

Technical data sheet AQUAZIT®

General information

AQUAZIT® (FILTER COAL N) is a natural anthracite filter material produced in Germany. Especially favorable geological processes formed anthracite with a particularly special structure. Our unique refining process of cleaning, crushing and sieving ensures our capability to convert anthracite to premium-quality filter media for single-layer and multi-layer filtration.

AQUAZIT® (FILTER COAL N) meets the purity requirements of the European standard EN 12909 and German Drinking Water Ordinance (TrinkwV) 2001, which specifies the harmlessness to human health. This has been confirmed with periodic examinations conducted by the Institute of Hygiene, Gelsenkirchen in 2019.

As upper layer of a multi-layer filter AQUAZIT® (FILTER COAL N) does increase the filter performance of open and closed systems. With its coarser grain size and lower bulk density the tailored anthracite forms an exact parting plane with the lower sand. The double layer design replaces the conventional surface filtration by a volume filtration with considerable advantages resulting in clearly lower operation costs and lesser space requirements

Fields of application

AQUAZIT® (FILTER COAL N) in rapid gravity and pressure filters serves to filter water containing suspended solids and turbidity in the fields of drinking water, process water and wastewater treatment. It is also used in the water purification process for swimming pools.

AQUAZIT® (FILTER COAL N) promotes

- ⇒ an improvement in the filtration efficiency
- ⇒ a decrease in the uncertainty of filter
- ⇒ break-through
- ⇒ a saving of backwash water
- ⇒ an increase in the filtration velocity
- ⇒ a lengthening of the filter run

Advantages

The natural product already possesses the properties which are necessary for an ideal filter medium:

- ⇒ High resistance to abrasion
- ⇒ Excellent separation of the filter layers after back-washing
- ⇒ Low tendency to clump
- ⇒ No adhesion of precipitated iron, calcium or manganese compounds
- ⇒ No release of silicic acid or heavy metals into the water
- ⇒ Fully functional between pH 3 to pH 12
- ⇒ Higher retention capacity for solids
- ⇒ Lower pressure loss
- ⇒ Lower initial filter resistance
- ⇒ Longer filter-runs
- ⇒ Higher filtration velocity
- ⇒ Better filtrate quality
- ⇒ Lower backwash frequency
- ⇒ Less space requirement

Chemical analysis		Physical parameters	
Carbon:	ca. 92.0 %	Bulk density	ca. 700 kg/m ³
Ash:	ca. 5.5 %	Specific density	ca. 1.35 – 1.55 g/cm ³
Volatile matters:	ca. 8.0 %	Hardness	ca. 3 – 4 Mohs
Moisture:	ca. 2 %	Hardgrove Index	ca. 44 °HGI
Acid solubility:	max. 2 %	Attrition loss per 100 backwashes	ca. 0.1 %

Standard grain sizes

Type	Grain size /mm	Effective size d ₁₀ /mm	Mass fraction of over / undersize particles /%
I	0.6 – 1.6	0.7 – 0.8	< 5
II	1.4 – 2.5	1.5 – 1.6	< 5
III	2.0 – 4.0	2.1 – 2.3	< 5
IV	3.5 – 7.0	< 4.0	< 10

Other grain sizes are available on request. Please contact our sales team.

Typical grain size combinations of dual media filtration with AQUAZIT® (FILTER COAL N)

Filter material AQUAZIT®	Size I 0.6 – 1.6 mm	Size II 1.4 – 2.5 mm	Size III 2.0 – 4.0 mm
Silica sand <i>Support layer</i>	0.4 – 0.8 mm	0.71 – 1.25 mm	1 – 2 mm
Quartz gravel	2 – 3.15 mm	3.15 – 5.6 mm	5.6 – 8 mm
Quartz gravel	3.15 – 5.6 mm	5.6 – 8 mm	8 – 12 mm

The use of a support layer of quartz gravel depends on the type of filter bottom and nozzles. The grain size of the bottom layer should be at least 1.5 times higher, than the slit width of the filter nozzles.

