Hot gas filtration with ceramic candles

A multifunctional filter for the simultaneous removal of particulate, acid gases and NOx from flue gases
Discover the benefits of ceramic candle filters

GEA high temperature filters with ceramic elements remove particulates and are now available as BisCat ceramic filters with an embedded catalyst matrix allowing removal of NOx, dioxins, mercury and VOC. The filter elements are chemically inert and corrosion-resistant.

**Emission control advantages**
Ceramic filter elements show very low dust emissions < 2 mg/Nm³ and are thermally stable up to high operating temperatures. No cooling of flue gases is required and no thermal heat energy is wasted.

Filter elements are cleaned online during operation by means of separate, compressed air jet pulses. The filter elements are placed in a single or multi-compartment housing to handle large volumetric flow rates. This construction technique allows for maintenance of a single module while others continue to operate, without interruption of the process itself.

The injection of lime-based reagents allows for control of inorganic gaseous emissions like HF, HCl, SOx. The rigid candle structure enables surface filtration and forms a first layer of reactive dust for absorption processes.

**BisCat ceramic catalyst filters**
In addition to treating particulate and acid gases, the BisCat ceramic catalyst filters is enriched with a catalyst providing effective NOx removal by using upfront ammonia injection and replace a conventional selective catalyst reactor (SCR).

The BisCat filter solution is combining three process steps in one unit for advanced emission control:
- Dedusting
- Removal of acid components
- Reducing THC and NOx

<table>
<thead>
<tr>
<th>CERAMIC FILTERS</th>
<th>BISCAT</th>
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<tbody>
<tr>
<td>• Low dust emissions</td>
<td>• Effective NOx removal</td>
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<td>• High operating temperatures</td>
<td>• Low differential pressure</td>
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<td>• Excellent gas permeability</td>
<td>• Single emission control unit</td>
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<td>• Lightweight construction</td>
<td>• Multi-pollutant performance</td>
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<td>• Long service lifetime</td>
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**APPLICATIONS**
- Glass furnaces
- Cement kilns and coolers
- Incinerators
- Refineries
- Roasters
Special features of ceramic candle filters with pulse jet technology

- Low differential pressure
- Dust monitoring system (Broken Bag Detector) allows for safe operation with almost zero dust emission
- Low a/c ratio allows n-1 operation for longer periods
- Baffle plates protect candles from direct gas flow intake in raw gas compartment
- Clean gas dampers are designed for low differential pressure
- Candle installation period is short, due to easy and fast candle piece assembly
- Penthouse equipped with lifting devices to handle candles and clean gas compartment covers

The special GEA design allows for candle length of up to six meters. A downholder plate holds four candles in place to a common tubesheet. The intake nozzle protects candles from excessive abrasion by means of compressed air and the sealing between candle and head plate prevents from bypass gas.

Standard reverse pulse jet methods, commonly used in fabric filter baghouses, are used for ceramic filter cleaning. A pulse of compressed air is sent down in the center of the filter elements and cleans the accumulated dust from the outer surface of the tubes. The particulate falls into a lower hopper and is removed through an airlock device. Filters are cleaned on-line, with no need to isolate individual housings or sections.
GEA is a global technology company with multi-billion euro sales operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA is listed in the STOXX® Europe 600 Index. In addition, the company is included in selected MSCI Global Sustainability Indexes.