

Cement Plant Baghouse with Abrasive Dust Loading and High Temperatures

At ClipOn, we often experience requests from Operation Managers and people in other roles of higher than standard abrasive dust loading and temperatures in their baghouse. One such recent request was from an Operations Manager at a Cement Plant. The baghouse had been experiencing problems with abrasive dust loading and high temperatures for the past few weeks, and it was starting to affect the plant's production.

The symptoms of the problem were clear. The pressure drop across the baghouse increased, making the filters more dust-covered. The temperature inside the baghouse was also rising, causing the fabric of the filters to deteriorate. These problems were causing several problems for the plant. The increased pressure drop was reducing the efficiency of the baghouse, which meant that more dust was being released into the atmosphere. The rising temperatures were also causing the filters to fail prematurely, which meant that the plant had to be shut down more often for maintenance.

The Operations Manager knew it was only a short time before other additional problems surfaced, such as:

- Increased risk of fires and explosions
- Reduced efficiency of the baghouse
- Increased maintenance costs
- Damage to the baghouse structure
- Release of harmful pollutants into the environment

The Operations Manager knew that he had to find a solution to the problem quickly. He called us at ClipOn to investigate the issue and to confirm several solutions his team, and he had thought of:

- Installing a prefilter removes some abrasive dust before reaching the baghouse.
- Increasing the frequency of baghouse cleanings.
- Installing cyclones to act as a prefilter in front of the baghouse.

The ClipOn representative was on site the next day and highlighted a few additional factors to consider for a baghouse with high abrasive properties and temperature:

- Type of dust: The dust's abrasiveness will affect the filter bag's lifespan. More abrasive dust will require a more durable filter bag material.

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- Operating temperature: The operating temperature will also affect the lifespan of the filter bag. Higher temperatures will require a more heat-resistant filter bag material.
- Dust-holding capacity: The dust-holding capacity of the filter bag is the amount of dust the bag can hold before it needs to be cleaned. A higher dust-holding capacity will reduce the frequency of bag cleanings.
- Cost: The filter bag and finish will vary depending on the material and the finish. When deciding, it is important to factor in the filter bag's cost and finish.

ClipOn also made recommendations for the type of filter bag and finish for a baghouse that has higher than standard abrasive properties and temperature:



- Filter bag material:
 - Aramid (Nomex): This is a high-strength, heat-resistant fabric well-suited for applications with high levels of abrasion and dust. It can withstand temperatures up to 204°C (400°F).
 - P84: This proprietary fabric is even more heat-resistant than Nomex, with a continuous operating temperature of 246°C (475°F). It is also more resistant to acids and chemicals.
 - PPS: This synthetic fabric is very strong and heat-resistant. It can withstand temperatures up to 190°C (375°F).
- Filter bag finish:
 - PTFE coating provides excellent resistance to abrasion, chemicals, and high temperatures. It can also help to improve the dust-holding capacity of the filter bag.
 - Fluoropolymer coating: This coating is similar to PTFE, but it is even more resistant to chemicals.

He also noted that the best type of filter bag and finish for a particular application will depend on the specific properties of the dust and the operating conditions. It is always best to consult with a qualified baghouse manufacturer to get recommendations for your specific application.

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He then covered different air inlets that can be considered on a baghouse to help reduce abrasive properties and temperature.

- **Low inlet:** This type of inlet is located at the bottom of the baghouse, which helps reduce the velocity of the incoming air and the number of abrasive particles carried into the baghouse.
- **Side inlet:** This type of inlet is located on the baghouse's side, which helps distribute the incoming air more evenly across the filter bags. This can help to reduce the temperature of the bags and the amount of abrasion that they experience.
- **Tangential inlet:** This type of inlet is located at the top of the baghouse, directing the incoming air in a tangential direction around the baghouse. This helps to create a swirling motion of the air, which helps to reduce the velocity of the air and the number of abrasive particles carried into the baghouse.

Additional benefits of using a low inlet, side inlet, or tangential inlet on a baghouse were also covered:

- **Reduced bag cleaning frequency:** The lower velocity of the incoming air can help reduce the frequency of bag cleanings, saving time and money.
- **Improved baghouse efficiency:** The more evenly distributed incoming air across the filter bags, the more efficiently the baghouse collects dust.
- **Reduced wear and tear on the baghouse:** The lower velocity of the incoming air can help to reduce wear and tear on the baghouse, which can extend the lifespan of the baghouse.

The ClipOn representative also covered but did not recommend using the cyclones effectively to remove these contaminants. He stated that cyclones work by centrifugal force to separate the dust from the airstream. However, abrasive particles and hot air can be too small or too light to be effectively separated by centrifugal force. As a result, cyclones often pass these contaminants through to the baghouse or other downstream particulate control devices. In addition, the high temperatures and abrasive particles can damage the cyclone, leading to premature wear and tear. This can increase the maintenance cost and reduce the cyclone's lifespan.

The Operations Manager's purchase of the P84 with a special finish was determined to be the best solution. However, he also added a few Nomex bags to install in several rows to see if a less expensive bag could be used. The inlet was modified to create an airflow closest to a tangential inlet.

Both parties agreed to review the inlet changes to the baghouse at a future date. The immediate problem with the baghouse was quickly resolved. The pressure drop across the baghouse decreased, the temperature inside the baghouse stabilized, and the filters started

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to last longer. The plant resumed normal production, and the Operations Manager was relieved that he had found a solution to the problem. He knew the new measures would help protect the environment and keep the plant running smoothly for years. He also would soon know if further inlet condition modification would be beneficial and if a less expensive bag could be used.

Key Learning: Customization is a key aspect of aftermarket filtration and fabric manufacturing. Companies can work closely with these manufacturers to create unique filtration solutions that meet their needs. This customization can involve adding additional features, such as increased filtration capacity or enhanced durability for harsh environments. Alternatively, companies may choose to remove certain features to reduce costs, streamline production processes, or improve the functionality of their product.

Through collaboration and prototyping, custom solutions align with the company's goals while delivering optimal performance in real-world applications. As a result of this tailored approach, businesses are better equipped to compete in today's marketplace by improving productivity and reducing costs without sacrificing quality or reliability.

About Us: ClipOn is an artisanal company in material handling. We customize solutions based on specific applications with the help of our global collaboration and in-house technical team to deliver bespoke explications. If you want additional technical resources for filter media, air slides, canvas belts, and filter bags and their applications, visit [ClipOn.io](https://clipon.io).

ClipOn offers decades of experience and cost-effective solutions to help you find the right filter bag replacement frequency.

Contact us today to learn more about our filter bag replacement solutions and get started!

Ten Reasons to Consider ClipOn:

1. More Affordable Alternative vs OEM
2. Equal if Not Superior Performance vs OEM
3. Readily Available
4. Customizable
5. Alternative Materials & Coatings
6. Equal if not Superior Warranty
7. Reverse Engineering Capabilities
8. Limited Production Runs
9. Global and Local Logistic Network
10. Prototyping Available