

# Dust collector systems

There are three common types of dust collector systems.  
Their names reflect their cleaning style:



## Shaker unit

Mechanical cleaning system which physically shakes the bags clean



## Pulse jet bag unit

A jet of compressed air is blown down the bags/cartridge, this causes it to bellow and discharge the built-up dust cake



## Static unit

Under normal circumstances has no cleaning system, however some cartridge units have manually operated brushes or paddles within the cartridge



## Pulse jet cartridge unit

Cleaning mechanism similar to pulse jet bag unit above

# Dust collector systems

## Shaker dust collector:

Filter bags can have a hem and be secured at both ends with clamps. They can also be closed at one end and hung from an eyelet or hanging strap. Envelope-style flat bags are also very common, there are many varied designs available.

Dust side of the fabric can be inside or outside depending on the unit.

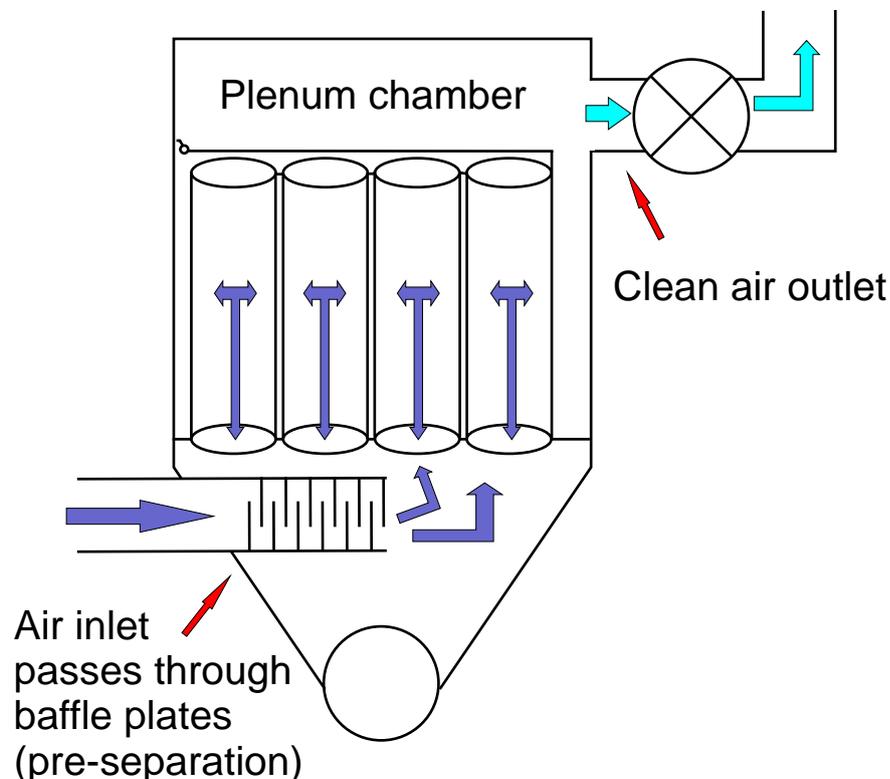
Woven fabric or light grade felts are generally used in a shaker unit.

## Shaker unit example:

The air inlet is below the filter bags. The air is sucked through the pre-separation or baffle plates. It then travels up through the filter bags, where a dust cake builds inside. The pressure of the air keeps the bags inflated.

During the cleaning cycle (normally activated by a timer or pressure switch) the bags can collapse, so sometimes supporting rings are sewn into them to facilitate the dust cake dropping through the bag and into the collection hopper below.

Lightweight fabrics ( $\leq 410\text{g}$  felt or woven) are used due to the cleaning system because they need to be flexible.



# Dust collector systems

## Static dust collector:

The static unit is a bulky unit. It is used where there is not too much dust loading or where a cost effective or budget solution is required.

It generally has a low air-to-cloth ratio and uses lightweight felts or woven fabrics.

