Kraton
Giving Innovators Their Edge

A New Generation of Elastic Nonwovens

Superior Softness

Bi-axial Stretch

Solid Durability

Innovations from Kraton Polymers provide you with new ways to design and construct high performance fabrics.

Our new polymer technology offers superior softness, bi-axial stretch and solid durability. This exciting advancement in fiber technology breaks through the processing barriers of conventional SBC polymers. Kraton MD6705, G1643 and MD6717 are specifically created to meet the requirements in single use and durable nonwoven applications. MD6705 and G1643 are bicomponent spunbond grades which provide the core construction of elastic yarns or elastic nonwovens. These polymers are paired with sheath materials such as polypropylene, copolyester, nylon and blends of polypropylene to achieve properties in addition to stretch and flexibility. MD6717 is specifically used in melt blown processes where strength and increased elasticity are desired.

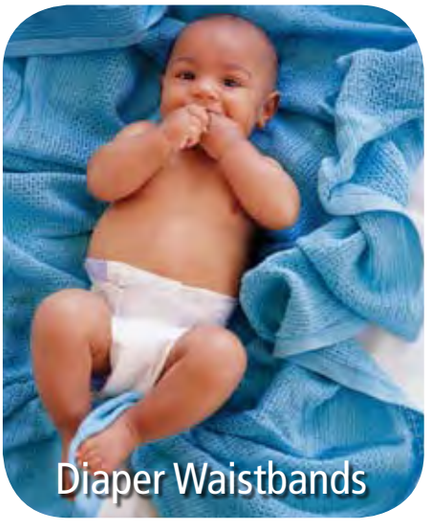
The competitive advantage of a Kraton polymer lies in the design and optimization of the copolymer to retain its elasticity, while still making it suitable for high-speed processing. Kraton elastic nonwovens are proven to be drapeable, non-tacky and breathable, enabling the creation of products that are soft, quiet and discrete. Kraton polymers exhibit excellent process stability and require no pre-drying. Fabric elasticity can be further enhanced by pre-stretching. Dyeing and/or printing are also possible with the proper choice of sheath material.

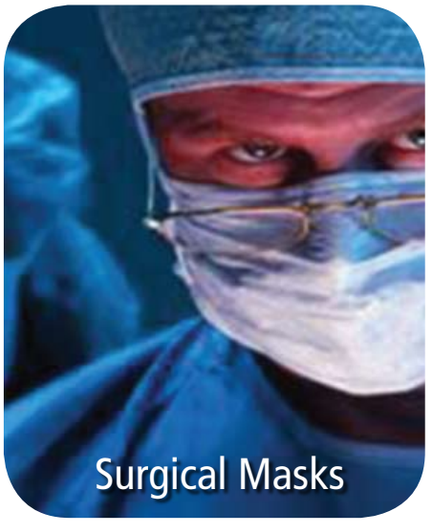
Kraton polymers impart the stretch and flexibility required in personal care products such as baby diapers, childcare trainers and adult incontinence products. The softness improves comfort in items such as scrub suit apparel, medical gown laminates, surgical drapes, protective apparel and wound care dressings.

What are Kraton SBC Polymers?

Styrenic Block Copolymers (SBCs) are a unique class of thermoplastic elastomers consisting of a two-phase structure of hard polystyrene endblocks and soft rubber midblocks that impart strength and elasticity, respectively. The polystyrene endblocks associate to form domains that lock the molecule into place without vulcanization.

Kraton G is a line of second-generation SBCs which feature hydrogenated midblocks of styrene-ethylene/butylene-styrene (SEBS). Of all the styrenic thermoplastic block copolymers available today, Kraton G SEBS is one of the strongest and most compatible with polyolefins. These polymers are ideal for outdoor applications where improved UV, ozone resistance, or exposure to low temperatures are required. These grades can be sterilized via a variety of methods including EO, E-beam, gamma and in some cases steam sterilized. G1643, MD6705 and MD6717 are Kraton G polymers specially designed for nonwoven high-speed spinning processes.





The Kraton Tool Box for Product Developers

Kraton polymers are hydrophobic, non-allergenic and provide improved fabric drape, elasticity, moldability and durability for nonwoven markets. Aesthetic property improvements can be made with dyeing, printing and texturizing. Kraton polymers have been coextruded and spun with polypropylenes, polyesters and polyamides to make nonwoven fabrics for single use and durable applications. The ability to customize the sheath in our bicomponent fabrics provides our customers another design tool for giving innovators their edge – for specific durability attributes, such as temperature resistance, gamma sterilization and chlorine resistance.

