

Developmental Products

Kraton Polymers is committed to continuous innovation and subsequently is frequently introducing new polymers. These polymers are being specifically designed for new applications and new property sets that cannot be achieved with existing commercial block copolymers.

Developmental Products Selector

Use the dropdown to select your region and click on the arrows to sort the data. Download the Adobe Acrobat Reader. To browse a wider range of Kraton products, visit the Product Selector

Grade	Structure	% Styrene	Hardness	% Diblock	% Oil	Solution Viscosity	Melt Flow	Data Doc	MSDS
D-KX222	(SB)n	18	40	-	0	2	-		
D-KX405CP	SBS	24	55	-	0	2	12		-
D-KX408CP	SBS	43	88	-	0	-	-		-
D-KX410CS	(SB)n	18	52	59	0	4.3	-		-
D-KX414JP	SBS	52	97	-	0	-	4		-
D-KX415JP	SBS	35	83	40	0	-	12		-
G-1643	SEBS	20	52	-	0	0.2	18		-
GRP-6924	SEBS	20	48	-	0	1.3	-		
MD-157JP	SBS	40	87	-	0	0.7	14		-
MD-6459	(SB)n	75	-	-	0	0.32	11		
MD-6917	SEBS	34	64	-	0	-	-		
MD-6933	SEBS	30	-	-	0	-	-		
MD-6944	SEBS	30	-	-	0	-	-		
RP-6935	S-(EB/S)-S	58	85	-	0	-	-		
RP-6936	S-(EB/S)-S	41	65	-	0	2.4	-		

Properties Legend

Property	Units
%Styrene	wt%
Hardness	Shore A
%Diblock	wt%
%Oil	wt%
Solution Viscosity	Pa.s @ 25% in Toluene @ 25C
Melt Flow	grams/10 min @ 200C, 5 kg



Description

KRATON™ D-KX222 Polymer is a clear branched block copolymer based on styrene and butadiene, with bound styrene of 18% mass. It is supplied as porous pellets dusted with an amorphous silica, which is indicated by the letter 'S' in the grade nomenclature, i.e. D-KX222CS

KRATON D-KX222 Polymer is used for formulating adhesives, sealants and coatings and in particular as UV/EB curable polymer for applications requiring high temperature resistance.

KRATON D-KX222 Polymer is a development grade, manufactured in tonnage quantities. It's main characteristics may be modified and, therefore, D-KX222 will be supplied initially according to typical properties.

Product properties

Property	Physical Form	Test Method	Units	Typical Value
Bound styrene	All	KM ^d 03	%mass	18
Volatile matter	All	KM ^d 04	%mass	0.3
Ash	All	ISO 247-B	%mass	0.3
Total extractables	All	KM ^d 05	%mass	1.0
Solution viscosity ^a	All	KM ^d 06	Pa.s	2.0
Specific gravity	All	ISO 2781		0.91
Bulk density	All	ASTM D1895 Method B	Mg/m ³	0.3
Hardness ^b Shore A, 30s	All	ISO 868		41
Tensile strength ^c	All	ISO 37	MPa	5.6
Modulus 300% ^c	All	ISO 37	MPa	1.6
Elongation at break ^c	All	ISO 37	%	770

(a) Measured on 25% mass solution in toluene at 25°C using a Brookfield viscometer, LTF or LTV model

(b) Measured on compression moulded slabs

(c) Measured on films cast from a solution in toluene

(d) KRATON Polymer Test Method: Copies can be requested from your local KRATON Polymers representative

Packaging

KRATON Polymers are available in a number of different pack types. For information specific to this grade please contact your local KRATON Polymers representative.

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End Use Requirements

If the finished article is intended for use in contact with food or in pharmaceutical applications, toys, and other human contact areas, the relevant regulations should be observed. Detailed information is available from the supplier.

For food packaging, manufacturers of the final product should ensure that all ingredients used comply with the regulations. It should be noted that some of these regulations require tests to be carried out on the final product, e.g. migration. These are the responsibility of the final product manufacturer.

Restriction on Medical/Healthcare Applications

DO NOT USE KRATON™ POLYMERS PRODUCTS IN ANY DEVICES OR MATERIALS INTENDED FOR TEMPORARY OR PERMANENT IMPLANTATION IN THE HUMAN BODY. THE KRATON POLYMERS BUSINESS ALSO RESTRICTS THE USE OF ITS PRODUCTS IN OTHER MEDICAL/HEALTHCARE APPLICATIONS.

Please contact your KRATON Polymers Sales Representative for more details.

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Each customer or user of KRATON Polymers products is solely responsible for determining the suitability of the materials they select for the intended purpose. With regards to medical/healthcare applications, each customer or user must conduct their own studies, registrations, and other related activities to establish the safety and efficacy of their products.

Safety and Handling Precautions

Read the Material Safety Data Sheet for KRATON Polymer products carefully and thoroughly before beginning any work with this product. Additional information relating to Health, Safety, Storage, Handling and Processing can be found in the KRATON Polymers HSE Fact Sheet (ref. K0155), available from your local KRATON Polymers representative. It is also recommended to consult other sources of safety information, for example, the current edition of Toxicity and Safe Handling of Rubber Chemicals - Code of Practice 4th Edition 2000, British Rubber Manufacturers Association Limited (BRMA), London, EC2A 3JE, UK Tel: +44 (0)20 7457 5040

KRATON Polymers and compounds can accumulate electrostatic charges when rubbed, chafed or abraded. Equipment should provide a means of dissipating any charges that may develop. Processing of KRATON Polymers and compounds in high shear equipment can cause the temperature to rise. Do not allow the temperature to exceed 225-230°C (437-446°F) for KRATON D Polymers and compounds and 280-285°C (536-545°F) for KRATON G Polymers and compounds. Maintain a fire watch if these temperatures are reached. KRATON Polymer products (the neat resin or the base product) are high molecular weight polymers which by all accounts are non-toxic and biologically inactive.

