

Case history

GORE® LOW DRAG Filter Bags – Lower Differential Pressure and Higher Air Flow in a Carbon Black Purge Gas Baghouse

Challenge

A carbon black producer sought to improve process stability, production efficiency and bag life in their purge gas operations.

Solution

The customer removed their incumbent filter bags and equipped the baghouse with GORE LOW DRAG Filter Bags.

For the duration of this trial, the cleaning-pulse pressure was reduced from 6 bar to 4.5 bar. All other process parameters were identical to those used for the incumbent bags.

Result

Performance data for the GORE LOW DRAG Filter Bags was tracked across a range of carbon black grades. The customer provided analogous historical performance data for the incumbent bags. Analysis of the two data sets revealed:

- With the GORE filter bags, the measured average fan current increased from 93.6 to 103.5 amps. This increased total average fan power from ~46.8 kW to ~55.9 kW. This corresponds to a >30% increase in airflow¹.
- The GORE bags enabled a 12% average reduction in differential pressure (dP), with a corresponding decrease in back-pressure from the baghouse (from ~452.5 to ~394 mm wc).

The following graphs (next page), plotted on the same scale, compare dP and total fan-current trends for the incumbent filter bags (Figure 1) and the GORE LOW DRAG Filter Bags (Figure 2) over 14 days of continuous operation.

Application:

Carbon Black Purge Gas Baghouse

Temperature:

200 – 220 °C

Filtration Area:

520 m²

Baghouse Type:

Pulse Jet, positive pressure

Cleaning:

Off-line, on time,
250 cycles/compartments/day

Filter Material:

GORE LOW DRAG Filter Bag,
22 opsy fiberglass

1. Air flow, calculated using a fan curve, increased from 13,300 m³/hr to 17,300 m³/hr.

This data demonstrates that GORE LOW DRAG Filter Bags supported greater process efficiency and operational stability by enabling lower resistance (as shown in dP data) and higher airflow (indicated by Total Fan Current data).

In addition, the improved cleanability of these Gore filter bags meant that cleaning-pulse pressure could be reduced from 6 bar to 4.5 bar without adversely affecting the dP. This reduction in cleaning energy is expected to support longer bag life.

GORE LOW DRAG Filter Bags also offer superior dust-cake release, which is expected to reduce the amount of wasted product as well as the amount of downtime between grade changes.

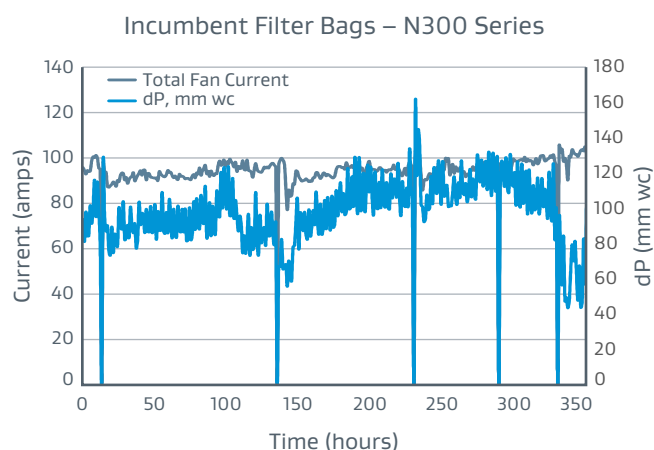


Figure 1:
The incumbent bags exhibited a significantly higher dP trend, along with lower (and less stable) average fan current

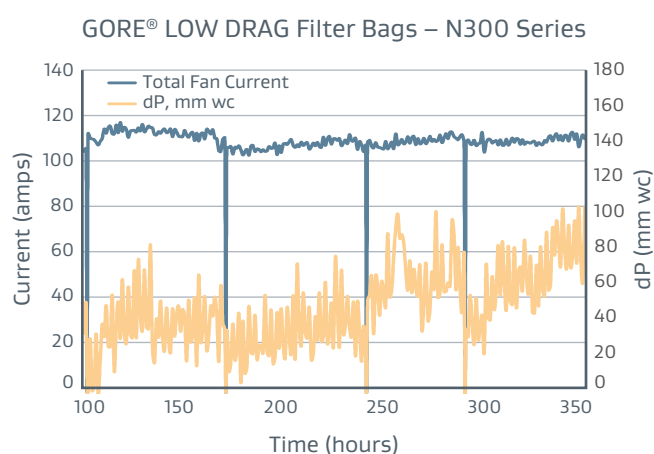


Figure 2:
The GORE LOW DRAG Filter Bags enabled a consistently lower dP trend and higher, more consistent fan current.

Variable	Incumbent Filter Bag	GORE LOW DRAG Filter Bag	Difference
Cleaning Pressure	6 Bar	4.5 Bar	-25%
Average Fan Power	46.8 kW	55.9 kW	+19%
Average Air Flow	13,300 m ³ /hr	17,300 m ³ /hr	+30%
Average dP	75 mm wc	66 mm wc	-12%

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