



Air Tightness for Plenums/Raised Access Floors

Things to watch out for

Factor	What to look out for	Addressed
Know your airtightness target	<p>The requirements can vary but the typical targets (suggested in BG65) are for the plenum to achieve an air permeability of less than 0.7 l/s/m² of floor area @ 50Pa and for the Raised Access Floor (RAF) to achieve less than 1.1 l/s/m² of floor area @ 50Pa.</p> <p>These are relatively tight targets for what tends to be quite a small space (in volume at least), so care and attention to detail is required in installing the RAF, sealing the plenum and temporary sealing both.</p>	
What areas are tested	<p>Typically, the plenums are tested in the way they are intended to operate so:</p> <ul style="list-style-type: none">• If the plenum is subdivided with separate air supplies to different areas, these areas would be tested individually.• If the plenum has fire stopping partially separating it but the air is intended to flow between these areas (via louvres that would close/be sealed in the case of a fire), the plenum would be tested as a whole. <p>The testing is completed in 2 stages on each Plenum/RAF:</p> <ol style="list-style-type: none">1. Test on the plenum with the RAF fully sealed (see pre-test preparation)2. Test on the plenum and RAF together with only the floor grilles sealed <p>Temporary sealing of the RAF is time-consuming so will need to be completed in advance of the test day. Removal of the temporary sealing can also be time-consuming so sufficient resources should be available on the day to minimise this time.</p>	
Potential leakage paths	<p>The most likely air leakage paths are likely to be:</p> <ul style="list-style-type: none">• Around services – ducting, cables, pipework through the plenum• Around the perimeter of the plenum• Around the perimeter of the RAF and between the RAF tiles, these are temporarily sealed for the plenum test but gaps between the RAF and wall/columns can cause the RAF to fail if not addressed. A visual inspection should identify any noticeable gaps that may require certain tiles to be lifted and re-laid or additional foam gaskets to be fitted	
Timing of the test	<p>The test tends to take place when the air supply system has been fitted, all other services are installed, the plenum has been fully sealed and the raised access floor is complete, including floor grilles/electrical boxes, etc. But before the carpet/carpet tiles have been laid.</p>	
What if the shaft fails to achieve the target	<p>Given the restricted access to the plenum, the preferred method for finding air leakage is to pressurise the plenum using our fan and push theatrical smoke into it. The smoke is pushed out of any gaps/cracks in the plenum/RAF or temporary sealing so the problems can be identified. A number of people will</p>	

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	<p>be needed to spot/photograph the smoke while our test engineer operates the fan.</p> <p>The smoke escaping may be enough to set off smoke alarms, cause concern to those who spot it and aren't aware of what is going on (on site and outside the building) or reduce visibility.</p> <p>If a smoke leakage test is required, it will mean informing as many people as possible on the day (including the local fire brigade) and, potentially, limiting access to some areas until the smoke disperses.</p>	

Testing

Pre-test Preparation Checklist for Air Tightness Testing of Plenums/RAF

Site Name:			
Our reference:		Test Date:	

Item	Considerations	Date/Initial
1) Sealing of the plenum and RAF	<p>Has it been agreed how best to ensure the plenum is sealed, including around services and other penetrations?</p> <p>Is the RAF in place and no obvious gaps between tiles and the perimeter?</p> <p>Has someone checked everything has been done correctly at a time when it can be seen and addressed?</p>	
2) Test Preparation		
a. Book the test	We typically need 2 weeks' notice	
b. Provide drawings	Of the RAF(s) layout to allow us to identify how the plenums should be tested and accurately calculate the floor area	
c. Confirm air test result required	Check with the M&E consultant but typically the plenum needs to achieve under '0.7' and the RAF under '1.1'.	
d. Access	<ul style="list-style-type: none"> Access to site to unload test equipment A single RAF tile will need to be removed so we can install our fan, typically this would be in the centre of the RAF but clear of immediate ductwork/pipework (unless the depth of the RAF was shallower in this position) 	
e. Power	Mains 240V power within 10m of the fan(s) installation location (if only 110V power available, please inform test engineer in advance of arrival).	
f. Pre-Plenum Test (temporary sealing)	<p>Plenum Test – sealing of:</p> <ul style="list-style-type: none"> Joints between RAF tiles Perimeter of RAF Floor grilles Electrical boxes <p>These are typically sealed in one of two ways:</p> <ol style="list-style-type: none"> Sealing of each joint, grille, etc using low tack tape – this is more time-consuming to remove but provides a better seal Sealing of the whole floor area using floor protection (sheets or Corex) – it is important that each sheet is completely sealed to the next sheet as well as being adhered to the RAF at regular intervals so that all the sheeting doesn't balloon up when under test and fly away <p>Sealing of air supply – Corex/sheet and taping to seal any open ducting</p>	
g. Post-Plenum Test (removal of temporary sealing)	<p>Plenum and RAF Test – remove temporary sealing of:</p> <ul style="list-style-type: none"> Joints between RAF tiles Perimeter of RAF Electrical boxes <p>The only temporary sealing that should remain is of the ventilation i.e. the floor grilles and air supplies</p>	

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