Warranty

The information contained in this publication is, to the best of our knowledge, true and accurate, but any recommendations or suggestions which may be made are without guarantee, since the conditions of use are beyond our control. Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents covering any material or its use.

All products purchased from or supplied by the KRATON Polymers Business are subject to terms and conditions set out in the contract, order acknowledgement and/or bill of lading. The KRATON Polymers Business warrants only that its products will meet those specifications designated as such herein or in other publications.

All other information supplied by the KRATON Polymers Business is considered accurate but is furnished upon the express condition that the customer shall make their own assessment to determine the products' suitability for a particular purpose. **The KRATON Polymers Business makes no other warranty, either express or implied, including those regarding such other information, the data upon which the same is based, or the results to be obtained from the use thereof; that any products shall be merchantable or fit for any particular purpose; or that the use of such other information or product will not infringe any patent.**

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Or contact your local KRATON Polymers representative

Visit us at WWW.KRATON.com



K0035 DDb-02E
KRATON D-KX222 Polymer
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Data Document

KRATON D-KX405 KRATON D-MD405

Description

KRATON D-KX405 and MD405 Polymer is a clear linear block copolymer based on styrene and butadiene, with bound styrene of 24%mass. It is supplied from Japan in the physical form identified below.

- D-KX405CP supplied as dusted dense pellets
- D-MD405JS supplied as dusted crumb

KRATON D-KX405 Polymer is used in formulating adhesives, sealants and coatings and as a modifier of polymers. It is also used in compounds for technical applications.

Product properties

Property	Physical Form	Units	Typical Value	Sales Specification (where applicable)
Specific gravity	All		0.94	
Melt flow rate(a)-E	All	g/10min	2.5	2.0-4.0
Hardness, Shore A	All		55	
300% Modulus	All	MPa	2.0	
Tensile strength	All	MPa	16	
Elongation at break	All	%	1,040	
Solution viscosity(b)	All	Pa·s	-	
Oil content	All	%mass	0	
Volatile matter	All	%mass	-	1.0 max.
Ash	All	%mass	-	1.0 max.
Bound styrene	All	%mass	24	
Packaging	All		Paper bag	
Net weight	CP	kg/bag	25	
	JS	kg/bag	20	

(a) Test condition: G=200°C/5kg, E=190°C/2.16kg

(a) 25% Toluene solution viscosity at 25°C

For further information:

In Japan: KRATON Polymers Japan Ltd.

3-13-16, Mita, Minato-ku, Tokyo, 108-0073, Japan

Tel: +81 3 3769 5990 Fax: +81 3 3769 5994



Data Document

KRATON D-KX408

Description

KRATON D-KX408 Polymer is a clear linear block copolymer based on styrene and butadiene, with bound styrene of 43%mass. It is supplied from Japan in the physical form identified below.

•D-KX408CP supplied as dusted dense pellets

KRATON D-KX408 Polymer is used as a modifier of polymers, and used in formulating adhesives, sealant and coatings. It is also used in compounds for technical and footwear applications.

Product properties

Property	Physical Form	Units	Typical Value	Sales Specification (where applicable)
Specific gravity	All		0.96	
Melt flow rate(a)-E	All	g/10min	4.5	3.5-6.0
Hardness, Shore A	All		88	
300% Modulus	All	MPa	2.9	
Tensile strength	All	MPa	25	
Elongation at break	All	%	690	
Solution viscosity(b)	All	Pa·s	-	
Oil content	All	%mass	0	
Volatile matter	All	%mass	-	0.2
Ash	All	%mass	-	0.2
Bound styrene	All	%mass	43	
Packaging	All		Paper bag	
Net weight	All	kg/bag	25	

(a) Test condition: G=200°C/5kg, E=190/2.16kg

(b) 25% Toluene solution viscosity at 25°C

For further information:

In Japan: KRATON Polymers Japan Ltd.

3-13-16, Mita, Minato-ku, Tokyo, 108-0073, Japan

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Data Document

KRATON D-KX410

Description

KRATON D-KX410 Polymer is a clear branched linear block copolymer based on styrene and butadiene, with bound styrene of 18%mass. It is supplied from Japan in two physical forms identified as follows in the grade nomenclature:

- D-KX410CS supplied as dusted crumb
- D-KX410CU supplied as non-dusted crumb

KRATON D-KX410 Polymer is used as a modifier of polymers, and used in formulating adhesives, sealants and coatings.

Product properties

Property	Physical Form	Units	Typical Value	Sales Specification (where applicable)
Specific gravity	All		0.93	
Melt flow rate(a)-G	All	g/10min	-	
Hardness, Shore A	All		52	
300% Modulus	All	MPa	1.0	
Tensile strength	All	MPa	7	
Elongation at break	All	%	1,200	
Solution viscosity(b)	All	Pa·s	1.4	0.9-1.9
Oil content	All	%mass	0	
Volatile matter	All	%mass	-	1.0 max.
Ash	CS CU	%mass	-	1.0 max. 0.5 max.
Bound styrene	All	%mass	18	
Packaging	All		Paper bag	
Net weight	All	kg/bag	20	

(a) Test condition: G=200°C/5kg, E=190°C/2.16kg

(b) 20% Toluene solution viscosity at 25°C

For further information:

In Japan: KRATON Polymers Japan Ltd.

3-13-16, Mita, Minato-ku, Tokyo, 108-0073, Japan

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Data Document

KRATON D-KX414

Description

KRATON D-KX414 Polymer is a clear linear block copolymer based on styrene and butadiene, with bound styrene of 52%mass. It is supplied from Japan in the physical form identified below.

