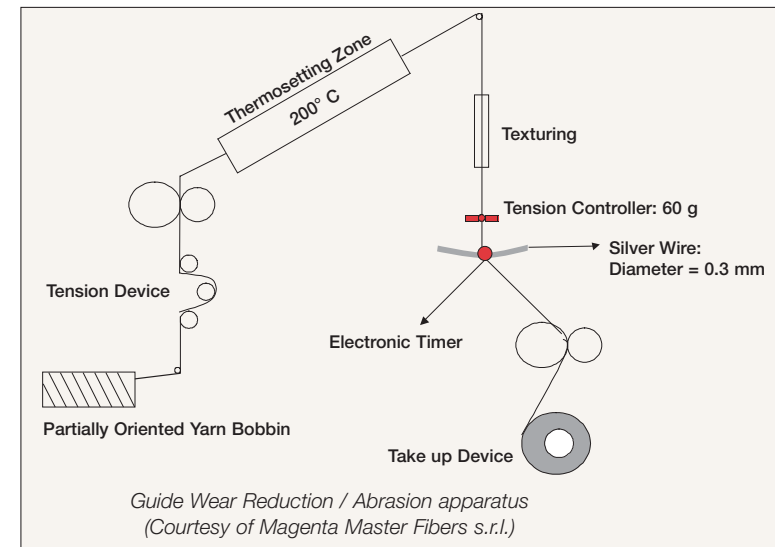


■ Guide Wear Reduction / Abrasion

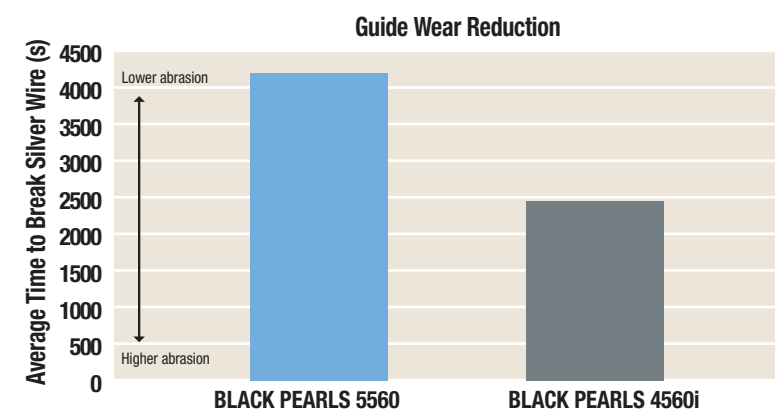
Due to the increasing number of fully automated lines in the market, polyester fiber producers are also looking at reducing the wear and frequency of change of the guides. During the texturing process, the latter, typically made out of ceramic, are submitted to a high level of abrasion caused by the friction of the filament yarns at temperatures around 200° C and high speeds.

Utilizing an outside laboratory test method, Cabot has tried to simulate this guide wear reduction. A simplified flow chart of the test method is shown below:



1. The POY (1.2 % pigment, 98.8 % bright polymer, 285/36 Dtex) is heated up at 200° C and subsequently textured with a tension of 60 g. The resulting DTY produced has a titer of 167/36 Dtex.
2. The DTY is guided on a 0.3 mm thick silver wire.
3. An electronic timer is calibrated and the time to break the silver wire is measured. The higher the time, the lower the abrasion.
4. An average of three measurements is reported as abrasion result.

Cabot has applied this method to BLACK PEARLS 4560i and 5560. The results are reported in the graph below.



The newly developed BLACK PEARLS 5560 shows an optimum performance in guide wear reduction. With this level of performance, we are confident to meet existing market requirements.

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CARBON BLACKS



BLACK PEARLS® 4560i & 5560: High Performance Pigments for Fine-Denier Polyester Fiber



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BLACK PEARLS 4560i & 5560: High Performance Pigments for Fine-Denier Polyester Fiber

Over the last few years, the overall pigment performance required by the fine-denier polyester fiber industry has been increasingly demanding. In response, Cabot has developed BLACK PEARLS 4560i and 5560.

These grades provide an excellent cost/performance balance for the five main requirements of the polyester fiber producers:

- Color strength: total visible light absorbency of the pigmented polyester yarn
- Blue tone: undertone of the polyester fiber measured with b* value in CIELAB coordinates
- Filterability/spinability: operational lifetime of filter media on polyester fiber production lines
- Masterbatch dilutability: ease with which the pigment is released by the carrier resin and is evenly distributed in the polymer matrix or polyester fiber
- Dispersability: ease with which the pigment can be wetted with the masterbatch carrier resin and subsequently de-agglomerated.

