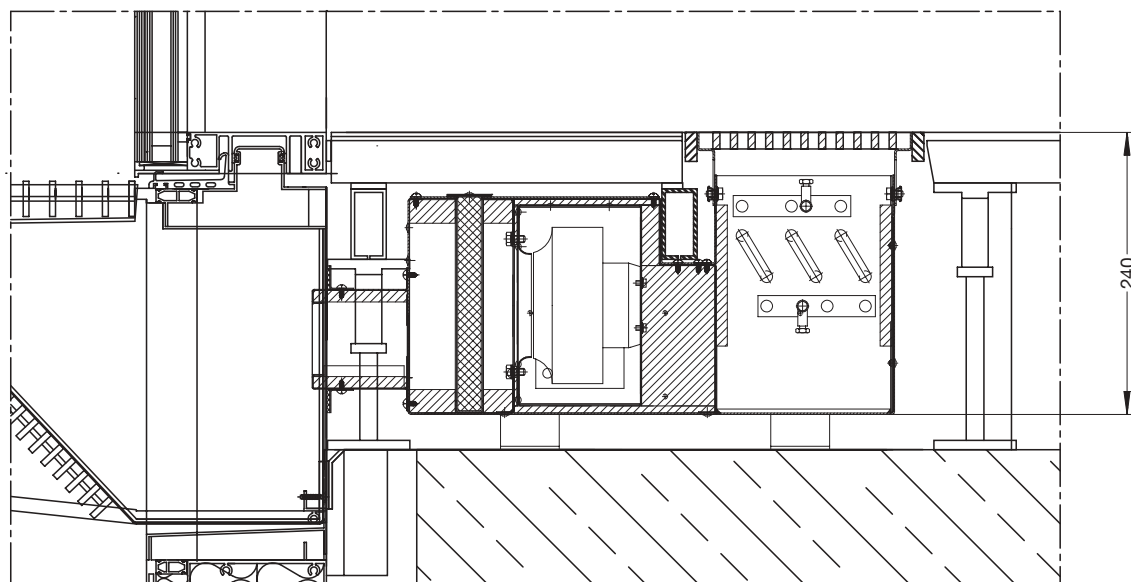
Dimensions

The layout and dimensions of the unit were adapted to the specific façade for the project and the false floor. Due to the elliptical shaped façade, the outer bearing brackets for the discharge grill are 6 mm longer than the inner brackets. To compensate for the tolerances on the structure, it is possible to adjust the height by up to 30 mm using adjustable feet.

Underfloor unit – top view



Underfloor unit installed – section



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Technical data

The underfloor units were optimised to the specific thermal and acoustic requirements of the project. The coils were selected based on the performance figures required for

the volumetric flows stipulated. The technical data for the units is given in the following table.

Volumetric flow		m³/h	120	60	30
Cooling	Cooling load	W	950	540	280
	Air inlet temperature	°C	40	40	40
	Air outlet temperature	°C	20,9	19	19
	Chilled water volumetric flow	l/h	288	144	72
	Water flow temperature	°C	14	14	14
	Water return temperature	°C	17	17	17
	Pressure drop, water side	Pa	1600	600	200
Heating	Heating load	W	1630	810	410
	Air inlet temperature	°C	-10	-10	-10
	Air outlet temperature	°C	30	30	30
	Hot water volumetric flowrate	l/h	72	36	18
	Water flow temperature	°C	70	70	70
	Water return temperature	°C	50	50	50
	Pressure drop, water side	Pa	100	50	25
Sound pressure level incl. 8 dB room attenuation		dB(A)	32	19	14
Fan voltage		V	230	82	55
Current consumption		A	0,07	0,05	0,03