•D-KX414CP supplied as dusted dense pellets

KRATON D-KX414 Polymer is used as a modifier of polymers.

Product properties

Property	Physical Form	Units	Typical Value	Sales Specification (where applicable)
Specific gravity	All		0.98	
Melt flow rate(a)-G	All	g/10min	4.0	2.0-6.0
Hardness, Shore A	All		97	
300% Modulus	All	MPa	5.9	
Tensile strength	All	MPa	26	
Elongation at break	All	%	700	
Solution viscosity(b)	All	Pa·s	-	
Oil content	All	%mass	0	
Volatile matter	All	%mass	-	0.2 max.
Ash	All	%mass	-	0.2 max.
Bound styrene	All	%mass	52	
Packaging	All		Paper bag	
Net weight	All	kg/bag	25	

(a) Test condition: G=200/5kg, E=190°C/2.16kg

(b) 25% Toluene solution viscosity at 25°C

For further information:

In Japan: KRATON Polymers Japan Ltd.

3-13-16, Mita, Minato-ku, Tokyo, 108-0073, Japan

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Data Document

KRATON D-KX415

Description

KRATON D-KX415 Polymer is a clear branched block copolymer based on styrene and butadiene with bound styrene of 35%mass. It is supplied from Japan in the physical form identified below.

•D-KX415JP supplied as dusted dense pellets

KRATON D-KX415 Polymer is used in formulating adhesives, sealants and coatings, and as a modifier of polymers and bitumen.

Product properties

Property	Physical Form	Units	Typical Value	Sales Specification (where applicable)
Specific gravity	All		0.92	
Melt flow rate(a)-G	All	g/10min	12	8.0-16.0
Hardness, Shore A	All		83	
300% Modulus	All	MPa	2.2	
Tensile strength	All	MPa	13	
Elongation at break	All	%	1,000	
Solution viscosity(b)	All	Pa·s	-	
Oil content	All	%mass	0	
Volatile matter	All	%mass	-	1.0 max.
Ash	All	%mass	-	1.0 max.
Bound styrene	All	%mass	35	32-38
Packaging	All		Paper bag	
Net weight	All	kg/bag	25	

(a) Test condition: G=200°C/5kg, E=190°C/2.16kg

(b) 25% Toluene solution viscosity at 25°C

For further information:

In Japan: KRATON Polymers Japan Ltd.
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0460
North America
4/16/2007

KRATON[®] G1643M Polymer

Data Document

Identifier : K460DDa07U

Description

Kraton G1643M is a low viscosity, transparent polymer suitable for compound applications and as a modifier of thermoplastics. It may also find use in formulating adhesives, sealants, coatings, and films. It is supplied from North America in the physical form identified below.

- Kraton G1643M is supplied as a dusted, dense pellet.

Sales Specifications

Property	Test Method	Units	Sales Specification Range	Notes
Volatile Matter	BAM 907	%w	≤ 1	
Dust content	BAM 908	%w	0.02 TO 0.12	a
Total Extractables	BAM 1206	%w	≤ 1.6	
Antioxidant content	BAM 929	%w	0.06 TO 0.14	b
Polystyrene Content	BAM 919	%w	16.6 TO 20.6	c

- a** Silica
- b** Non-staining phenolic antioxidant
- c** Measured on the polymer before hydrogenation.

Typical Properties (These are typical values and may not routinely be measured on finished product)

Property	Test Method	Units	Typical Value	Notes
Styrene / Rubber ratio	n/a		20/80	
Solution Viscosity	BAM 922	cps	210	c
Melt Index 230°C, 2.16 kg	ASTM D 1238	gms/10 min.	18	
Specific Gravity	ASTM D 792	g/cc	0.90	
Hardness, Shore A (30 sec)	ASTM D 2240	Hardness, Shore A (30 sec)	52	
Elongation at Break	ASTM D 412	%	> 600	
Tensile Strength	ASTM D 412	psi	> 1500	

- c** 25%w toluene solution at 25 C

Packaging

Kraton Polymers are available in a number of different package types. For information specific to this grade, please contact your local Kraton Polymers representative.

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For food packaging, manufacturers of the final product should ensure that all ingredients used comply with applicable regulations. Some of these regulations require tests to be carried out on the final product, e.g. migration. These are the responsibility of the final product manufacturer.

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Products or compounds made from Kraton Polymers' products shall not be used in any of the following applications: (a) cosmetics, (b) drugs and other pharmaceuticals, and (c) Class II and Class III Medical Devices, as defined in 21 CFR 860.3 (hereinafter collectively referred to as "Medical/Healthcare Applications"). Kraton Polymers requires that it give its prior written approval before its products are used in such Medical/Healthcare Applications.

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Kraton Polymers' products and compounds can accumulate electrostatic charges when rubbed, chafed or abraded. Processing and storage equipment for use with Kraton Polymers' products should provide a means of dissipating any charges that may develop.

When processing Kraton Polymers' products, maintain a fire watch if the material reaches 225°C (437°F) for Kraton IR and Kraton D (polymers and compounds), and 280°C (536°F) for Kraton G (polymers and compounds). The temperatures listed above are indicated only for safety reasons (risk of fire and product degradation) and are not necessarily recommended for processing. Degradation of the polymer (polymer breakdown) will start at lower temperatures depending on the specific processing conditions. Therefore, operating below these temperatures does not guarantee the absence of product degradation.

Kraton Polymers' products (the neat resin or the base product) are high molecular weight polymers which by all accounts are non-toxic and biologically inactive.

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K0186
North America
Issued July 2003

KRATON® GRP6924* Polymer

Data Document

Description

KRATON® GRP6924* is a clear, linear triblock copolymer based on styrene and ethylene/butylene, with a polystyrene content of 21%. It is supplied from North America in the physical form identified below.

