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New efficiency in hot gas filtration

Trimetric filter media: Top for temperature resistance, retention rate, and robustness

The innovative, highly porous filter medium made from sinter materials, Trimetric, combines in one medium everything that efficient hot gas filtration requires: high retention rates, thermal resistance up to 600°C, mechanical robustness to vibrations, and regenerability during operation. With this new product range, leading international technical weavers GKD – Gebr. Kufferath AG (GKD) are making the proven efficiency of combined optimized dutch weaves and metal fiber nonwovens demonstrated in a study by the German Institute of Mechanical Process Engineering (IMVT) available in practice for the first time. Adaptable to specific applications, the inherently stable filter elements can be employed in all economical designs of standard dust filters – and also in bag filter systems with minimal adjustments to fixtures.

Whether for producing color pigments and catalysts, for recovery of reusable materials or in wood-chip heating, industrial and district waste: The filtration and treatment of hot gas flows plays a key role in tackling the increasing demands for environmental protection and cost-effectiveness. The recovery of thermal energy after the filtration process is of decisive importance for the CO₂ footprint and overall efficiency of the system. Operating temperatures over 260°C not only dispense with energy-intensive reheating of the exhaust gas, but also contribute to protecting downstream units like heat exchangers, catalysts, or gas scrubbers. At low process temperatures, tar deposits can form a coating that is tough to remove here and gives rise to time-consuming and costly cleaning. However, higher operating temperatures place greater



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strain on the filter media used to ensure very good retention rates for the gas flow, even for fine particles smaller than 0.1 μm . The temperature range currently used most often for particle separation from hot gas flows is between 300 and 500°C. However, as the temperature increases, pressure loss also becomes greater with this cake-forming dust filtration. Regular cleaning of the filter media through pressure pulses is therefore vital for maintaining the performance of the filter. The use of filter media made from PTFE or other synthetic fibers is restricted to temperatures of maximum 260°C. What is more, they can also be damaged by smoldering particles or even catch fire, compromising the safety of the entire system. Ceramic filters are therefore the technology of choice at higher temperatures. However, their length is limited as they begin to vibrate from the pressure pulses used for regeneration – and risk breakage as a result. Filter media made from metallic materials are temperature resistant up to 600°C, non-combustible, and withstand vibrations with mechanical robustness. Until now, though, they have not managed to achieve the retention rate of PTFE media.

A real all-round talent

With the highly-porous Trimetric filter medium, GKD now offers a filter medium that unites all the positive properties of existing proven filter types in one medium. The four-ply, inherently stable product combines three different filter media – including metal nonwoven – into high-performance filters for hot gas filtration. As a sintered filter medium laminate, Trimetric is based on the tried and tested processes at GKD for producing the mesh laminate Gekuplate and the results of the IMVT study. The study showed that the combination of metal fiber nonwoven on the outflow side and optimized dutch weave on the inflow side is unbeaten in terms of cleaning and filtration efficiency. The high dirt holding capacity of this combination guarantees a slow increase in pressure loss with high separation efficiency. Temperature resistant up to 600°C, the laminate made of stainless steel media can also



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be used where polymer filter media no longer work. The material guarantees good weldability and thereby the necessary sealing between the raw gas side and clean gas side. Thanks to its support structures, the self-supporting filter element does not require a support basket. For cleaning, the filter cake is separated from the rigid filter medium by local differential pressure reversal. The long service life resulting from the very good regenerability of the Trimetric filter cartridges is the basis for durable and reliable operation. Unlike ceramic cartridges, filter cartridges made of Trimetric can also be cleaned outside the filter housing with a high-pressure cleaner, enabling them to be reused multiple times. This mechanical stability generally renders them far superior to ceramic cartridges: Trimetric cartridges even withstand vibration stress from pulsed pressure increases during cleaning or bolted connections that have been closed too tightly.

Universally deployable

Generally speaking, there is no limit to the filter length with this new filter medium: The required formats are comprised of segments up to 900 millimeters long mounted specifically for the application without the need for tools or expensive molds. As such, defective individual segments can also be repaired or replaced at any time. With external diameters that can be individually selected between 60 and 600 millimeters, Trimetric filter media have a cylindrical form as standard. In principle, though, square shapes or any other geometry are also possible. This modularity enables Trimetric filter media to be used in all economical designs of the standard dust filter. In this application, it guarantees optimal dirt absorption with the usual inflow speeds of 0.7 to 1 meter per minute. The innovative Trimetric filter media from GKD can be used in existing cartridge filter systems without alteration. Even existing bag filter systems or systems based on filter leaves can be converted with only a slight modification of the fastening elements in the filter housing. The cleaning properties and filtration efficiency of Trimetric filter



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media were tested on the basis of series constructions on VDI test benches. Compared with pure metal fiber nonwoven cartridges or powder cartridges, they exhibit very good regenerability, are also resistant to breakage, and comparable with PTFE media in terms of their retention rate – however only for temperatures up to 600°C. All of which means that Trimetric filter media significantly contribute to increasing process efficiency, reducing CO2 emissions, and maximizing cost-effectiveness.

6.524 characters incl. spaces

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As a privately owned technical weaver, GKD - Gebr. Kufferath AG is the world market leader in metal, synthetic and spiral mesh solutions. Four independent business divisions bundle their expertise under one roof: Industrial Mesh (woven metal mesh and filter solutions), Process Belts (belts made of mesh and spirals), Architectural meshes (façades, safety and interior design made of metal fabrics) and Mediamesh® (Transparent media façades). With its headquarter in Germany and five other facilities in the US, South Africa, China, India and Chile – as well as its branches in France, Spain, Dubai and worldwide representatives, GKD is close to markets anywhere in the world.

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