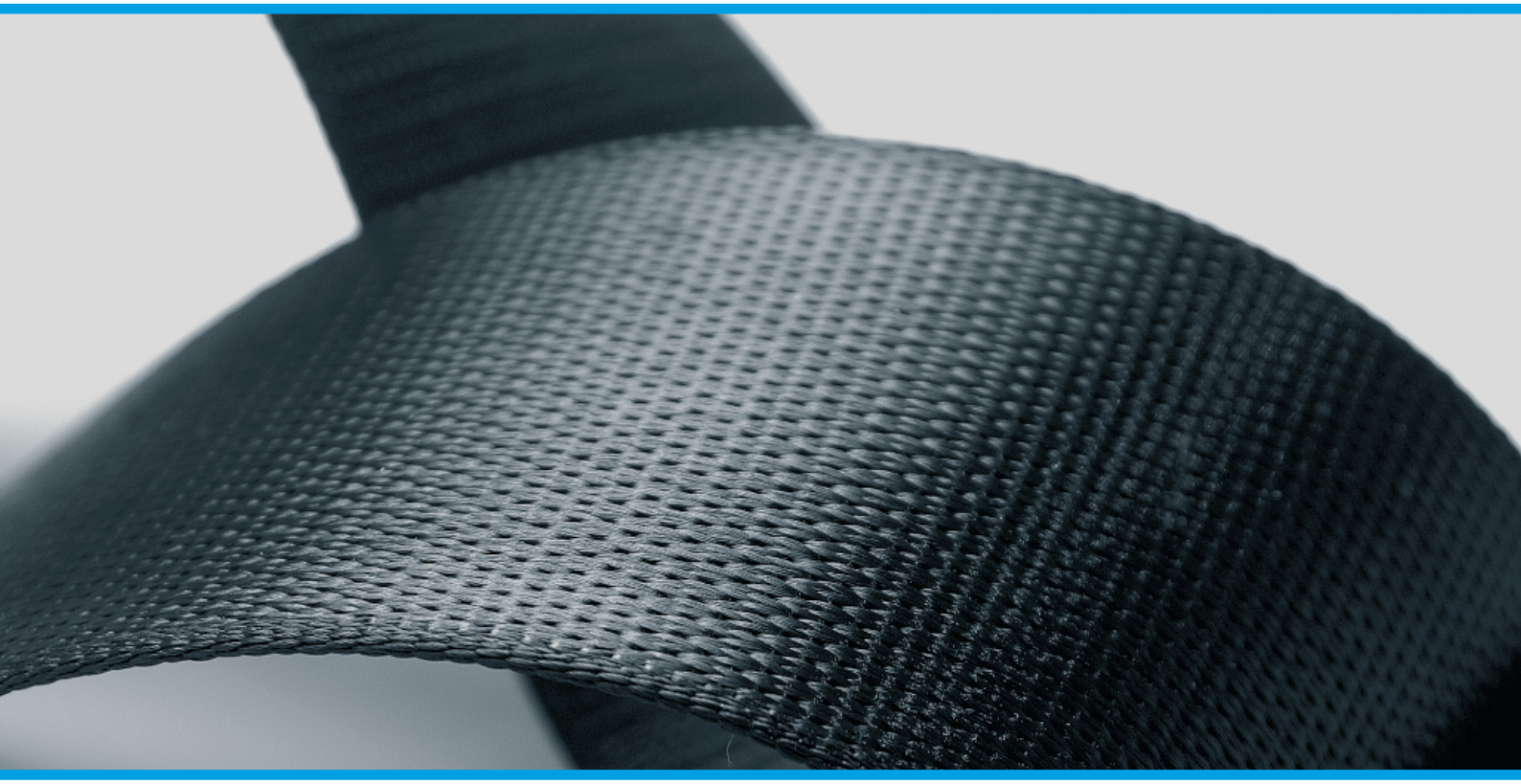
Specialty carbon blacks for fibers

Technical Information 1377



orion ENGINEERED CARBONS

Focused. Innovative. Responsive.

Orion Engineered Carbons is a leading global manufacturer of carbon blacks for pigment and rubber applications. Production sites and applied technology centers can be found in all regions of the world. Orion Engineered Carbons is selling specialty carbon blacks under many brand names such as PRINTEX®, AROSPERSE®, HIBLACK®, NEROX®, NIPex®, COLOUR BLACK, SPECIAL BLACK, LAMP BLACK and PANTHER®. Our specialty carbon blacks offer an excellent balance of colorimetric properties, dispersibility, UV-protection, infrared absorption, electrical conductivity and adjustment of mechanical and rheological properties.