- GRP6924* supplied as a powder.

KRATON GRP6924* is used in compound formulations and as a modifier of thermoplastics. It may also find use in formulating adhesives, sealants, coatings and modified bitumens. The product is also available in a dusted version (-12).

Sales Specifications

<u>Property</u>	<u>Test Method</u>	<u>Units</u>	<u>Sales Specification Range</u>
Polystyrene Content	Anal HNMR	%w	18.5 – 22.5
Volatile Matter	BAM 907	%w	≤ 1.0
Total Extractables	BAM 1206	%w	≤ 1.6
Antioxidant Content ^a	BAM 929	%w	0.03 – 0.10

^aNon-staining, phenolic antioxidant.

Typical properties (These are typical values and may not routinely be measured on finished product.)

<u>Property</u>	<u>Units</u>	<u>Typical Value</u>
Tensile Strength ^{a,b}	psi	> 3,000
Elongation ^a	%	1,200
Hardness ^c	Shore A (10 sec.)	48
Specific Gravity	gm/cc	0.90
Melt Index, 230°C, 2.16 kg	gms/10 min.	<1
Styrene/Rubber Ratio	%	21/79

^aBAM1245

^bTypical properties determined on film cast from toluene solution.

^cTypical values on polymer compression molded at 300°F.

Packaging

KRATON Polymers are available in a number of different package types. For information specific to this grade, please contact your local KRATON Polymers representative.

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For food packaging, manufacturers of the final product should ensure that all ingredients used comply with the regulations. It should be noted that some of these regulations require tests to be carried out on the final product, e.g. migration. These are the responsibility of the final product manufacturer.

Restriction on Medical/Healthcare Applications

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Or contact your local KRATON Polymers Representative

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K0186 DDc-03U

KRATON GRP6924 Polymer

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Data Document

KRATON D-MD157

Description

KRATON D-MD157 Polymer is a clear linear block copolymer based on styrene and butadiene, with bound styrene of 40%mass. It is supplied from Japan in two physical forms, identified as follows in the grade nomenclature:

•D-MD157JP supplied as dusted dense pellets

KRATON D-MD157 Polymer is used as a modifier of polymers, and used in formulating adhesives, sealants and coatings. It is also used in compounds for technical and footwear applications.

Product properties

Property	Physical Form	Units	Typical Value	Sales Specification (where applicable)
Specific gravity	JP		0.96	
Melt flow rate(a)-E	JP	g/10min	3.0	1.8-4.2
Hardness, Shore A	JP		87	
300% Modulus	JP	MPa	2.9	
Tensile strength	JP	MPa	28	
Elongation at break	JP	%	800	
Solution viscosity(b)	JP	Pa·s	-	
Oil content	JP	%mass	0	
Volatile matter	JP	%mass	-	0.2 max.
Ash	JP	%mass	-	0.2 max.
Bound styrene	JP	%mass	40	
Packaging	JP		Papar bag (P/B) Flexible container (F/C)	
Net weight	JP	kg/bag (P/B)	25	
	JP	kg/bag (F/C)	1000	

(a) Test condition: G=200°C/49.0荷重, E=190°C/21.2N荷重

(b) 25% Toluene solution viscosity at 25°C

For further information:

In Japan: KRATON Polymers Japan Ltd.
3-13-16, Mita, Minato-ku, Tokyo, 108-0073, Japan
Tel: +81 3 3769 5990 Fax: +81 3 3769 5994

K0407
North America
February 2005

Kraton® MD6459 Polymer

Data Document

Description

Kraton® MD6459* is a styrene/butadiene block copolymer with a 75% polystyrene content. It is supplied from North America in the physical form identified below.

- Kraton MD6459 supplied as a waxed transparent pellet

Kraton MD6459 is designed for a variety of applications. It is highly efficient at improving the impact of polystyrene while maintaining excellent clarity and low haze.

*Kraton MD6459 is a market development product and, as such, we reserve the right to modify or discontinue this product at any time.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Polystyrene content	ANAL HNMR	%w	74.5 - 76.0
Total extractables	BAM 905	%w	2.0 max.
Antioxidant content ^[a]	BAM 929	%w	0.30 - 0.40
Melt Flow, 200°C, 5 kg	BAM 903	gm/10 min	6.0 - 17.0

^[a] Primary antioxidant is a non-staining phenolic antioxidant. The antioxidant package also contains a secondary antioxidant at a target level of 0.3% wt.

Typical Properties (These are typical values and may not routinely be measured on finished product)

Property	Test Method	Units	Typical Value
Vicat Softening Point ^[b]	ASTM D-1525	C	58
HDT at 264 psi ^[b]	ASTM D-648	C	37
HDT at 66 psi ^[b]	ASTM D-648	C	43
Haze ^[b]	ASTM D-1003	%	3
Instrumented Impact Energy (Dynatup) ^[b]	D-3763	in-lb	380
1/8" Notched Izod ^[b]	ASTM D-256	ft-lb/in	18
Tensile Yield Strength ^[b]	ASTM D-638	psi	1260
Tensile Break Strength ^[b]	ASTM D-638	psi	2420
Melt index 200°C, 5kg ^[b]	ASTM D-1238	gms/10 min	12
Elongation at break ^[b]	ASTM D-638	%	250

^[b] Injection molded parts

Packaging

Kraton Polymers are available in a number of different package types. For information specific to this grade, please contact your local Kraton Polymers representative.

End Use Requirements

If the finished article is intended for use in food contact and packaging applications, toys, or human contact areas, manufacturers of the final product should observe all relevant regulations. Some of these regulations require tests to be carried out on the final product, e.g. migration. These are the responsibility of the final product manufacturer.