BLACK PEARLS 4560i

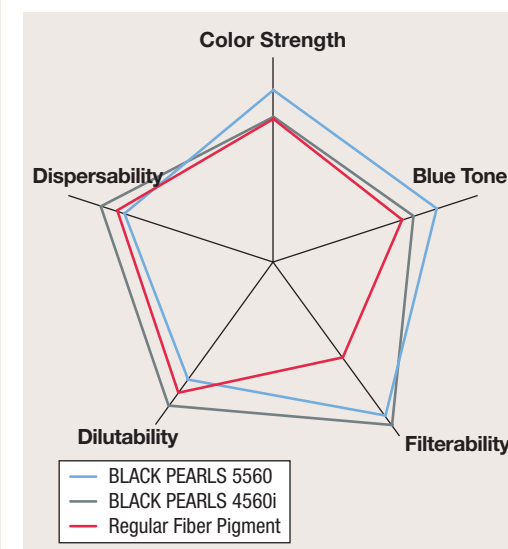
During the past two years, Cabot has worked extensively on the physical cleanliness of the well-known industry benchmark BLACK PEARLS 4560. The result of this intensive research has led to the development of BLACK PEARLS 4560i that has a specified Fine Screen Delta P¹ of 0.25 bar/g of pigment (correlated test in polypropylene resin) vs. 0.5 bar/g of pigment for BLACK PEARLS 4560.

As the Delta P Test simulates and predicts the filterability/spinability performance, this improved product should allow polyester fiber producers to increase the spin-pack life during production. It is important to note that the overall color performance, the masterbatch dilutability and the dispersability of BLACK PEARLS 4560i are the same as BLACK PEARLS 4560.

¹ Cabot Brochure "Cabot Delta P Test Characterizes Carbon Black Performance in Fine-Denier Synthetic Fibers" (Ref: DELTAP/05.01/E)

Star Diagram

A visual and accessible way to compare different black pigments on their relative suitability for the polyester fiber application is the star diagram. The opposite star diagram compares the performance of BLACK PEARLS 4560i and 5560 with a regular fiber pigment in terms of the five key performance criteria described above.



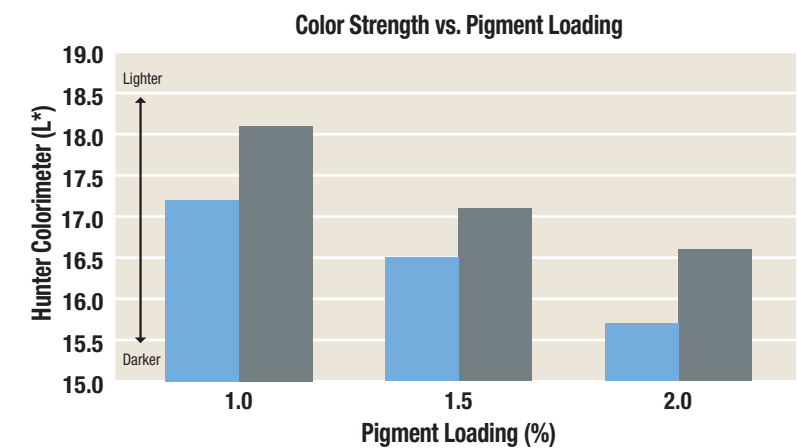
Performance improves from chart centre

BLACK PEARLS 5560

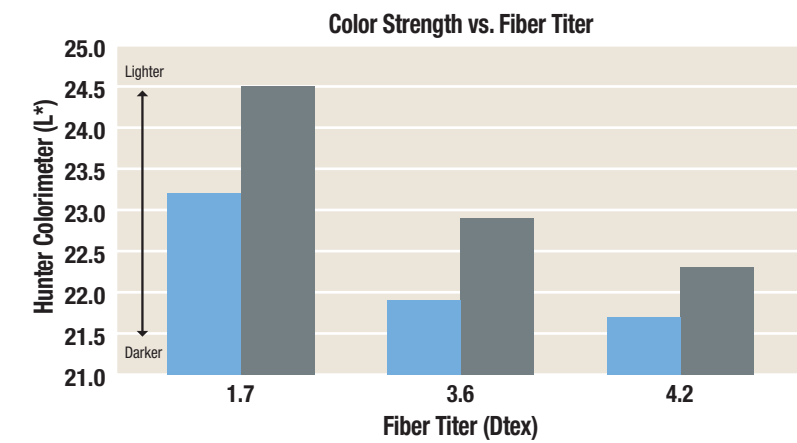
BLACK PEARLS 5560 is the new premium performance pigment for fine-denier polyester fiber with improved color strength and blue tone over BLACK PEARLS 4560i. This grade is therefore designed for applications where high color performance is required.

