



Ultipleat® Polymer Candles in PET Film Manufacturing

Background:

A major Asian producer of polyester films was faced with a challenge to reduce its annual operating costs while maintaining its product quality. The company has nine manufacturing sites. One of its main plants produces several grades of white PET film used for LCD reflectors.



PET films are used in a variety of applications across a large number of industries due to their excellent properties — high mechanical strength, excellent electrical insulation, and high durability and dimensional stability, as well as high resistance to temperature and chemicals. Film producers have the ability to customize the film's manufacturing process, composition, thickness, and the film's surface properties to meet application needs.

One easy way to alter a film's properties is by using fillers. A wide range of fillers have been incorporated into PET films to improve the density and handling properties of the final film. Fillers such as barium sulfates are used as a low cost method to compound an inorganic material in the polymer matrix, giving unique properties to the final polymer materials. The concentration and particle size of the filler materials depends upon the final requirements of the film's properties and the end application.

PET melt containing high filler content is a big challenge in melt filtration. Melt filtration of PET requires a multilayered, tapered pore style, fine sintered fiber media for gel retention. Fine particles of filler materials typically poison the fiber media, which in turn reduces the filter's on-stream life and requires film producers to make a difficult choice between coarse filtration (low film quality) or high filtration costs.

Challenge:

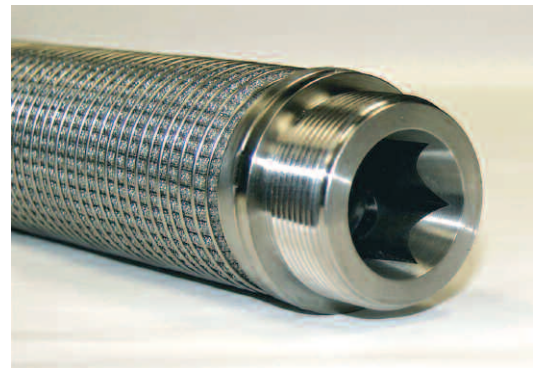
At a flow rate of 1500kg/hr (3300 lb/hr) using seven (7) elements per housing, the customer experienced an on-stream life of only three days using a competitor's 30 µm fiber media. The annual operating cost was estimated to be US \$1,548,360. Other significant data includes:

- Down time/scrap production/labor per changeover:
1 hour = US \$16,867
- Filter consumption per changeover: 1 unit = US \$4,638
- Changeovers per month: 6

The goal was to reduce the annual operating cost as much as possible without changing capital equipment or reducing the film quality. Increasing the filter area is a key factor for prolonging the on-stream life of the filter. However, increasing the area by simply adding more pleats to the element's design can have a net adverse affect. The tighter spacing of the pleats (which would be required to accommodate additional pleats) likely would prevent the flow from reaching all of the filter's media.

Solution:

After careful study, Pall recommended its Ultipleat Polymer candles for use in this application. One bundle of seven (7) elements size 6 cm (2.36 inch) od x 89 cm (35 inch) length was designed to retrofit into the customer's existing housing. Pall's Ultipleat Polymer elements provided a theoretical area of 1.04 m² (11.2 ft²), roughly 1.6 times greater than the area of the current design. Pall's Ultipleat Polymer elements provided a pressure rating of 128 bard (1850 psid), allowing the elements to resist high dp. The elements were put online in December 2010.





Customer Benefits:

- The customer reported trouble-free 'fit and seal' into the existing housing
- The on-stream filter life of the Ultipleat Polymer candles reached 7.5 days, an increase of 2.5 times over the competitive design
- The customer reported no reduction in quality
- The estimated annual cost savings of the Ultipleat Polymer candles is US \$730,000
- The customer intends to phase out the competitive elements with Pall's Ultipleat Polymer candles.



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