Information on the food packaging clearances of individual products is available from Kraton Polymers.

Medical, Healthcare and Cosmetic Applications and Trademark Usage

Kraton Polymers products should not be used in any devices or materials intended for implantation in the human body as defined by the U.S. Food and Drug Administration under 21 CFR 812.3(d) and 21 CFR 860.3(d).

Kraton Polymers products may, in certain circumstances, be used in the following products or applications with prior written approval for each specific product or application:

(a) Cosmetics (exclusive of packaging or delivery applications).

(b) Drugs and other Pharmaceuticals (exclusive of packaging or delivery applications).

Kraton Polymers trade names, trademarks, logos or other similar identifying characteristics should not be used in the manufacture, sale, or promotion of cosmetics, drugs, and pharmaceutical products or other medical/healthcare applications or materials.

Kraton Polymers has no specific expertise in these markets and applications, and does not intend to perform testing, clinical studies or other investigations of the suitability of its products for specific applications.

Each customer or user of Kraton Polymers products is solely responsible for determining the suitability of the materials it selects for the intended purpose and acknowledges that it has not relied on any representations of Kraton Polymers regarding suitability for use in its intended cosmetics, drugs, pharmaceutical products or materials.

Please contact your Kraton Polymers Sales Representative for more details before using our products in these specific applications.

Safety and Handling Precautions

Read the Safety Data Sheet carefully and thoroughly before beginning any work. Additional information relating to the health, safety, storage, handling and processing of Kraton Polymers products can be found in "Health and Safety Aspects of Kraton D and Kraton G Polymers" (Document K0155), available from your local Sales Representative or the company website. Kraton Polymers also recommends that customers or users consult other sources of safety information, for example, the current edition of the "Code of Practice on the Toxicity and Safe Handling of Rubber Chemicals," British Rubber Manufacturers Association Limited.

Kraton Polymers products and compounds can accumulate electrostatic charges when rubbed, chafed or abraded. Processing and storage equipment for use with Kraton Polymers products should provide a means of dissipating any charges that may develop.

When processing Kraton Polymers products, maintain a fire watch if the material reaches 225°C (437°F) for Kraton IR and Kraton D (polymers and compounds), and 280°C (536°F) for Kraton G (polymers and compounds). The temperatures listed above are indicated only for safety reasons (risk of fire and product degradation) and are not necessarily recommended for processing. Degradation of the polymer (polymer breakdown) will start at lower temperatures depending on the specific processing conditions. Therefore, operating below these temperatures does not guarantee the absence of product degradation.

Kraton Polymers products (the neat resin or the base product) are high molecular weight polymers which are non-toxic and biologically inactive.

Warranty

The information contained in this publication is, to the best of Kraton Polymers' knowledge, true and accurate, but any recommendations or suggestions that may be made are without guarantee or warranty of any kind whatsoever, since the manufacturing conditions to which Kraton Polymers' products will be subject are beyond Kraton Polymers' control. Customers of Kraton Polymers must make their own assessment to determine the suitability of a Kraton Polymers product for a particular purpose. Further, nothing contained herein shall be construed as a recommendation to use any Kraton Polymers product in conflict with existing patents of Kraton Polymers or any third party. All products purchased from or supplied by Kraton Polymers are subject to the terms and conditions of sale set out in the applicable contract, order acknowledgement and/or bill of lading. Kraton Polymers warrants only that its products will meet the specifications designated in any such contract, order acknowledgement or bill of lading.

Kraton POLYMERS MAKES NO OTHER WARRANTIES REGARDING ITS PRODUCTS, WHETHER OF FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR OTHERWISE, AND NONE SHALL BE IMPLIED. FURTHER, Kraton POLYMERS MAKES NO REPRESENTATIONS AND ASSUMES NO RESPONSIBILITY WHATSOEVER WITH RESPECT TO FREEDOM FROM INFRINGEMENT OF ANY PATENT AND/OR COPYRIGHT RESULTING FROM ITS CUSTOMERS' USE OF Kraton POLYMERS' PRODUCTS OR INFORMATION.

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K0407 DDb-05U
MD6459 Polymer
01/05/2005

Description

KRATON™ MD6933 Polymer is a clear linear triblock copolymer based on styrene and ethylene/butylene, S-E/B-S, with bound styrene of 31% mass. It is supplied from Europe in two physical forms identified as follows in the grade nomenclature:

- MD6933E supplied as undusted fluffy crumb
- MD6933ES supplied as fluffy crumb dusted with an amorphous silica

KRATON MD6933 Polymer is used as a base material for compound formulations and all other applications which require higher temperature performance. The inherent stability of the mid block suggests the use of MD6933 in applications that must withstand weathering and high processing temperatures.

KRATON MD6933 Polymer is a development grade manufactured in tonnage quantities. Some of its characteristics may be modified and therefore MD6933 will be supplied initially according to a preliminary sales specification.

Product properties

Property	Physical Form	Test Method	Units	Typical Value	Sales Specification (preliminary)
Bound styrene ^a	All	BMS°0407	%mass	31	30 - 32
Volatile matter	All	KM°04	%mass	≤1	1.0 max.
Total extractables	All	KM°05	%mass	≤1.6	1.6 max.
Ash content	ES	BMS°0425	%m/m	0.4	-
Solution viscosity ^b	All	BMS°0380	Pa.s	0.25	-
Antioxidant content	All	KM°08	%mass	≥0.03	0.03 min.
Specific gravity	All	ISO 2781	Mg/m ³	0.91	-

(a) Measured on the polymer before hydrogenation

(b) Measured on 5% m/m solution in toluene at 25°C using a Brookfield viscometer LVT model

(c) KRATON Polymer Test Method: Copies can be requested from your local KRATON Polymers representative

Packaging

KRATON Polymers are available in a number of different pack types. For information specific to this grade please contact your local KRATON Polymers representative.

