Case Study

OSEPA BHA® PulsePleat®

Prior to contacting Parker Hannifin (formerly GE Environmental Services), a cement company employed a Fuller pulse jet dust collector connected to an OSEPA high efficiency separator. The configuration included 975 filters, each made of 16 oz (500 grams) polyester PTFE laminated felt with a dimension of 6.25 in. (158.75 mm) x 144 in. (3658 mm), totalling 19 134 ft.^{2} (1779 m^2) of filter area. The design airflow rate was 61,000 ft.^{3}/min (103 639 m^3/h); the air to media ratio was 3.1:1.

The company's main concern was the short life expectancy of its filters, which was just two years at the time due to a combination of issues. The velocity of the material was 'scrubbing' off the membrane on the filter bags, causing bleed through into the depth of the polyester felt bag. This eventually increased the operating differential pressure to over 8 in. (203 mm) and increased emissions. Due to the high operating differential pressure, the filter bags were being pulsed with 100 psi (6.9 bar) every 10 seconds and firing four valves simultaneously.

Solution and outcome

The company contacted Parker Hannifin to find a reasonable solution. After evaluating several options, the customer chose to install pleated filters elements (PFEs) to replace the existing conventional bags and cages, and 975 TA625 x 1.4 m (57 in.) long PFEs were installed. The PFEs were constructed with spunbond polyester media at only 57 in. (1400 mm) in length with a molded urethane top and bottom end pan. No tube sheet or collector modifications were required to install the PFEs. One PFE replaced a bag and cage that was previously used. Even though the PFEs were more than 7 ft. (2133 mm) shorter, the total filtration area was increased by 75% to 33 590 ft.^{2} (3123 m^2), and the overall air to media ratio was reduced to 1.8:1.

After several months of operation with the newly installed PFEs, the customer realized numerous savings and benefits. The shorter elements created a dropout area in the dust collector, allowing for lower velocities and more even distribution of the grain loading to the PFEs. This success, combined with the lower air to media ratio, resolved the 'scrubbing' issue. Operating differential pressure was reduced by 55% to 3.5 in. (89 mm), allowing full flow of 61,000 ft.^{3}/min (103 639 m^3/h) and contributing to a 2 tph increase in production.

After the installation of the PFEs, the customer also realized significant energy savings. Pulse cycles were increased from a 10 second cycle to a 360 second cycle. Additionally, the number of simultaneous pulse valve firings was reduced from four to two, while the pulse pressure was reduced from 100 psi (6.9 bar) to 60 psi (4.1 bar). Based on a 24 hour per day operation, at 330 days per year, the customer has saved more than $14,000 each year in compressed air.

The dust collector still operates at a differential pressure of 3.25 in. (82.5 mm) w.g., pulsing one valve every 210 seconds at 60 psi (4.1 bar). The filter bag life has increased by 200%, equivalent to more than five years.

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By installing the PFEs, the customer was able to avoid the costly options of either adding on to the existing collector or building a new one. It has now realized the full production capability of the separator with lower emissions, lower differential pressure, reduced energy cost and compressed air consumption, as well as longer filter life.

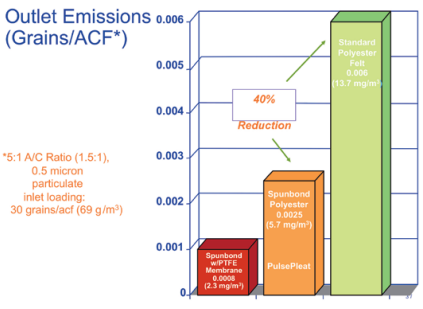

Figure 1. VESA test data.

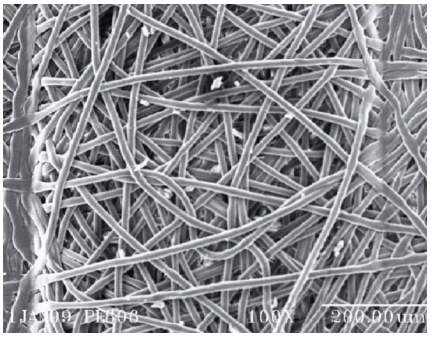

Figure 2. Spunbond polyester (face view magnified 100x).

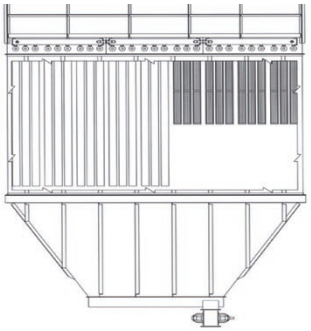

Figure 3. Shorter PFE elements for lower velocities and even distribution.

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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

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