

Case history

GORE® LOW DRAG Filter Bags – Longer Bag Life and More Stable Operation in Refining Catalyst Production

Challenge

A multinational producer of alumina catalyst desired longer pulse jet filter bag life and steadier operation in both their calciner and feedbin baghouses.

Solution

The customer historically used standard GORE® Filter Bags in each process baghouse (ePTFE membrane on 830 gsm PTFE backer in calciner and ePTFE membrane on 543 gsm polyester backer for dryer). They installed GORE® LOW DRAG Filter Bags with identical backers for this trial. Process data from the standard membrane bags was used as a control comparator.

For the duration of this trial, the flow rates to the bag houses were maintained identical to the control data. The calciner baghouse was programmed to clean “on demand” at a set differential pressure (dP) limit. The feedbin baghouse was programmed to clean “on time”. This trial of GORE LOW DRAG Filter Bags continued for more than one year, during which relevant data (including dP and airflow) were documented.

Result

In the calciner baghouse, the airflow rates to the baghouses were consistent and comparable. As shown in Figure 1, during 8,000 hours of operational time, the baghouse with GORE LOW DRAG Filter Bags consistently achieved a much lower dP after each cleaning cycle (2.5" wc vs. 4" wc).

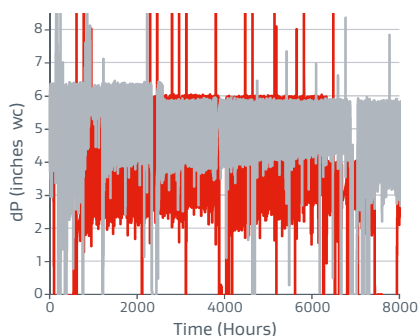


Figure 1:
Calciner Baghouse dP Comparison

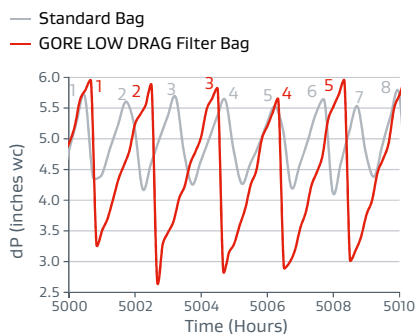


Figure 2:
Calciner Baghouse Cleaning Cycles

Application:
NiCO₃ Based Al₂O₃ Catalyst

Flow Rate:
Confidential Am³/hr

Bag House Type:
Pulse Jet

PROCESS BAGHOUSE: CALCINER

Temperature (avg):
185 °C

Filtration Material:
GORE Membrane on 830 gsm
Non-woven PTFE Felt

PROCESS BAGHOUSE: FEEDBIN

Temperature (avg):
80 °C

Filtration Material:
GORE Membrane on 543 gsm
Non-woven Polyester Felt

GORE LOW DRAG Filter Bags delivered more than 3X the service life of Standard bags

Figure 2 shows a shorter-duration test (10 hours) in which the GORE LOW DRAG Filter Bag requires only 5 cleanings, compared to 8 cleanings for the standard bag. For the customer, this reduction in cleaning frequency has extended bag life by 2X, relative to historical performance.

In the catalyst feedbin baghouse, similar value was demonstrated. Figure 3 compares dP trends for the standard GORE Filter Bag and the GORE LOW DRAG Filter bag, over a period of 70 days. These results clearly demonstrate that the GORE LOW DRAG Filter Bags delivered higher cleanability, lower pressure drop and consistently more stable operation. More specifically: The standard bags generally exceeded the 2" wc threshold within 20 days of operation. Even with frequent offline cleaning, they were replaced every three months. Conversely, the GORE LOW DRAG Filter Bags did not approach the 2" wc threshold for 70 days — a performance improvement of more than 300 percent. To date, these bags have demonstrated a service life exceeding 22 months. This customer is planning further system enhancements to fully capitalize on the benefits of low-resistance filtration. However, even without an optimized system, this customer has realized important benefits in terms of bag life, reduced process variability and more stable operation.

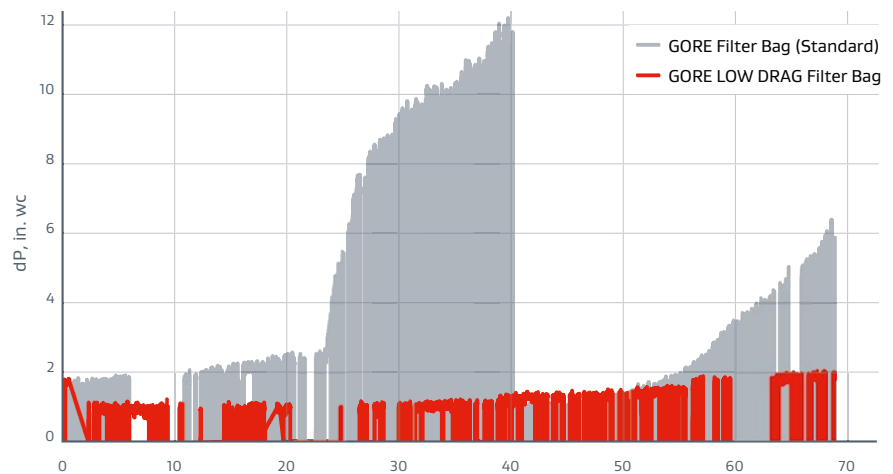


Figure 3: Catalyst feedbin baghouse Baseline Pressure Drop (dP) Comparison

In summary, the GORE LOW DRAG Filter Bags provided significantly greater value-in-use in multiple baghouses. As demonstrated by the data, these bags enabled lower pressure drop, longer bag life, and steadier operation in both calciner and feedbin baghouses.

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