KRATON, its logo and associated images are trademarks.

End Use Requirements

If the finished article is intended for use in contact with food or in pharmaceutical applications, toys, and other human contact areas, the relevant regulations should be observed. Detailed information is available from the supplier.

For food packaging, manufacturers of the final product should ensure that all ingredients used comply with the regulations. It should be noted that some of these regulations require tests to be carried out on the final product, e.g. migration. These are the responsibility of the final product manufacturer.

Restriction on Medical/Healthcare Applications

DO NOT USE KRATON™ POLYMERS PRODUCTS IN ANY DEVICES OR MATERIALS INTENDED FOR TEMPORARY OR PERMANENT IMPLANTATION IN THE HUMAN BODY. THE KRATON POLYMERS BUSINESS ALSO RESTRICTS THE USE OF ITS PRODUCTS IN OTHER MEDICAL/HEALTHCARE APPLICATIONS.

Please contact your KRATON Polymers Sales Representative for more details.

THE KRATON POLYMERS BUSINESS HAS NO SPECIFIC EXPERTISE IN THE MEDICAL/HEALTHCARE MARKET OR APPLICATIONS and does not intend to perform testing, clinical studies or other investigations of the suitability of its products for specific medical/healthcare applications. KRATON Polymers products are generally manufactured for use in a variety of commercial applications.

DO NOT USE THE TRADENAMES, TRADEMARKS, LOGOS OR OTHER SIMILAR IDENTIFYING CHARACTERISTICS OF THE KRATON POLYMERS BUSINESS IN THE MANUFACTURE, SALE OR PROMOTION OF MEDICAL DEVICES OR MATERIALS.

THE KRATON POLYMERS BUSINESS MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE (INCLUDING MEDICAL APPLICATIONS) FOR ITS PRODUCTS.

Each customer or user of KRATON Polymers products is solely responsible for determining the suitability of the materials they select for the intended purpose. With regards to medical/healthcare applications, each customer or user must conduct their own studies, registrations, and other related activities to establish the safety and efficacy of their products.

Safety and Handling Precautions

Read the Material Safety Data Sheet for KRATON Polymer products carefully and thoroughly before beginning any work with this product. Additional information relating to Health, Safety, Storage, Handling and Processing can be found in the KRATON Polymers HSE Fact Sheet (ref. K0155), available from your local KRATON Polymers representative. It is also recommended to consult other sources of safety information, for example, the current edition of Toxicity and Safe Handling of Rubber Chemicals - Code of Practice 4th Edition 2000, British Rubber Manufacturers Association Limited (BRMA), London, EC2A 3JE, UK Tel: +44 (0)20 7457 5040

KRATON Polymers and compounds can accumulate electrostatic charges when rubbed, chafed or abraded. Equipment should provide a means of dissipating any charges that may develop. Processing of KRATON Polymers and compounds in high shear equipment can cause the temperature to rise. Do not allow the temperature to exceed 225-230°C (437-446°F) for KRATON D Polymers and compounds and 280-285°C (536-545°F) for KRATON G Polymers and compounds. Maintain a fire watch if these temperatures are reached. KRATON Polymer products (the neat resin or the base product) are high molecular weight polymers which by all accounts are non-toxic and biologically inactive.

Warranty

The information contained in this publication is, to the best of our knowledge, true and accurate, but any recommendations or suggestions which may be made are without guarantee, since the conditions of use are beyond our control. Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents covering any material or its use.

All products purchased from or supplied by the KRATON Polymers Business are subject to terms and conditions set out in the contract, order acknowledgement and/or bill of lading. The KRATON Polymers Business warrants only that its products will meet those specifications designated as such herein or in other publications.

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KRATON MD6933 Polymer
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Europe/Africa
Oct 2005

Kraton[®] MD6944 polymer

Data Document

Description

Kraton[®] MD6944 polymer is a clear copolymer based on styrene and ethylene/butylene, S-E/B-S, with bound styrene of 31% mass. It is supplied from Europe in two physical forms identified as follows in the grade nomenclature:

- MD6944E supplied as undusted fluffy crumb
- MD6944ES supplied as fluffy crumb dusted with an amorphous silica

Kraton MD6944 polymer is used as a base material for compound formulations and all other applications which require higher temperature performance. The inherent stability of the mid block suggests the use of MD6944 in applications that must withstand weathering and high processing temperatures.

Kraton MD6944 polymer is a development grade manufactured in tonnage quantities. Some of its characteristics may be modified and therefore MD6944 will be supplied initially according to a **preliminary sales specification**.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Bound styrene	BMS0407	%mass	30 - 32
Volatile matter	KM04	%mass	1.0 max.
Total extractables	KM05	%mass	1.6 max.
Antioxidant content	KM08	%mass	0.03 min.

Typical Properties (These are typical values and may not routinely be measured on finished product)

Property	Test Method	Units	Typical Value
Ash	BMS 0425	%m/m	0.4 (ES)
Solution viscosity	BMS0380	cps	
Specific gravity	ISO 2781	Mg/m ³	0.91

Packaging

Kraton Polymers are available in a number of different pack types. For information specific to this grade please contact your local Kraton Polymers representative.

End Use Requirements

If the finished article is intended for use in food contact and packaging applications, toys, or human contact areas, manufacturers of the final product should observe all relevant regulations. Some of these regulations require tests to be carried out on the final product, e.g. migration. These are the responsibility of the final product manufacturer.

Information on the food packaging clearances of individual products is available from Kraton Polymers.

Medical, Healthcare and Cosmetic Applications and Trademark Usage

Kraton Polymers products should not be used in any devices or materials intended for implantation in the human body as defined by the U.S. Food and Drug Administration under 21 CFR 812.3(d) and 21 CFR 860.3(d).

