Innovative solutions for industrial gas filtration

Maximum system protection. Minimal operating costs.
Applications – complex requirements

Gas filters are used in a variety of industrial processes such as:
- Exploration, transportation, storage and processing of oil and gas,
- Production of chemical and petrochemical products,
- Preparation of industrial raw materials,
- Operation of fixed and mobile installations for power generation.

Gas filters are often combined with compressors or turbines, but also with reactors and fixed or mobile large engines. The mediums to be filtered are normally seal gas, fuel gas, heating and cooling gas, injection gas as well as a number of technical gases. The filtration process can include the removal of particle contamination, the separation of moisture from gas or a combination of both.

There are high technical and safety requirements for gas filtration:
- Required degree of purity for the filtered gas,
- Specific properties of gases, which are explosive, aggressive, toxic, polluting,
- Special conditions of processes, such as extreme temperatures and pressures,
- Extreme environmental and climatic conditions,
- Exotic material specifications.

All listed aspects require the highest precision and maximum safety, which can be identified as a common denominator in the gas filtration industry. BOLLFILTER for oil and gas fulfill these comprehensively.
### Simplex filters

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal diameters</th>
<th>Connections inline</th>
<th>Switch-over</th>
<th>Material variations</th>
<th>Filter housing</th>
<th>Pressure stage</th>
<th>Grade of filtration</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOLLFILTER Simplex Type 1.12.2</td>
<td>DN 25 – DN 80</td>
<td>no</td>
<td></td>
<td>nodular cast, iron, cast stainless steel (DN 25 und DN 50)</td>
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<td>max. PN 550</td>
<td>from -10°C to 160°C 10 µm – 5000 µm **</td>
</tr>
<tr>
<td>BOLLFILTER Simplex Type 1.58.1/1.78.1</td>
<td>DN 25 – DN 300</td>
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<td></td>
<td>carbon steel, stainless steel, Duplex, Super Duplex, Inconel, non-welded</td>
<td>max. PN 250</td>
<td>max. PN 100 / PN 550</td>
<td>from -196°C to 250°C 0.1 µm - 250 µm **</td>
</tr>
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</table>

* Dependent on the filter size
** With coalescer - optionally with demister and cyclone

### Duplex filters

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<tr>
<td>BOLLFILTER Duplex Type BFD-C</td>
<td>DN 20 – DN 200</td>
<td>yes</td>
<td></td>
<td>carbon steel, stainless steel, Duplex, Super Duplex, Inconel, non-welded</td>
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<td>max. PN 250</td>
<td>from -196°C to 250°C 0.1 µm - 250 µm **</td>
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<tr>
<td>BOLLFILTER Duplex Type 2.58.2/2.78.2</td>
<td>DN 25 – DN 200</td>
<td>no</td>
<td></td>
<td>carbon steel, stainless steel, Duplex, Super Duplex, Inconel, non-welded</td>
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<td>BOLLFILTER Duplex Type BFD-P DBB/BFD-C DBB</td>
<td>DN 20 – DN 200</td>
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All BOLL gas filters are characterised by the highest precision, reliability and safety. The special feature of the BOLLFILTER product program for gas filtration is that it covers all applications. In addition to standard filters, the product range also includes filters that are manufactured according to customers’ specifications. The unique system flexibility and wide range of variants allow a precise customisation of the filter solution to the individual application requirements.

For each type of gas, volume of gas, required degree of purity, type of plant and all operating conditions, the BOLLFILTER portfolio offers a perfect gas filter. Available options include:

- Simplex or Duplex filter
- Forged, welded or cast construction
- Different housing sizes and connection nominal diameters
- Particle or coalescer elements
- Cyclone pre-separation/knock-out
- Demister pre-separation
- Additional reservoir sizes according to the application
- Liquid level indicator
- Differential pressure indicator/transmitter
Gas filtration: An overview

Gas filtration is a very complex task. Depending on the contamination of the gas flow, various filter elements, different separation mechanisms, and filters manufactured by BOLL & KIRCH may be used. Two stages of particle separation are necessary to achieve a high degree of separation efficiency. The particle filter element first filters the solid particles out of the gas flow and the second stage, the coalescer element, filters out the liquid and solid particles. The cyclone, like the demister, is used as a pre-separator when the gas is expected to be highly contaminated by liquid and solid particles. The separation efficiency for solids and high gas content as well as high liquid content. The separation efficiency is based on centrifugal force, which separates the particles in the outer and inner region of the cyclone.

The demister as a pre-separator

In a demister, the effects of inertia are the main separation mechanism. Good separation of dust is achieved by a separator where the gas flow is deviated by a certain angle. With this type of separation, the solid particles are separated from the gas flow. The cyclone, on the other hand, separates according to the density of the particle. The filter element filters out the solid particles. Due to the required high gas velocity, the efficiency of gas separation decreases.

The particle filter element

During the filtration of solid particles from gas, the particles follow the flow through the filter fabric. Due to the separation efficiency, the particles are deposited, so that their flow is very low. The particle filter element, depending on the consistency of the gas flow and the size of the particles, they penetrate into the pores of the fabric. The result is that the pores become blocked and as a consequence, the differential pressure increases.

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For more than 60 years, we are focusing on the filtration of liquids and gases. Today, the brand BOLLFILTER is a guarantee for high performance, precise function, best material, best processing, reliability and freedom from maintenance. This is based on a quality management system, which is designed according to international standards and certified according to ISO 9001 and ISO 14001.

As part of Research and Development as well as in the course of regular production control, product tests and quality tests play an equally important role at BOLL & KIRCH. This ensures that all manufactured products fulfil the legal and customer-specific requirements and that only qualitatively flawless products leave the production. Gas filter elements for example, go through a rigorous test of efficiency, capacity and safety, facilitated by the following measures:

- Fractional separation efficiency measurements according to ISO 12500-3
- Differential pressure measurements
- Loading measurements
- Bubble Point Test according to ISO 2942

All test installations are in-house and therefore always available. A highly sophisticated, special software is used for the automatic control of the test runs and to document the results.

Gas filtration on an industrial scale demands highly sophisticated filter systems for most different tasks, plant and operating conditions. In addition to adapting our core group of standard products, BOLL also strategises with our customers to develop specialised technically optimal solutions for individual applications. Within Customised Engineering, we accompany our customers through all project sub-processes from the definition of the requirements to the realisation and the commissioning of the systems.

All BOLLFILTER models, whether standard or special executions, are top-quality products. In their competitive environment, they set quality standards for gas and liquid filter systems. This is confirmed by 80 national and international authorisations and certificates.

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<table>
<thead>
<tr>
<th>Authorisation/regulations/set of rules</th>
<th>Construction design</th>
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<tr>
<td>API 610 / 614 / 618 / 692 (International)</td>
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<td>MOM (Singapore)</td>
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</table>
Maximum customer orientation for maximum satisfaction

BOLL & KIRCH continues to prove its strengths as a manufacturer and supplier long after the product has been delivered. As a leading international supplier of marine and industrial filters for filter systems with a global network of sales and service centres, BOLL & KIRCH has at its fingertips the ideal logistical basis for providing perfect customer support. Naturally, users of the different BOLL gas filters also benefit from the advantages this worldwide network provides – swift delivery, faster availability of technical support and a trouble-free supply of BOLLFILTER Genuine Parts.

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