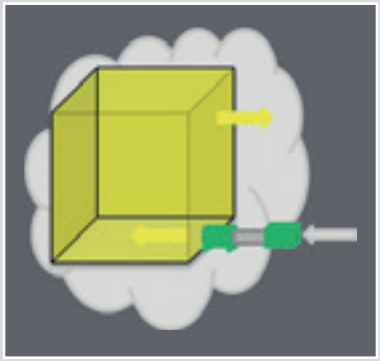
Guide to containing dust and fume

Successfully working with negative and positive air pressures

What is positive air pressure?

This principle is used to prevent the spread of hazardous dust, fumes or gases from work areas into sensitive environments. A fan with suitable filtration is set up outside the room to force filtered air in. With a positive (higher) air pressure within the room, air will flow out and prevent dust and dirt from migrating into the room. This is used for a number of settings, such as computer server rooms and operating theatres.

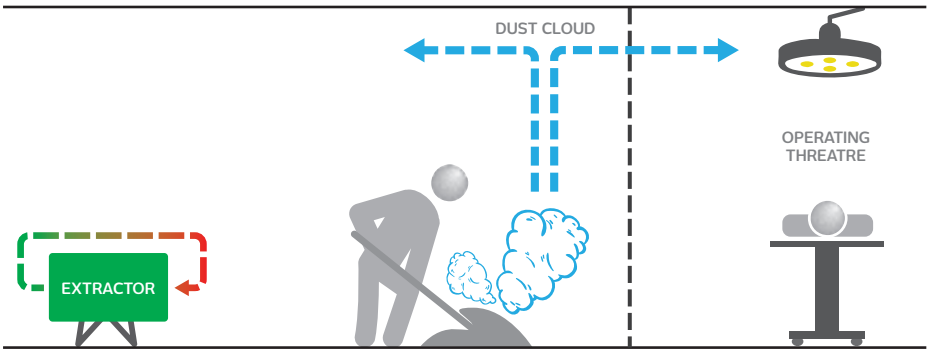


How air pressure affects dust and fume

When dust or fume is created in an enclosed area, these harmful molecules of particulate become evenly distributed in the air. The dust or fume then spreads into the surrounding environment via any access points, such as windows, doors and keyholes.

A common mistake

A small self-contained dust filtration unit (pictured) is often used to try to cleanse the air. However, the filtered air is quickly contaminated again by itself with no negative pressure system put in place.. See our diagram, below. At most, this fan will create a small area of clean air, but this will have minimal impact on the general conditions, with no improvement at the leakage points, where dust or fume will seep out.



The site assessment is key

There isn't a simple formula to use to discover how much air needs to be moved to create a negative pressure. This is dependent on a number of variables, including:

- **The size of the room**
- **How well sealed it is**
- **How critical the environment around the worksite is.**

One guideline is to try and achieve 10 air-changes per hour. However, this may not be appropriate for very large or very small areas. In some instances, a 'make-up air fan' is required to feed air into the enclosure.

- **The environment outside the work area.** Workspaces like food factories and hospitals need much higher standards of control than a demolition site in an open area.

This is why a proper site assessment is needed, where we survey the site carefully and ask questions to fully understand the requirements, in order to design a practical, cost-effective solution.

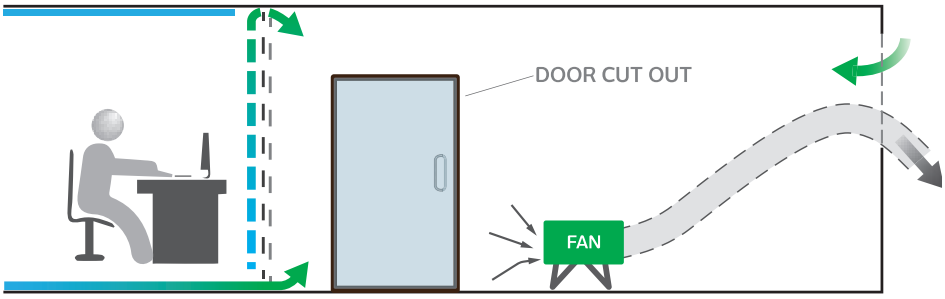
What is negative air pressure?

This is used to control dust and fume, to prevent these escaping from a work environment. An extraction system removes air faster than it is replaced to create a slight vacuum in the room. As a result, the air from outside rushes in (via access points) to balance the air pressure in the room. This prevents hazardous dust, fumes and gases from escaping through doors and windows.

The Wandafilta in use at a hospital. RVT fans can extract dust at source through a capture hood and duct. The dust-laden air is then discharged to atmosphere via a Wandafilta filtration unit which is connected to the fan via outlet ducting. This system effectively creates a negative pressure, while also ensuring a regular air change to the work environment.

Using negative pressure on site

The principle of negative pressure can achieve the task of protecting an occupied area, adjacent to your work site, which cannot be contaminated. This is needed because dust travels easily through any small access points. This principle has been applied for many years for asbestos removal. However, all dust and fume is harmful and this method can be used very effectively for every work environment.

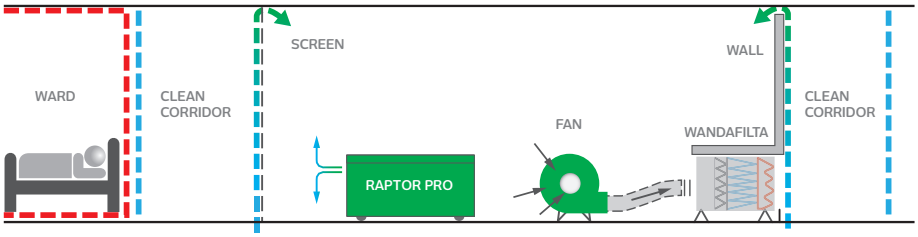


A localised system in use within an enclosed space.

The solution for a sealed room:

Create openings to allow fresh air into the room. Use basic filters at the openings to prevent dust seeping through when the fan is switched off. Force air in using a balancing fan of slightly less capacity than the extraction fan (considering any losses through filtration). Use localised systems to manage the dust at source while the current system maintains the room under the negative pressure.

This simple illustration, below, shows the principle at its most basic: a fan, with flexible ducting, blowing air out of the window faster than it can be replaced. This creates negative pressure and pulls air into the room through the openings. It's not possible for the dust to travel against the airflow. It also greatly assists effective capture of the dust because the natural airflow that comes with a negative pressure system will carry the dust and fume molecules to the intake of the fan.



In addition, filtration is needed. The dust can't simply be eradicated via a window. The example below is a typical set-up for a hospital ward refurbishment. This includes a screened off area, local controls for the dusty work and a fan pulling air out of the work area into a corridor. It could also be an operating theatre, treatment room – any setting. This is possible with the use of appropriate filtration. In this way, we enable contractors to carry out demolition in 'land-locked' rooms, adjacent to live areas. By balancing the extraction rates to the volume of the work area and how well sealed it is, we can even install temporary pressure gauges to prove that your work area is under control.

Using positive pressure on site

To protect finished areas or client equipment, filtered air is blown into the area to create a positively pressurised, clean room within your site. This saves on clean-up costs and demonstrates to your client that you care about their interests.

A negative pressure system using a dust containment enclosure.