Pall Corporation

Case Study

Ultipleat® Polymer Candles for Manufacturing GP Grade Polycarbonate

Background

Polycarbonate (PC) is a versatile, tough thermoplastic polymer with many unique properties. PC is light weight and very strong, making it ideal for use in a wide range of industrial and electronics applications. Manufactured by approximately 12 producers at 28 different sites around the world, PC is largely a niche polymer and often in very short supply.

A leading polycarbonate producer in Taiwan operates eight lines (three PC trains) producing 420 tons per day of both optical and general purpose grade polycarbonate resins. Due to the high market demand of CDs and DVDs in the early 2000s, the plant was designed to produce optical grade resin in six of its eight lines, while the remaining two lines were designed to produce general purpose grade resin.

With the rapid change in optical media and the digital data industry, CD and DVD usage declined drastically leaving the market with an over capacity in OQ grade quality resin. This resulted in reduction in OQ grade resin prices, as well as consolidation of OQ resin capacity in some regions. In order to respond to the changing market conditions, the customer wants to convert two lines from OQ to GP grade PC.

Challenge

The challenge that the customer faced was in converting its two lines of PC1 train with total capacity of 4.2 tph from OQ to GP grade PC. OQ grade PC has a low viscosity and is able to use thin style segment filters (30.5 cm/12 inch) for maximizing the filtration area and on-stream life. Each housing encompasses approximately 25 m^2 (268 ft^2) of filter area.

GP grade PC has a high viscosity – roughly 8-10 times higher than OQ grade PC. Therefore, the existing segment filters cannot be used with GP grade melt. In this case, thicker segments must be used to counter the high viscosity. However, this results in a 20% reduction in filtration area vs. thin segment filters.

Reduced area, coupled with high viscosity melt fluid, would result in a much higher clean differential pressure and ultimately reduce the effective on-stream life. To maintain long on-stream life, the customer would need to purchase new equipment with more capacity, requiring significant modifications to the entire PC train.

Solution

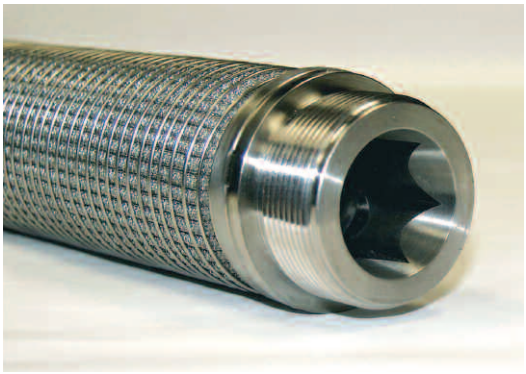
After carefully studying the customer's application, Pall proposed the use of its Ultipleat Polymer candles instead of segment filters for use in their existing housing. The details are as follows:

- Nineteen candles were fitted into the housing, providing the best flow distribution and optimization of the housing space
- Standard fan pleat candles can only provide 21 m^2 (230 ft^2) of filter area, 15% less than the current area provided by segment filters
- Our newly launched Ultipleat Polymer candle was designed to yield 1.52 m^2 (16.37 ft^2) per candle for a total of 28.88 m^2 (311 ft^2)per housing
- The result – 15% more filter area than the existing setup. This is a crucial gain in reducing the delta P through the media on high viscosity melt streams
- Ultipleat Polymer candles are pressure rated at 128 bard (1850 psid), allowing the candles to resist high delta Ps associated with high viscosity melt

Filtration. Separation. Solution.SM

Customer Benefits

- Avoided expensive revamping costs associated with a new filter system solution
- Utilized existing system and setup by using Ultipleat candles in segment housings for GP grade PC production
- Gained 16% more filter area compared to the existing setup and 36% more area compared to thick leaf discs technology
- Low bundle cost for altering micron rating which is necessary for producing multiple grades of GP resin
- Ability to run both segments for OQ and Ultipleat candles for GP grade PC in the same system/housing



ENABLING A GREENER FUTURE℠

Pall Corporation

Fuels and Chemicals

25 Harbor Park Drive
Port Washington, NY 11050
+1 516 484 3600 telephone
+1 888 873 7255 toll free US

Portsmouth-UK
+44 (0)23 9230 2357 telephone
+44 (0)23 9230 2509 fax

Filtration. Separation. Solution.℠

Visit us on the Web at www.pall.com

Pall Corporation has offices and plants throughout the world. For Pall representatives in your area, please go to www.pall.com/contact

Because of technological developments related to the products, systems, and/or services described herein, the data and procedures are subject to change without notice. Please consult your Pall representative or visit www.pall.com to verify that this information remains valid. Products in this document may be covered by one or more of the following patent numbers: EP 0 667 800; EP 0 982 061; EP 1 380 331; US 5,543,047; US 5,690,765; US 5,725,784; US 6,113,784; US 7,083,564; US 7,318,800; EP 1 656 193; US 7,871,515.

FCUPPCEN Produced in the USA April 2011