## Static unit example:

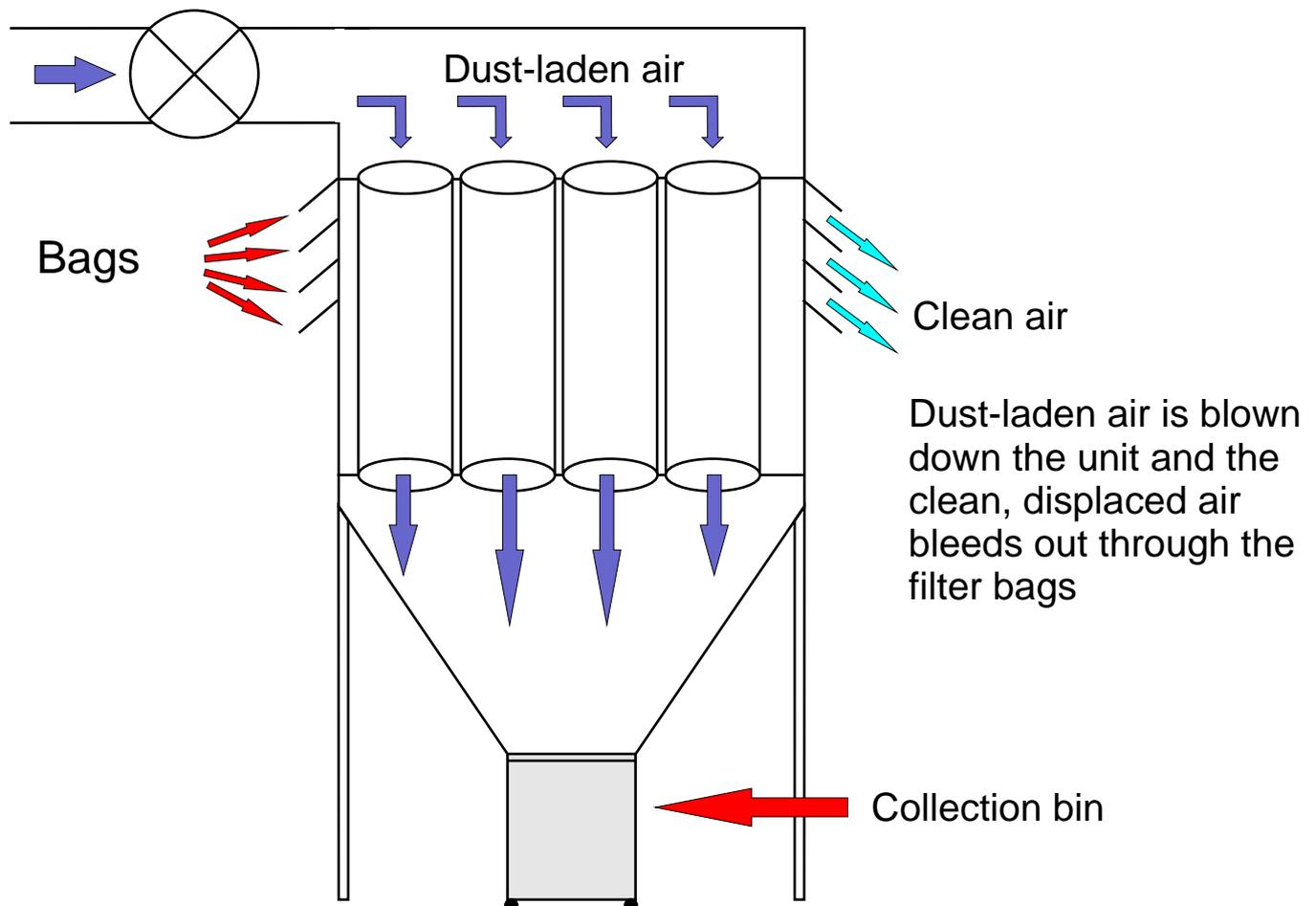
The filter bags are open both ends and have a hem. Bags are usually clamped in place at both ends.

The dirty air is blown down the bags. The clean air is pushed through the bags and then out through louvres on the side of the unit. In some cases, bags are exposed and not contained within a plenum.

