Can Simatek give lifetime guarantee on filter bags?

The answer is no! but Simatek can minimise the wear of the filter bags.

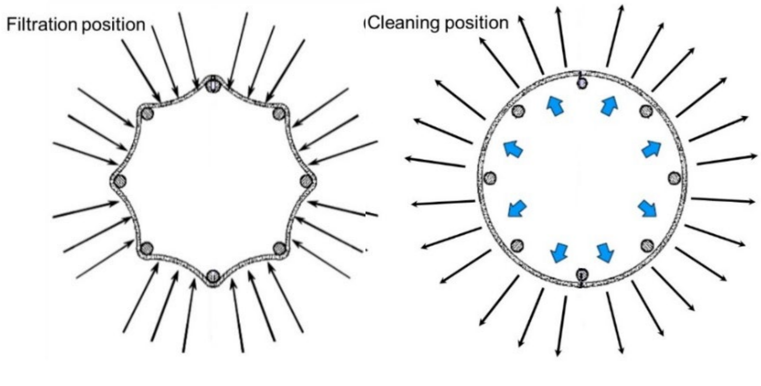
The lifetime of filter bags is primarily influenced by jet pulse air cleaning and washing. Typically, filter bags are made of needle-felted polyester fibres, which serve as the basic filtering medium, with particles settled on the surface forming a secondary filter layer.
Over time, filter bags need to be replaced due to wear or being 'blinded' by powder particles infiltrating the filter fabric, resulting in increased pressure drop across the filter bags and the bag filter. This increased pressure drop reduces the effectiveness of filtering and increases the energy consumption of the exhaust fan.

The correct air-to-cloth ratio

The correct air-to-cloth ratio (A/C ratio), which is the volumetric flow rate of air flowing through the bag filter divided by the total cloth area of the filter bags [$m^3/m^2/min$] or [m/min], also affects the lifetime of the filter bags. With too high an A/C ratio, smaller particles are pressed into the filter bag fabric, causing an increased pressure drop over the bag filter and higher energy consumption as mentioned above. If the A/C ratio is set too low, the required filter cloth area will be too high compared to what is needed for optimal filtration and optimal sizing of the bag filter, resulting in over-costing the bag filter.

Wet washing of filter bags

By using CIP (Cleaning in Place) or cleaning out of place (COP or laundry), the filter bags are refreshed by cleaning their surface (washed), and some particles inside the filter fabric are removed, reducing the pressure drop. However, over time especially if the CIP is not carried out correctly, the filter bag fabric becomes filled with small powder particles that cannot be sufficiently removed, leading to an excessively high pressure drop for proper operation of the bag filter. During CIP or washing, the polyester fibres hydrolyse, become brittle, and tend to break, necessitating replacement after approximately 12-24 cleaning cycles, depending on the temperature and the concentration of the cleaning detergents. Filter bags washed outside the bag filter typically wear out faster than with CIP due to mechanical wear during washing. Additionally, the cleanliness of the filter



Pic. 1 Pic. 2

bags can be affected by manual handling compared to CIP, where the filter bags are cleaned and dried without direct human impact.

Jet pulsing of filter bags

The lifetime of filter bags is also affected by the pulsing mechanism.
In conventional bag filters, the aim is to 'shake off' the powder layer on the filter bag by jet pulsing the filter bags. When the filter bags are reverse jet pulsed, they are blown up (pic. 2) from their tight vacuum position (pic. 1) around the filter bag cage in a split second and then return to the tight vacuum position again. This movement stresses the fabric, causing the felted fibre structure to loosen and potentially break. Especially if the jet pulse pressure is increased to overcome an increasing pressure drop this will harm the felted structure of the filter bags.

Filter Bag Wear Due to Uncontrolled Air Flow

Filter bag wear can further be caused by severe swinging of the filter bags due to uncontrolled air flow within the bag filter. In such cases, the cage material can damage the filter bag fabric as the cages collide with each other at the lower part of the filter bag.

Simatek's Innovations to Minimise Filter Bag Wear

Simatek has developed various features to minimise the wear of filter bags:

1. Low-pressure jet pulsing with SimPulse 3C bag filter technology, using only 0.6 to 1.2 bar jet pulse pressure, resulting in less mechanical stress to the filter bag fabric.
2. Higher volume of low-pressure jet pulsing air with SimPulse 3C bag filter technology, which presses jet pulse air through the filter bag fabric, blowing especially fine powder particles out from the fabric.
3. Filter cages with 10 wires (on Ø 140mm) to reduce mechanical movement of the filter bag fabric when transitioning from filtration to cleaning position and back. Conventional filter cages typically have only 6 or 8 wires.
4. The special spring bottom of the cage gives the bag the right tightening for an enhanced cleaning result. Furthermore, it improves the CIP drain out of the bags and avoids powder residues.
5. CIP of filter bags both outside and inside with the SimPulse 3C bag filter technology, resulting in better cleaning of the filter bag fabric's inner structure.
6. Long bags do not swing more than short filter bags if the air inlet to the bag filter is designed properly using CFD simulation and years of expertise as Simatek does. Further the long bags are stabilizing and slowing the movement of the filter bags.

All in all, these features minimise the wear of the filter bags. If you would like to hear more about these features or other developments within Simatek's bag filter technology, feel free to contact us.