

Case history

GORE® LOW DRAG Filter Bags — Low Emissions, Lower Pressure Drop, Longer Bag Life and Stable Operation in TiO₂ Production

Challenge

A multi-national TiO₂ producer had installed a set of standard Aramid bags. Shortly after their installation, the baghouse experienced an ongoing steady increase in pressure drop (dP). As a result, the service life of these bags was short: just one year. These bags also suffered from problematic intermittent emissions.

Solution

In one baghouse, this customer replaced the incumbent bags with GORE LOW DRAG Filter Bags. A subsequent performance analysis compared data from the Gore filter bags to equivalent data from the incumbent (competitive) bags.

This comparative trial proceeded for more than 20 months. For the duration of the trial, the flow rates to the two baghouses were identical, and each baghouse was programmed to clean “on demand” at a set differential pressure of 1 KPa (4 inches of wc). At each baghouse, dP and flow data were monitored and recorded, and emissions at each stack were observed.

Result

The airflow to the baghouse was identical for each set of bags. Figures 1 and 2 document results over the installed life of each set of bags (pressure drop to **inlet** and **outlet** fan speed; airflow proportional to fan speed.)

| | |
|-----------------------------|--|
| Application: | TiO ₂ Flash Dryer |
| Temperature (avg): | 180 °C |
| Flow Rate: | Confidential Am ³ /hr |
| Baghouse Type: | Pulse Jet |
| Filtration Material: | GORE LOW DRAG Filter Membrane |
| Filter Bags: | ePTFE GORE Membrane on 830 g/m ² (24.5 opsy) non-woven PTFE Felt Backer |

GORE LOW DRAG Filter Bags: Lower residual dP than incumbent bags even after 20 months of service

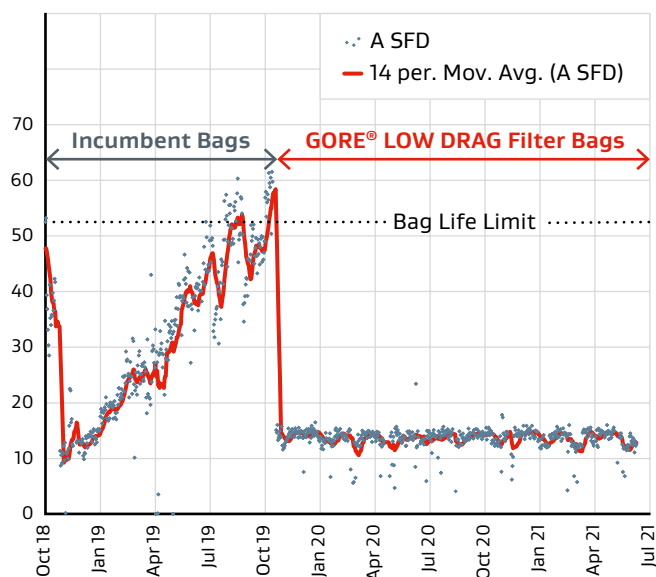


Figure 1: Ratio of dP to Baghouse Inlet Fan Speed

Key findings

Incumbent Bags:

- Initially had a lower dP, but this increased continuously from the start
- Reached the limit of 4 KPa (16" wc) within 1 year, which triggered the need for bag replacement
- Comparable level of performance (compared to GORE LOW DRAG Bags) expected for only the first month after installation (based on extrapolation of the persistent performance baseline from trial)

GORE LOW DRAG Filter Bags:

- Maintained a flat and lower residual dP even after 20 months of service
- Showed less variability, which enabled stable bag house operation
- Required cleaning 40% less often than the incumbent bags
- Enabled cleaning at 20% lower pulse pressure than the incumbents (520 KPa versus 650 KPa, or 75 psi versus 95 psi).

Less frequent cleaning at lower cleaning pressure translates to significantly longer bag life for the Gore products — as demonstrated in Figures 1 and 2.

This trial also included routine observation of emissions from the baghouse with GORE LOW DRAG Filter Bags, and from an adjacent dryer baghouse using the incumbent (competitive) bags. With visible emissions from both stacks, notably higher levels were escaping from the incumbent stack than from the GORE LOW DRAG Filter Bags stack. The customer further reported that the incumbent bags routinely and continually emitted dust, even immediately after installation.

GORE LOW DRAG Filter Bags: Lower residual dP than incumbent bags even after 20 months of service.

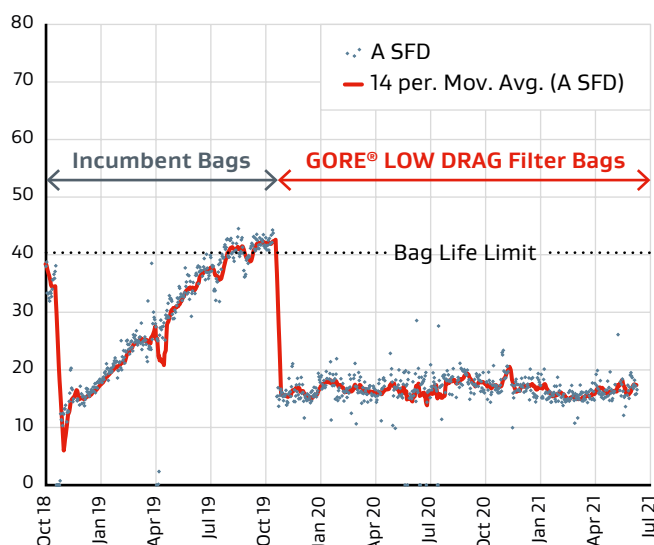


Figure 2: Ratio of dP to Baghouse Outlet Fan Speed

Conclusion

GORE LOW DRAG Filter Bags contributed to a lower total cost of ownership by enabling this customer to benefit from

- lower pressure drop
- lower emissions
- at least 2X longer bag life
- greater process stability
- opportunity to increase product throughput

Adjacent trials in TiO₂ micronizer applications delivered analogous results: Multiple sites reported longer bag life and stable operation after installing the same style of GORE LOW DRAG Filter Bags (ePTFE laminate). Similar production and economic benefits have also been noted when alternative GORE LOW DRAG products have been installed in lower-temperature TiO₂ applications, such as process and packing bins.

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