Specialty carbon blacks are one of the most commonly used coloring additives in fibers, which may be melt and solution spun. It imparts long-lasting color to textile, industrial and non-woven products that can withstand a variety of damaging external agents. The requirements for the specialty carbon blacks for use in fibers can vary depending upon the type of polymer (PET, PA, PP, Cellulose, PAN, etc), the method of incorporation into the polymer (during polymerization or downstream during fiber spinning); the spinning technology used (melt or solution spinning) and if the specialty carbon blacks would be incorporated either as a liquid dispersion or a thermoplastic concentrate. Specialty carbon blacks selection can also depend upon the fineness of the fibers and their intended end usage.

This technical bulletin addresses the key performance and functional attributes of specialty carbon blacks and their suitability for various fiber applications.

Key performance requirements for specialty carbon blacks and effects on fiber manufacturing

	Dispersion quality	Low sieve residue	Pellet quality and integrity	Chemical purity	Moisture uptake
Ease of handling and processing	■		■		■
Prolonged filter life	■	■	■	■	■
Consistent jetness & undertone	■				
Consistent compound viscosity	■			■	■
Lower guide wear	■	■			
Low spin breaks and improved texturizing	■	■		■	■
Minimal olfactory effects during orocessing				■	

PRINTEX® & AROSPERSE® – our solutions for fibers

Orion Engineered Carbons produces specialty carbon blacks by four production processes: Furnace black, gas black*, LAMP BLACK and thermal black process. With our technical capabilities and expertise, we are able to provide the market functional specialty carbon blacks with suitable chemical and physical properties. For the fiber application, we recommend the following furnace blacks as an ideal solution for our customers.

Product Recommendations

Product	Performance attributes						Aesthetic attributes		
	Dispersion quality	Longer filter life	Lower masterbatch viscosity	Micro denier	Fine denier	Coarse denier	High jetness	Blue undertone	Glossy appearance
PRINTEX® L6 SQ	■	■		■	■	■	■	■	■
PRINTEX® alpha SQ	■	■	■	■	■	■			■
AROSPERSE® 11	■	■		■	■	■	■		
AROSPERSE® 138	■	■	■	■	■	■	■	■	■
AROSPERSE® 26			■		■	■	■	■	

*according to the Orion Engineered Carbons gas black process

PRINTEX® SQ series, AROSPERSE® 11 and AROSPERSE® 138 meeting OEKO-TEX® Standard 100, (Status 2019)

Increasing consumer awareness about health related issues and regulations have led to the creation of standards on substances used in the textile industry. The Austrian Textile Research Institute (ÖTI) and the German Research Institute Hohenstein therefore jointly developed the Oeko-Tex® Standard 100 to assess the human ecological implications of textiles and established standards for companies within the textile and clothing industry. The Oeko-Tex® Standard 100 is – world-wide – the most well known independent product label for textiles that requires testing for harmful substances.

Using the PRINTEX® SQ series, AROSPERSE® 11 or AROSPERSE® 138 of the carbon black product portfolio for textile fibers should enable the manufacturer of the final article to achieve the requirements of the Oeko-Tex 100 standard.

Product	Recommended for Oeko-Tex® Standard 100 textile fibers
PRINTEX® L6 SQ	■
PRINTEX® alpha SQ	■
AROSPERSE® 11	■
AROSPERSE® 138	■

The PRINTEX® SQ series, AROSPERSE® 11 and AROSPERSE® 138 are furnace grade specialty carbon blacks that are compliant with standards that govern heavy metal content, PAH content and other critical substances, including EU directive 10/2011.

Oeko-Tex® Standard 100 certifies a product that has successfully passed tests based on more than 100 health-relevant parameters set by the independent testing institutes of the Oeko-Tex® Association. It is designed to ensure a comprehensive level of safety at all levels of production – from raw materials, to yarns and all the way to the finished products.

Oeko-Tex® Standard 100 tests for substances according to the following classification:

Product class	I	II	III	IV
	Baby	Direct contact with skin	No direct contact with skin	Decoration material

It includes:

- substances that are prohibited by law, such as carcinogenic dyestuffs
- substances that are regulated by law, such as formaldehyde, softeners, heavy metals or pentachlorophenol
- substances that according to current knowledge are harmful to health, but which are not yet regulated or prohibited by law, such as pesticides, allergy-inducing dyestuffs or tin-organic compounds
- parameters such as colorfastness and a skin-friendly pH-value, which are precautionary measures to safeguard consumers heath

All information of Oeko-Tex® Standard 100 is available via: http://www.oeko-tex.com/OekoTex100_PUBLIC

Regional Ability

Product	EMEA	AMERICAS	APAC
PRINTEX® L6 SQ	■	■	■
PRINTEX® alpha SQ	■	■	■
AROSPERSE® 11	■	■	■
AROSPERSE® 138		■	■
AROSPERSE® 26		■	■

Regulatory compliance

Specialty carbon blacks from Orion Engineered Carbons comply with most global regulatory requirements including CONEG, REACH, etc. Rigorous quality standards are followed during the production, handling and storage of these grades. The products are supported by an extensive and competent sales, technical and customer support staff around the world. For additional details and to verify compliance with specific regulations, please contact our local sales representative.