Market Applications

- Surgical Drapes and Gowns
- Scrub Suits and Protective Apparel
- Diaper and Adult Incontinence Waistbands
- Wound Care Dressings
- Industrial Composites and Specialty Textiles

The Kraton Difference

- Superior Softness and Quiet
- Flexibility and Bi-axial Stretch
- Durability and Resilience
- Remains Elastic and Improves Fit
- Non-yellowing

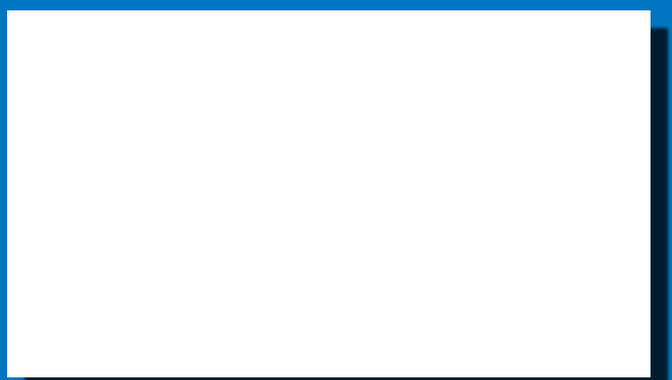
Processing Advantages

High-speed commercial runs of MD6705 and G1643 have been demonstrated on Hills, Reifenhäuser REICOFIL and Oerlikon Neumag extrusion equipment with polypropylene, copolyester and polypropylene blends as the sheath polymers. Core/sheath ratios ranging from 70/30 to 90/10 have been successfully produced into nonwovens.

Superior elastic properties are immediate because these polymers are amorphous, not crystalline. This eliminates the multiple steps required by some conventional laminates. Cost reductions in product handling, work in progress inventory and transportation are possible.

- Commercial Spinning Speeds Achieved
- No Pre-drying Required
- Process Stability Maintained (Equal to Polypropylene)
- Relative Low Bonding Temperature Required
- No Elastic Activation Step Necessary

Superior Softness
Bi-axial Stretch
Solid Durability



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Product Grade Description and Properties

High speed fiber processes required the design of new grades of Kraton. MD6705 and G1643 offer good tensile strength and elastic performance. Polymer A is an experimental grade that is not very elastic and demonstrates the additional benefit of selecting a sheath polymer with more elastic properties. MD6717 is specifically targeted for the melt blown, SMS processes and provides a high coefficient of friction.

Product	Molecule Design	Melt Flow @230 C/2.16kg (g/10min)	Tensile Strength (MPa)	EB (%)	Hysteresis Set (%) @100% elong.	Recovered Energy (%) @100% elong.
MD6705	S-EB-S Enhanced Rubber	50	11[a]	700[a]	5	90
G1643	S-EB-S Enhanced Rubber	18	12[a]	900[a]	6	90
Polymer A	S-EB/S-S Controlled Distribution	55	29[a]	490[a]	15	53
MD6717	S-EB-S Enhanced Rubber	53	8.4[b]	730[b]	n.m.	n.m.

a: The mechanical properties are for melt cast films in the cross-direction (CD).
S = Styrene, E = Ethylene, B = Butylene
b: measured on 2 mm thick injection molded plaques in CD.
n.m.: not measured

Melt blown Fabric Properties

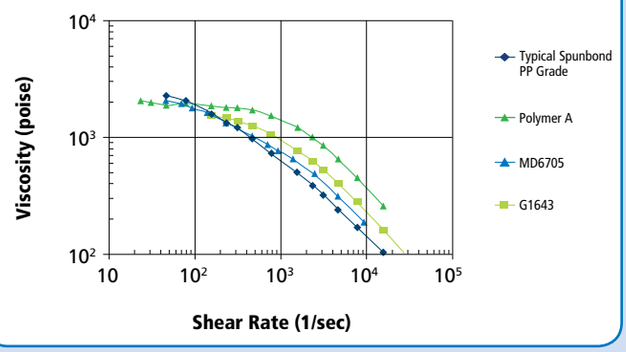
The MD6717 elastic melt blown delivers a high elongation at break (>650%) and almost isotropic for all properties. Hysteresis is evaluated at 200%, more strenuous than spunbond and good set is observed. A high coefficient of friction is achieved with low tack. The melt blown nonwoven is not subjected to a post treatment, which would further enhance the fabric strength. Highly elastic constructions can be achieved when combined with Kraton spunbond grades. Improvements in barrier and durability are observed.

