BHA® Dust Collector Performance

Background

The customer has a baghouse on their product cooling process collecting calcined clay. The collector worked relatively well, running at 5-6" dP with 18 month filter life, but several operating parameters were considered unsatisfactory:

- The lift-off lids and roof of the baghouse were becoming more and more corroded. The baghouse was installed in the late 1970s and was potentially reaching its end-of-life.
- Visible emission triggers, a process that results in a 24 hour cycle where several mechanics perform physical inspections and filter change-outs, were increasing. This peaked in 2013 with 9 visible emission triggers.
- Mechanics had voiced dissatisfaction with the "bottom-load" design of the collector, meaning filters, when replaced, had to be done from the bottom (dirty) side of the collector in a confined space.
- Maintenance expenses were increasing to keep the baghouse performing well. This peaked in 2013 with \$83k in maintenance expenses.



Solution

The customer partnered with Parker Hannifin to evaluate the dust collector and recommend solutions to improve performance. The initial discussions were around a capital project to replace the entire collector, but upon inspection the dirty-air plenum (DAP) was determined to be in very good condition. A solution was developed to keep the existing DAP, hoppers, support structure, and material evacuation systems in place and convert the dust collector to a top-load design with a new clean-air plenum (CAP).

The engineers in this business have several ongoing goals, one is to improve the performance and reliability of the Dust Collectors amongst the sites by completing the following:

- investigate and install new technology in at least one of the dust collectors for evaluation
- · compile a report of results and recommendations by year-end

© 2018 Parker Hannifin Corporation



Parker Hannifin Corporation Industrial Gas Filtration and Generation Division 11501 Outlook Street, Suite 100 Overland Park, KS 66211 USA p: 800.821.2222 | f: 816.353.1873 e: filtration@parker.com PB180413-342

BHA® Dust Collector Performance



A simple clean-air plenum conversion utilizing conventional bags and cages would not address this goal. As the solution continued to be developed, the customer considered two additional Parker Hannifin recommendations:

1. **FilterSense**—FilterSense is a baghouse optimization and control system that provides unparalleled notification and control of the baghouse cleaning system. Besides allowing the baghouse to clean on-demand (cleaning based upon pressure readings and not time) it electronically notifies plant personnel of any cleaning system malfunction automatically, as opposed to waiting for visual inspections.





2. **BHA ThermoPleat**^{*} filter elements are a rigid, one-piece high-temp filter element that replace traditional filter bags/cages. Besides being highly efficient, single-piece in construction, and easy to install, they pack more filtration area into a smaller design, which, in this case, means the finished design required far fewer filters when compared to using traditional filters.

© 2018 Parker Hannifin Corporation



Parker Hannifin Corporation Industrial Gas Filtration and Generation Division 11501 Outlook Street, Suite 100 Overland Park, KS 66211 USA p: 800.821.2222 | f: 816.353.1873 e: filtration@parker.com PB180413-342

BHA® Dust Collector Performance

Results

The total system started to come online in September of 2014. As of May 2015, there have been zero visible emission triggers. That's an 8-month period of perfect asset availability.

As the customers personnel performed the filter installation, the true benefit of the BHA ThermoPleat filter and top-load design was realized from a maintenance & safety, and cost standpoint:

Measureable	Previous State	Current State
Confined Space?	Yes	No
Man-hours for compartment change-out	60 (5 men, 12 hours)	4 (4 men, 1 hour)
Visible emission triggers?	Yes	No
Pulse cycles required to maintain dP?	1,200/hour	120/hour

Year	Annual Maintenance Cost	
2012	\$75,000.00	
2013	\$83,000.00	
2014*	\$46,000.00	
2015	\$2,000.00	
*Drop in 2014 due to system coming online for the final 4 months		

The reduction in pulse cycles has led to significant savings, both in compressed air usage and reduced energy consumption:

Measureable	Before	After
Pulse Pressure	100psi	75psi
Pulse Frequency	Every 5 seconds	Every 50 seconds
Actual SCF Per Pulse	4.5	3.375
Compressed Air Cost	\$12,656.00	\$316.00
Previous System Resistance	15" w.c.	12.5" w.c.
Fan Energy Cost	\$63,849.00	\$53,207
Total Energy Savings		\$22,981.00

© 2018 Parker Hannifin Corporation



Parker Hannifin Corporation Industrial Gas Filtration and Generation Division 11501 Outlook Street, Suite 100 Overland Park, KS 66211 USA p: 800.821.2222 | f: 816.353.1873 e: filtration@parker.com PB180413-342

BHA® Dust Collector Performance

Utilizing BHA ThermoPleat filters provided another unique design aspect. Because of the increased filtration area "per hole" of the BHA Thermopleat, the conversion only required about $\frac{1}{3}$ of the horizontal space that traditional bags and cages require.

Air, and the dust carried with it, naturally speed up when entering smaller spaces. Conversely, a massive "drop-out box" was created in the existing DAP with all the filters installed at the far side of the inlet. This resulted in the majority of the particulate collected in this baghouse never even reaching the surface of the filters. Instead, it drops out into the hopper due to the low carrying velocities. This further improves performance, reduces cleaning cycle requirements, extends filter life, and improves asset availability.



© 2018 Parker Hannifin Corporation



Parker Hannifin Corporation Industrial Gas Filtration and Generation Division 11501 Outlook Street, Suite 100 Overland Park, KS 66211 USA p: 800.821.2222 | f: 816.353.1873 e: filtration@parker.com www.BHA.com PB180413-342