Color Strength and Blue Tone

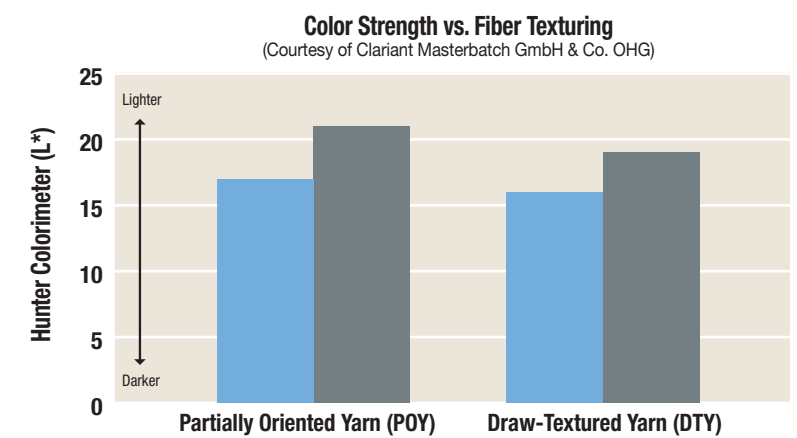
The graphs below show the color strength of BLACK PEARLS 4560i and 5560 vs. pigment loading, fiber titer and fiber texturing respectively. In all cases, BLACK PEARLS 5560 exhibits higher color strength over BLACK PEARLS 4560i.



BLACK PEARLS 5560
BLACK PEARLS 4560i
Fiber Titer = 3.6 Dtex
Semi-dull
Textured Fiber

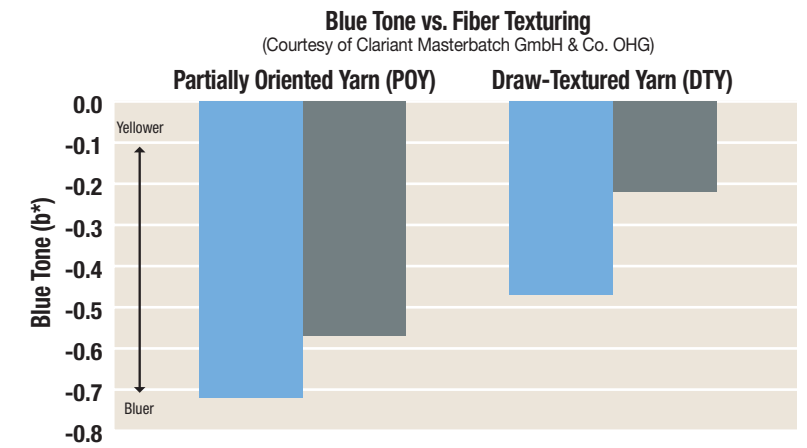


BLACK PEARLS 5560
BLACK PEARLS 4560i
Pigment Loading = 1.0%
Semi-dull
Flat Fiber



BLACK PEARLS 5560
BLACK PEARLS 4560i
Pigment Loading = 1.4%
Fiber Titer = 3.8 Dtex
Semi-dull

The blue tone of BLACK PEARLS 5560, as shown on the graph below, is also more pronounced than BLACK PEARLS 4560i.



BLACK PEARLS 5560
BLACK PEARLS 4560i
Pigment Loading = 1.4%
Fiber Titer = 3.8 Dtex
Semi-dull

Filterability / Spinability

Filterability is a measure indicating the operational lifetime of the two filter media typically present on polyester fiber production lines, i.e. the Central Polymer Filtration system (CPF) and the spin-pack filter, installed just before the spinneret. Spinability, on the other hand, refers to filament breakages, maximum spin yields and picking.

The development by Cabot of the Fine Screen Delta P (FSDP) test method¹ (165 x 1400 mesh size screen) represents an accurate and reliable prediction of the above-mentioned properties. Because of this important cost factor in the polyester fiber production, BLACK PEARLS 4560i and BLACK PEARLS 5560 are specified in FSDP at maximum 0.25 bar/g of pigment and 0.50 bar/g of pigment respectively (correlated test in polypropylene resin). The graph below exhibits the extremely high FSDP consistency of lot-to-lot production for both grades.

BLACK PEARLS 5560
BP5560 trendline
BLACK PEARLS 4560i
BP4560i trendline