		Kraton MD6717
Weight	**gsm**	**48**
Tensile Properties		MD/CD
Tensile Strength	N	3.0/2.0
Elongation at Break	%	690/710
Stress Relaxation at 100% Elongation		MD/CD
Initial Force	N	1.2/0.6
Force Retention, after 2 hrs at 40˚C	%	50/50
Hysteresis 200% Cycle 1		**MD/CD**
Set	%	28/29
Recovered Energy	%	41/43
Hysteresis 200% Cycle 2		**MD/CD**
Set	%	30/32
Recovered Energy	%	62/64

Spunbond Processing Information

The success of good stable spinning at commercial rates results from the rheological match of these Kraton polymers to typical polypropylene spunbond grades (38MFR). Melt viscosities are plotted for the Kraton spunbond grades and a typical polypropylene. MD6705 is particularly suited in bicomponent processes at temperatures between 230-250 ˚C and G1643 is recommended for applications between 250-300 ˚C.

Capillary Viscosity @ 250˚C



Spunbond Fabric Properties

The polymer type and ratio of both the sheath and core greatly influence the degree of stretch and flexibility achieved. Fabrics with a 10% polypropylene sheath are more elastic than fabrics with a 20% sheath. The elasticity can be enhanced with an activation draw (see the 2nd cycle hysteresis data). Typically spunbond fabrics are biased in the machine direction as demonstrated in tensile strength, but the elongation at break is almost isotropic. The elongation at break is very high for all fabrics creating a tough extensible fabric that is adaptable for many applications.

A more elastic fabric can be achieved by combining elasticity in both the sheath and core. A more elastic sheath (copolyester) paired with a core polymer (polymer A) that is not optimized for elasticity, results in a more elastic fabric. In this case the 80/20 fabric is almost as elastic as the 90/10 fabric. The resulting nonwovens have good tactile properties.

		PP Sheath/MD6705		ETP Sheath/Polymer A	
Sheath/Core*		**20/80**	**10/90**	**20/80**	**10/90**
Weight	**gsm**	**100**	**100**	**85**	**85**
Tensile Properties		MD/CD	MD/CD	MD/CD	MD/CD
Tensile Strength	N	39/20	27/11	21/7	21/5
Normalized Tensile Strength	N/gsm	0.39/0.20	0.27/0.11	0.25/0.08	0.25/0.06
Elongation at Break	%	300/340	500/500	270/330	300/360
Hysteresis 100% Cycle 1		MD/CD	MD/CD	MD/CD	MD/CD
Set	%	38/40	14/19	17/30	15/30
Recovered Energy	%	22/22	43/41	40/40	44/40
Hysteresis 100% Cycle 2					
Set	%	43/45	17/23	19/32	17/33
Recovered Energy	%	43/43	62/61	69/68	73/71

*For the spunbond fabrics: MD is the machine direction. CD is the cross direction. Normalized Tensile Strength is the tensile strength divided by the basis weight. The elongation at break was measured at the elongation where the load begins to drop, not at the elongation for total fabric failure.

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Almost 50 years ago, Kraton Polymers, LLC pioneered the development of styrenic block copolymers (SBCs), opening new doors to enhanced performance, versatility, aesthetics and durability for a wide variety of consumer and industrial products. Kraton has remained the market leader, driving innovation and developing new families of these highly engineered synthetic elastomers. The distinctive molecular structure of Kraton polymers can be precisely controlled and tailored to perform in a wide variety of applications. Our work in inventing, improving and innovating SBCs has made us the world's leading choice for SBC-related product innovation.

Kraton Polymers LLC, a subsidiary of Kraton Performance Polymers, Inc. (NYSE:KRA)

North/Central/South America:
15710 John F. Kennedy Blvd., Suite 300
Houston, Texas 77032
United States of America
Tel: +1-800-4-KRATON (572866)

Europe/Middle East/Africa:
John M. Keynesplein 10
NL – 1066 EP Amsterdam
The Netherlands
Tel: +31 (0)20 201 7697

Asia Pacific:
Rm 1601-03, Plaza 66, Phase 2
1266 West Nanjing Road,
Shanghai 200040, China
Tel: +86 21 6289 6161

For more information, please visit our website at www.kraton.com or email info@kraton.com.

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