Kraton Polymers products may, in certain circumstances, be used in the following products or applications with prior written approval for each specific product or application:

(a) Cosmetics (exclusive of packaging or delivery applications).

(b) Drugs and other Pharmaceuticals (exclusive of packaging or delivery applications).

Kraton Polymers trade names, trademarks, logos or other similar identifying characteristics should not be used in the manufacture, sale, or promotion of cosmetics, drugs, and pharmaceutical products or other medical/healthcare applications or materials.

Kraton Polymers has no specific expertise in these markets and applications, and does not intend to perform testing, clinical studies or other investigations of the suitability of its products for specific applications.

Each customer or user of Kraton Polymers products is solely responsible for determining the suitability of the materials it selects for the intended purpose and acknowledges that it has not relied on any representations of Kraton Polymers regarding suitability for use in its intended cosmetics, drugs, pharmaceutical products or materials.

Please contact your Kraton Polymers Sales Representative for more details before using our products in these specific applications.

Safety and Handling Precautions

Read the Safety Data Sheet carefully and thoroughly before beginning any work. Additional information relating to the health, safety, storage, handling and processing of Kraton Polymers products can be found in "Health and Safety Aspects of Kraton D and Kraton G Polymers" (Document K0155), available from your local Sales Representative or the company website. Kraton Polymers also recommends that customers or users consult other sources of safety information, for example, the current edition of the "Code of Practice on the Toxicity and Safe Handling of Rubber Chemicals," British Rubber Manufacturers Association Limited.

Kraton Polymers products and compounds can accumulate electrostatic charges when rubbed, chafed or abraded. Processing and storage equipment for use with Kraton Polymers products should provide a means of dissipating any charges that may develop.

When processing Kraton Polymers products, maintain a fire watch if the material reaches 225°C (437°F) for Kraton IR and Kraton D (polymers and compounds), and 280°C (536°F) for Kraton G (polymers and compounds). The temperatures listed above are indicated only for safety reasons (risk of fire and product degradation) and are not necessarily recommended for processing. Degradation of the polymer (polymer breakdown) will start at lower temperatures depending on the specific processing conditions. Therefore, operating below these temperatures does not guarantee the absence of product degradation.

Kraton Polymers products (the neat resin or the base product) are high molecular weight polymers which are non-toxic and biologically inactive.

Warranty

The information contained in this publication is, to the best of Kraton Polymers' knowledge, true and accurate, but any recommendations or suggestions that may be made are without guarantee or warranty of any kind whatsoever, since the manufacturing conditions to which Kraton Polymers' products will be subject are beyond Kraton Polymers' control. Customers of Kraton Polymers must make their own assessment to determine the suitability of a Kraton Polymers product for a particular purpose. Further, nothing contained herein shall be construed as a recommendation to use any Kraton Polymers product in conflict with existing patents of Kraton Polymers or any third party. All products purchased from or supplied by Kraton Polymers are subject to the terms and conditions of sale set out in the applicable contract, order acknowledgement and/or bill of lading. Kraton Polymers warrants only that its products will meet the specifications designated in any such contract, order acknowledgement or bill of lading.

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MD6944 polymer



K0417
North America
Nov. 2004

Kraton® Polymer RP6935

Data Document

Description

Kraton® Polymer RP6935 is a clear, linear triblock copolymer based on styrene and ethylene/butylene, with a polystyrene content of 57%. It is supplied from North America in the physical form identified below.

- RP6935 supplied as a powder

Kraton RP6935 is used in compound formulations and as a modifier of thermoplastics. It may also find use in formulating adhesives, sealants, coatings and modified bitumens.

This Kraton Polymer product is a development product. Thus, its properties and chemical composition may change from time to time. If the intended use of this product is for food packaging or for packaging or formulation into cosmetics, drugs or medical device applications, please contact your Kraton representative before using this product to obtain information about the Kraton Polymers Global Cosmetic, Drug and Medical Device Policy.

Please be advised that there is no assurance of continued supply of this development product on a long term basis or in commercial quantities and the production of such product may be discontinued at any time by Kraton Polymers for any reason, at its sole discretion. We encourage you to discuss your long term supply requirements for this product with your Kraton representative.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Polystyrene content	BAM 919	%w	54.6 - 60.4
Volatile matter	BAM 907	%w	1.0 max.
Total extractables	BAM 1206	%w	1.6 max.
Antioxidant content ^[a]	BAM 929	%w	0.03 - 0.10

^[a] Non-staining phenolic antioxidant

Typical Properties (These are typical values and may not routinely be measured on finished product)

Property	Test Method	Units	Typical Value
Melt index 230°C, 5kg		gms/10 min	< 1
Hardness ^[b]		Shore A (10s)	83
Tensile strength ^[b] ^[c]		psi	4,300
Elongation ^[c]		%	665
300% modulus ^[b]		psi	1,150

^[b] Typical properties determined on film cast from toluene solution

^[c] BAM 1245

Packaging

Kraton Polymers are available in a number of different package types. For information specific to this grade, please contact your local Kraton Polymers representative.

End Use Requirements

If the finished article is intended for use in food contact and packaging applications, toys, or human contact areas, manufacturers of the final product should observe all relevant regulations. Some of these regulations require tests to be carried out on the final product, e.g. migration. These are the responsibility of the final product manufacturer.

Information on the food packaging clearances of individual products is available from Kraton Polymers.

Medical, Healthcare and Cosmetic Applications and Trademark Usage

Kraton Polymers products should not be used in any devices or materials intended for implantation in the human body as defined by the U.S. Food and Drug Administration under 21 CFR 812.3(d) and 21 CFR 860.3(d).