The dust side of the fabric is inside.

The dust falls off the bags when the bag house is shut down/turned off, it then falls into a collection bin under the unit.

Bags must be manually cleaned when required.



# Dust collector systems

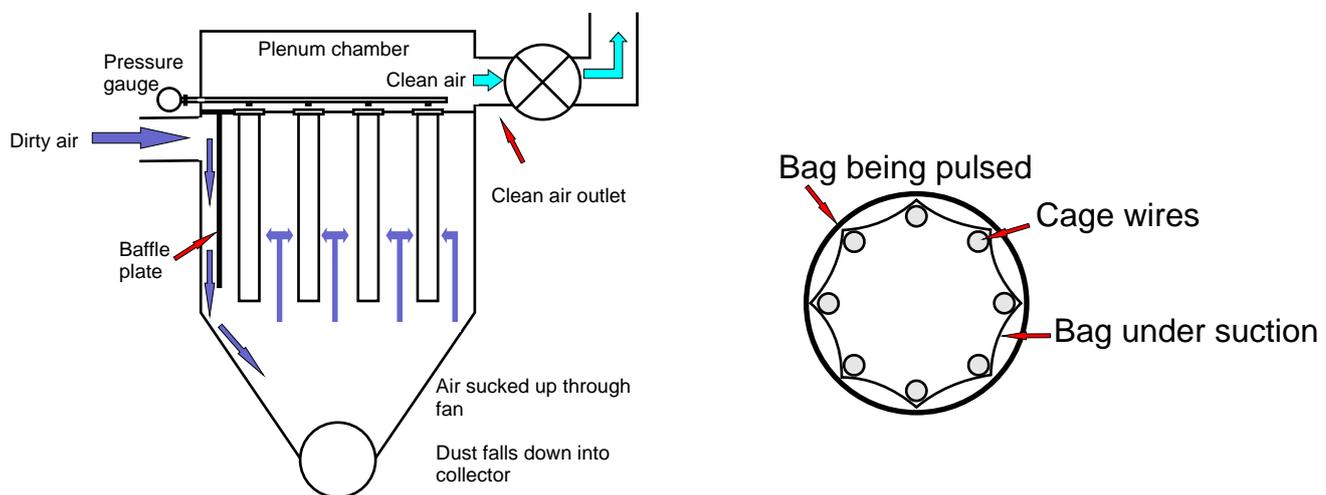
## Pulse jet dust collector:

Pulse jets are the most efficient dust collectors due to their cleaning system and are the most common. They are more economical than other dust collectors as they have a high air to cloth ratio.

As greater volumes of air can be handled, it also offers an overall reduction in power consumption. Because the pulse jet is cleaning continuously and quickly, the pressure drop should remain constant and the flow should not change.

All Pulse jet dust collectors require support cages when bags are used. Pleated cartridge style filters are self-supporting and do not require a cage.

The dirty air enters the inlet and is sucked around the baffle plate which provides pre-separation of dust particles. The air then passes through the filter bags, up the support cage, and out into the plenum chamber (plenum refers to the clean air chamber).



In the above drawing, the air flow is from the outside to the inside of the filter bags which are supported on wire cages to prevent them from collapsing. The dust cake which forms on the outside of the bags is dislodged by a pulse of compressed air which is injected into the inside of the bags.

This rapidly expands the bag throwing off the dust cake. The cleaning time is only about 0.2 seconds and the bags are generally not taken off-line during cleaning.

Needlefelts are generally used in Pulse jet units. The most common of these being polyester (PE). Due to suction pressures, a depth filtration fabric is required.

A needlefelt provides filtration in three ways:

1. **Surface filtration:** dust collects on the surface of the bag
2. **Depth filtration:** migration of dust into the fabric
3. **Cake filtration:** as a cake builds up on the surface of the bag: the dust itself becomes part of the filtration process.

Note: 550g/m<sup>2</sup> fabric is the most common weight used in a Pulse jet unit.