Quality standards

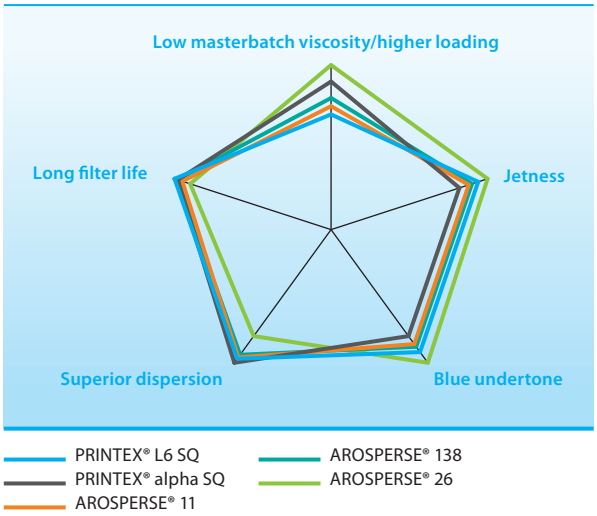
Orion Engineered Carbons follows rigorous quality procedures and standards during production, handling and storage of pigment blacks to ensure that the product consistently meets the requirements for these applications.

Our management systems are certified according to the actual ISO 9001 and ISO 14001 standard.

If you have further questions, please contact your local Orion Engineered Carbons representative or the address on the back.

Additional parameters

The following charts illustrate the relative figures of merit of the recommended specialty carbon blacks:



Special performance attributes

The fiber industry looks for several special performance attributes in specialty carbon blacks in some situations. The table below identifies the products that display those benefits. Some of these special attributes are described in detail below.

Product	Low spin breaks	Low olfactory effects	Lower gel content*	Enhanced texturizing	Surface gloss in fibers
PRINTEX® L6 SQ	■	■	■	■	■
PRINTEX® alpha SQ	■	■	■	■	■
AROSPERSE® 11	■	■	■		
AROSPERSE® 138	■	■	■	■	■
AROSPERSE® 26				■	

- Low olfactory effect – low undesirable odors such as sulfur smell during dispersion and subsequent processing
- Low gel content – induces lower gel formation (tested in polypropylene)
- Enhanced texturizing – easier processing and fewer tight spots during texturizing
- Surface gloss – enhances filament/fiber gloss

Typical product values

Product	Average primary particle size [nm]	BET Surface area [m^2/g]	Oil absorption number [ml/100 g]	Relative tint strength [%]
		ISO 4652 ASTM D 6556	ISO 4656 ASTM D 2414	ISO 5435 ASTM D 3265
PRINTEX® L6 SQ	18	250	123	114
PRINTEX® alpha SQ	20	105	100	102
AROSPERSE® 11	19	120	114	120
AROSPERSE® 138	19	120	95	120
AROSPERSE® 26	21	112	60	130

The physical-chemical data in this table is for guidance purposes only

ENGINEERED CARBONS

Focused. Innovative. Responsive.

The Americas

Orion Engineered Carbons LLC
1700 City Plaza Drive, Suite 300
Spring, TX 77389
USA
Phone +1 832 445 3300

AMERICAS@orioncarbons.com

Europe/ Middle East/ Africa

Orion Engineered Carbons GmbH
Frankfurter Straße 60 - 68
65760 Eschborn
Germany
Phone +49 6196 771 929 100

EMEA@orioncarbons.com

Asia Pacific

Orion Engineered Carbons (China) Investment Co., Ltd.
Room 2301, 2302, 2307, BM InterContinental Business Center
100 Yutong Road, Jing'an District, Shanghai 20007
P. R. China
Phone +86 21 6107 0966

APAC@orioncarbons.com

Incorporated in Luxemburg

Orion Engineered Carbons S.A., 6, Route de Trèves, 2633 Senningerberg, Luxembourg, Phone +352 270 48 06 0

www.orioncarbons.com

OEC-TI 1377-10/2022