Layer height of AQUAZIT®

Type	Typical value
Dual media filtration	600 – 1500 mm
Single layer filtration	1000 – 2000 mm

Filtration velocity

Type of filter	Typical value	Max. value
Open filter	8 – 12 m/h	up to 15 m/h
Closed filter	15 – 25 m/h	up to 30 m/h

Backwash techniques

The procedures described hereafter are recommendations based on our own tests and a lot of practical experiences. Nevertheless, backwashing has always to be optimized regarding the individual situation. The instructions of the filter supplier have to be observed.

Washing with air and water (separated)

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|----|---|-------------|
| 1. | Backwashing with water | 2 – 5 min |
| | Combination I | 35 – 40 m/h |
| | Combination II | 50 – 60 m/h |
| | Combination III | 80 – 95 m/h |
| 2. | Lowering the water level to few centimeters above the filter material | |
| 3. | Backwashing with air | 2 – 5 min |
| | Flush speed | ca. 60 m/h |
| 4. | Retention time to vent the nozzle floor and filter material | 3 – 8 min |
| 5. | Backwash with water | 4 – 7 min |
| | Combination I | 35 – 40 m/h |
| | Combination II | 50 – 60 m/h |
| | Combination III | 80 – 95 m/h |
| 6. | Pre-run | 1 – 5 min |

Depending on the individual situation step no. 1 and/or 6 can often be omitted.

Washing with air and water (combined)

A combined washing with air and water can generally not be recommended for multi-layer filters. Air adherent to the anthracite grains leads to an output of the specifically lighter material.

Exception: Special filter constructions (particularly filters being washed by submerging) allow a combined washing with air and water also in the case of multi-layer filters. The instructions of the filter supplier have to be observed exactly.

Washing with water only

Washing with water only is often chosen in the case of small filters ($d < 1000$ mm) or loose deposits of dirt.

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|----|------------------------|-------------|
| 1. | Backwashing with water | 4 – 7 min |
| | Combination I | 35 – 40 m/h |
| | Combination II | 50 – 60 m/h |
| | Combination III | 80 – 90 m/h |
| 2. | Pre-run | 1 – 5 min |

Special remarks for the backwashing of multilayer filters

1. In order to avoid/minimize the output of filter material
 - a. The water level has basically to be lowered to few centimeters above the filter layer.
 - b. The retention time has to be long enough to assure that the nozzle floor is completely vented.
 - c. The water washing after the retention time has to be executed with maximum speed from the beginning. Starting more slowly will lead to an increase and not to a reduction of the material output!
2. A long period of washing is of less importance for the cleaning effect. Better results are obtained by repeating the whole wash program: lowering – air washing – retention time – water washing as described above.
3. In case of filters used for removing flocs, it can be of advantage to perform a washing with water only (step 1 of the above backwash program) before air washing takes place. During washing with water only a great part of the flocs from the upper filter layer is removed. Herewith a distribution of the particles in the filter bed during air washing is avoided.
4. In the case the filter materials are mixed to a great extent, for example caused by a combined washing with air and water at the end of the washing a re-arrangement of the filter layers by an increase of approx. 15 % wash water speed is reached.
5. Especially in case of biologically assisted filtration processes, a period of preparation or seeding of the filter with prepared material may be necessary. Following such preparations, it may be useful to control the washing conditions (speed of washing, duration of washing etc.) and if necessary to optimize them. In the case of wastewater filtration, the required bed expansion will often be achieved with lower washing speeds than expected with fresh material.

A fully automatic process of the backwash program is helpful in many cases. However, there must be the possibility of easy adjustment of the main parameters.

Packaging and delivery

- ⇒ 50 L (35 kg) PE bags on Euro or one-way pallets
- ⇒ 1,65 m³ (1.155 kg) big bags
- ⇒ Bulk transport in silo trucks

Note

The information given in this technical data sheet is accurately put together, revised and updated if required. However, we cannot be held responsible for this information as being up-to-date, exact and complete. Apart from that, this information cannot replace a personal consultation in the specific case.