# Residual Dust and Test Certificates

The filter apparatus must not let through anything; this is a statement we very often hear. Many people think a filter apparatus holds back 100% of the appearing dust.

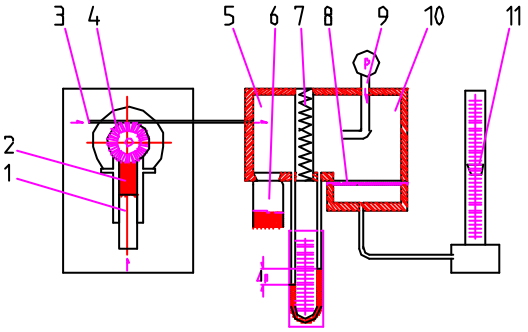
In principle a filter unit is a separation apparatus; this means that it separates the offered material. The separated product flows back to the production process or to the residual utilization. The particles contained in the outgoing air are called residual dust. The residual dust is indicated in mg/m³. TA-air regulates that the actual technical stand is authoritative for the residual dust value. Technical stand means the technical possibilities without considering economic concerns. Publications like this contribute to the technical stand. Users who don´t meet the technical regulations of the approving authorities most contribute to the technical stand. This way the conditions often are tightened up. Suppliers of filter units know how difficult it is to measure the residual dust. This way it comes to promises which cannot stand a control.

Technical control works try to uniform test methods. The VDI 3926 dated December 1994 is a new control work: test of filter media for regenerating filters.

For more than 10 years ts-systemfilter disposes of a test method and test appliances which even surpass the norms.

***The test appliances of ts-systemfilter***

A metering brush transports a reproduceable dust-air-mixture onto the test sample (7). The residual dust is collected in an absolute filter (8).




1 piston [mm/h]
2 test dust [g]
3 pressure transport conduction [bar]
4 metering brush [min-1]
5 dirty air side chamber
6 dust collecting box
7 star filter-test sample [dm²]
8 absolute filter [dm²]
9 compressed air cleaning [bar]
10 clean air side chamber
11 suspension body [l/min]

The disadvantage of such a test is that we can make statements about the filter media but not about the filter apparatus and its application. For examination of filter units there is no valid norm today. Therefore it is fallen back on test certificates of the 'Berufs-genossenschaftliches Institut für Arbeitssicherheit' (institute for Employer's liability Insurance Association of Labour Protection), called BIA. In general tests are made according ZH 1/487. The test methods have one important disadvantage: Test conditions of the testing institutes give reproduceable values, but do often not correspond to applications in practice.

Statistical probability consideration: in practice the filter units are often running 4 shifts. This means a running time of more than 8.000 hours per year. Usually the measuring process for the determination of the residual dust takes up to one hour. The durability of star filters can absolutely be 5.000 hours and more. The measuring area of the test sample is up to 2 dm². The installed filter area is 20 m².

The ratio figures are:

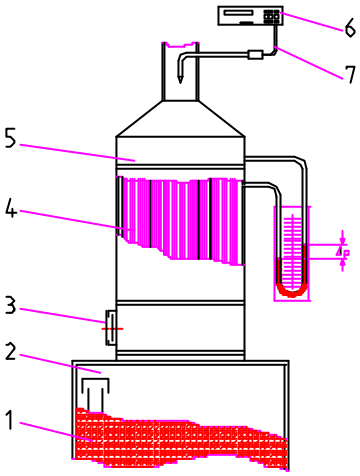
$i_{AF}$ [m²] .....= ... 20 m² to..... 0,02 m² ..... =... $i_{AF...}$ 1:1.000
$i_t$ [Bh] .....= ... 5.000 Bh to..... 1 measuring hour = ... $i_t$.... 1:5.000
$i_Q$ [Bm³/h] ..= ... 900 Bm³/h to ..... 3 Bm³/h..... =... $i_Q$... 1:300

This way statistically verified residual dust values cannot be determined. This is a delicate situation for the producers of filter units, however our customers insist on warranty promises concerning the residual dust content. There are electronic instruments which measure the residual dust with a resolution up to µg ranges. ts-systemfilter disposes of such a residual dust measuring instrument and we measure according to the general valid standard EN 481.

Measuring area:

velocity: ..... 0 - 16m/sec
grain size: ..... 0,5 - 20 µm
residual dust: ..... 0 - 100.000 µg/m
grain distribution classes:..... 0,5/1/2/3,5/5/7,5/10/>15 µm

***Measuring construction at a silo mounted filter apparatus with pressure compensation valve***




1 bulk material
2 dirty air side chamber and bulk material inflow [kg/h]
3 pressure compensation valve (DAV)
4 star filter
5 clean air side chamber (clean air side)
6 dust measuring instrument according to EN 481 dated april 1994 [µg]
7 suction conductor

ts-systemfilter makes following documents available:

BIA-certificate of the filter medium

ts-systemfilter test result

ts-systemfilter field measuring result

ts-systemfilter bulk material data determination

***BIA-test certificates of ts-systemfilter:***

| ts norm | kind of fibre | T [C°] | colour medium | class | test certificate |
|---|---|---|---|---|---|
| 916 | PES | 150 | white | USGC | BIA 9502650/6210 |
| 903 | cellulose | 100 | white | USG | BIA 9506449/6210 |
| 029 | PES | 130 | white | USGC | BIA 9820564/6210 |
| 911 | PP | 70 | white | USG | BIA 9603710/6210 |
| 017 | PES | 140 | white | US | BIA 8700333/6210 |
| 011 | PES | 140 | black | USGC | BIA 199824375/6210 |
| 016 | cellulose | 80 | white | USGC | BIA 8906556/6210 |
| 908 | cellulose | 100 | green | USGC | BIA 9204647/6210 |
| 900 | cellulose | 100 | green | USG | BIA 8902736/6210 |
| 914 | PP | 90 | white | USG | BIA 8900781/6210 |
| 010 | PES | 130 | white | USG | BIA 9108591/6210 |
| 915 | PP/PE | 80 | white | USGC | BIA 9104211/6210 |
| 910 | cellulose | 100 | green | U | BIA 9004705/6210 |
| 024 | PES | 150 | white | USGC | BIA 8706104/6210 |
| 023 | PES | 150 | white | USGC | BIA 9608230/6210 |
| 022 | PES | 150 | white | USGC | BIA 9004731/6210 |
| 021 | PES | 150 | white | USGC | BIA 9004728/6210 |
| 015 | cellulose | 100 | yellow | USG | BIA 8906265/6210 |
| 032 | PES | 140 | black | USGC | BIA 9821691/6210 |
| 018 | PES | 140 | white | USG | BIA 8805729/6210 |
| 019 | PES | 65 | white | USG | BIA 8500953/6210 |
| 912 | PES | 140 | white | USGC | BIA 9606547/6210 |

***silo filling***