Seebach GmbH
Neckarweg
D-34246 Vellmar
Germany

Telephone: +49 (0)561 98 29 70
Fax: +49 (0)561 98 29 733

Multi pass test

The multi pass test was developed at Oklahoma State University and standardized worldwide in 1981 as ISO 4572. Since December 1999, it is applicable in a revised version as ISO 16889.

The multi pass test presents an accelerated picture of the filter performance and yields associated data. It provides information on the filter rating and dirt hold capacity up to a specific differential pressure.

The test device as well as the testing itself is very elaborate. The test stand consists of three main components.

- Circuit (1) for test liquids that are contaminated with a specific dust.
- Circuit (2) for the purified test liquids that circulate through the test filter.
- Online particle counter (3).

During the test, contaminated test liquid from circuit (1) is fed into circuit (2). The particles that are not captured by the test filter remain in circuit (2) and are returned to the test filter by circulation (multi-pass). This causes the test filter to increasingly clog with particles, and the pressure continuously increases until it reaches an end differential pressure.

Before and after the test filter, particle counters (3) count the number of contaminant particles of different sizes (usually six different particle sizes), and transmit the values to a computer. The supplied contamination, volumetric flow, differential pressure, temperature and time are also recorded.

The ratio of the determined number of particles (per particle size) before and after the test filter is termed the β-value (filtration quotient).

Seebach GmbH
Neckarweg
D-34246 Vellmar
Germany

Telephone: +49 (0)561 98 29 70
Fax: +49 (0)561 98 29 733

Calculating the β-value

$$\beta x = \frac{\text{number of particles of size x before the filter}}{\text{number of particles of size x after the filter}}$$

For example β20

$$\frac{\text{150.000 particles of size 20µ before the filter}}{\text{2.000 particles of size 20µ after the filter}} = 75 \mathrel{\widehat{=}} \beta 20$$

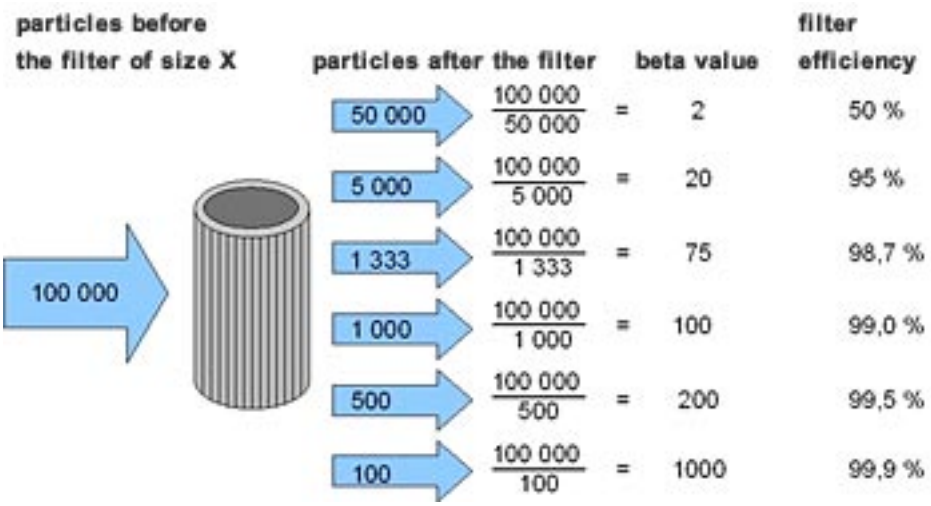
According to DIN 24550, the filter rating must attain a minimum β-value of 75 (nominal filter rating). Starting at a minimum β-value of 1000, the term absolute grade of filtration is used.

The separation (efficiency) can be derived from the β-value.

One example

$$\beta 20 = \frac{75 - 1}{75} * 100 \text{ in } \% = 98{,}67 \text{ \% separation of 20 µm particles}$$

It is particularly essential to indicate the β-value for depth filter materials (glass-fiber fleece, metal fleece, polymer fleece). Simpler test methods are available for surface filter materials (such as wire mesh).



A test protocol must illustrate the relationship between dirt hold capacity and differential pressure, as well as the bandwidth of the separation ability by simultaneously counting different particle sizes.

The multi-pass test is a destructive test in which only samples can be tested. It is not suitable for evaluating a filter element's processing quality. To investigate this, the bubble point test is used.

Seebach GmbH
Neckarweg
D-34246 Vellmar
Germany

Telephone: +49 (0)561 98 29 70
Fax: +49 (0)561 98 29 733