Pressure drop

In this context the bag filter consists of two parts: the filter bags and their "housing".
The "housing" is subject to the same regularities as other air technology components; it is dimensioned for the air quantity and has a constant pressure drop largely equivalent to the square of the air quantity. However, only a limited pressure drop takes place across the "housing" as the filter bags normally account for the main part of the total pressure drop.
The pressure drop across the bags in a bag filter is influenced by a number of factors. The presence of these factors makes it impossible to measure or calculate the pressure drop as you would with ducts, for example.
When starting a bag filter with new or washed filter bags the pressure drop is inconsiderable. After a short period of operation a "dust cake" is built up on the filter bags, and the pressure drop is stabilized. It is not until then that the filter has the optimal efficiency in respect of dust separation.
In many cases the pressure drop will then rise gradually until it reaches an unacceptable level, upon which the bags must be changed.
In other cases the pressure drop will be stable after the running-in until the filter bags are worn or replaced for hygiene reasons.

Parameters

The filter bags may be sensitive to a number of parameters, e.g.:

- Air quantity
- Dust type
- Dust fineness
- Dust agglomeration
- Electrostatic characteristics of the dust
- Water contents in air/dust
- Difference in temperature between filter and surroundings
- Bag quality in respect of wear
- Frequency and intensity of bag cleaning

Above all, these parameters influence the pressure drop across the filter bags, and may also influence the efficiency, i.e. amount of dust remaining in the air after the filter.
In most cases the pressure drop across the bags determines the suitability of the bags and the time of bag change.

Air quantity

The pressure drop across the filter bags increases with increased air quantity (filter load).
The emission generally increases with the filter load.
In principle, the filter load can not be too low.
In some cases the pressure drop across the filter bags will rise gradually if the filter load is increased, and then suddenly rise steeply when a certain filter load is exceeded.
A too high filter load and the consequent pressure drop may in some cases cause the dust to penetrate deeply into the filter cloth and block the air passage to such a degree that the filter cleaning system is unable to blow out the particles. In this case the bags require washing or replacement.

Dust

The dust quantity itself influences the efficiency of the filtration and the pressure drop across the bags to some extend only. The share and characteristics of the finest dust particles are more important. However, large dust quantities may wear down the filter bags.
It is rather important to the efficiency of the filtration as well as to the pressure drop whether the dust agglomerates, which improves the conditions in the filter.
Dust types that are susceptible to electrostatic charging may cause problems by staying floating in the air, or by sticking to the filter bags.

Humidity

Always work with temperatures above the dew point even during standstill, as humidity may cause problems with sticking dust, especially with hygroscopic dusts. The filter therefore may require insulation and maybe heating, also during standstill.

Cleaning of filter bags

If the cleaning interval or the cleaning pressure is changed, the pressure drop will change. The extent of change depends on the dust type.
The cleaning pressure influences the filtering efficiency as well as the pressure drop. A high cleaning pressure will expose the bags to further wear and may in extreme cases burst the bags.
Sometimes a dust cake is built up on the bags; this does not cause a particularly high pressure drop, and protects the bags from wear and sticky particles.
For some (fine) dust types it may be necessary to operate at lower cleaning pressure to reduce emission values. In that case, it should be considered that the bags are still cleaned satisfactorily for example by shortening the cleaning interval. ■

SIMATEK A/S
Office: +45 5884 1500
Spare parts/service: +45 5884 1591
www.simatek.com
aftersales@simatek.dK
office@simatek.dk
Doc. no.: 1 05 55 GB
Date: 98-09