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Please contact your Kraton Polymers Sales Representative for more details before using our products in these specific applications.

Safety and Handling Precautions

Read the Safety Data Sheet carefully and thoroughly before beginning any work. Additional information relating to the health, safety, storage, handling and processing of Kraton Polymers products can be found in "Health and Safety Aspects of Kraton D and Kraton G Polymers" (Document K0155), available from your local Sales Representative or the company website. Kraton Polymers also recommends that customers or users consult other sources of safety information, for example, the current edition of the "Code of Practice on the Toxicity and Safe Handling of Rubber Chemicals," British Rubber Manufacturers Association Limited.

Kraton Polymers products and compounds can accumulate electrostatic charges when rubbed, chafed or abraded. Processing and storage equipment for use with Kraton Polymers products should provide a means of dissipating any charges that may develop.

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Warranty

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K0417 DDa-04U
Polymer RP6935
9/17/2003



K0418
North America
1/12/2007

KRATON[®] RP6936 Polymer

Data Document

Identifier : K418DDd07U

Description

Kraton RP6936 is a linear triblock copolymer based on styrene and ethylene/butylene. It is manufactured in North America and has the following characteristics:

- Kraton RP6936 supplied as a powder.

Kraton RP6936 is used in compound formulations and as a modifier of thermoplastics. It may also find use in formulating adhesives, sealants, coatings and modified bitumens.

Note: This Kraton polymer product is a development product. Thus, its properties and chemical composition may change based on market feedback. Kraton Polymers reserves the right to change specifications and/or discontinue production of the product.

Sales Specifications

<u>Property</u>	<u>Test Method</u>	<u>Units</u>	<u>Sales Specification Range</u>	<u>Notes</u>
Volatile Matter	BAM 907	%w	≤ 1.0	
Total Extractables	BAM 1206	%w	≤ 1.6	
Antioxidant	BAM 929	%w	0.07 TO 0.13	a
Polystyrene Content	BAM 919	%w	37 TO 44	b

a Non-staining phenolic antioxidant.

b Measured on the polymer before hydrogenation.

Typical Properties (These are typical values and may not routinely be measured on finished product)

<u>Property</u>	<u>Test Method</u>	<u>Units</u>	<u>Typical Value</u>	<u>Notes</u>
Elongation at Break	BAM 1245	%	660	
Melt Index 260°C, 5kg	ASTM D-1238	gms/10min.	7	
300% Modulus	BAM 1245	psi	935	
Tensile Strength	BAM 1245	psi	> 5000	
Hardness	ASTM 2240	Shore A (10s)	65	

Packaging

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End Use Requirements

If the finished article is intended for use in food contact applications, toys, or human contact areas, manufacturers of the final product should observe all relevant regulations. Detailed information is available from Kraton Polymers.

For food packaging, manufacturers of the final product should ensure that all ingredients used comply with applicable regulations. Some of these regulations require tests to be carried out on the final product, e.g. migration. These are the responsibility of the final product manufacturer.

Restrictions on Medical/Healthcare Applications

Products or compounds made from Kraton Polymers' products shall not be used in any of the following applications: (a) cosmetics, (b) drugs and other pharmaceuticals, and (c) Class II and Class III Medical Devices, as defined in 21 CFR 860.3 (hereinafter collectively referred to as "Medical/Healthcare Applications"). Kraton Polymers requires that it give its prior written approval before its products are used in such Medical/Healthcare Applications.

Please contact your Kraton Polymers Sales Representative for more details before using our products in these specific applications.

KRATON POLYMERS HAS NO SPECIFIC EXPERTISE IN THE MEDICAL/HEALTHCARE MARKET OR MEDICAL/HEALTHCARE APPLICATIONS AND DOES NOT INTEND TO PERFORM TESTING, CLINICAL STUDIES OR OTHER INVESTIGATIONS OF THE SUITABILITY OF ITS PRODUCTS FOR THESE SPECIFIC APPLICATIONS. KRATON POLYMERS MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE (INCLUDING MEDICAL/HEALTHCARE APPLICATIONS) FOR ITS PRODUCTS.

EACH CUSTOMER OR USER OF KRATON POLYMERS' PRODUCTS IS SOLELY RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE MATERIALS IT SELECTS FOR THE INTENDED PURPOSE. FOR MEDICAL/HEALTHCARE APPLICATIONS, EACH CUSTOMER OR USER MUST CONDUCT ITS OWN STUDIES, REGISTRATIONS, AND OTHER RELATED ACTIVITIES TO ESTABLISH THE SAFETY AND EFFICACY OF ITS PRODUCTS.

Do not use Kraton Polymers' tradenames, trademarks, logos or other similar identifying characteristics for the manufacture, sale or promotion of products intended for Medical/Healthcare Applications.

Safety and Handling Precautions

Read the Material Safety Data Sheet for Kraton Polymers' products carefully and thoroughly before beginning any work with such products. Additional information relating to the health, safety, storage, handling and processing of Kraton Polymers' products can be found in the Kraton Polymer HSE Fact Sheet (K0155), available from your local Kraton Polymers Sales Representative. Kraton Polymers also recommends that customers or users consult other sources of safety information, for example, the current edition of the "Code of Practice on the Toxicity and Safe Handling of Rubber Chemicals," British Rubber Manufacturers Association Limited (www.brma.co.uk).

Kraton Polymers' products and compounds can accumulate electrostatic charges when rubbed, chafed or abraded. Processing and storage equipment for use with Kraton Polymers' products should provide a means of dissipating any charges that may develop.

When processing Kraton Polymers' products, maintain a fire watch if the material reaches 225°C (437°F) for Kraton IR and Kraton D (polymers and compounds), and 280°C (536°F) for Kraton G (polymers and compounds). The temperatures listed above are indicated only for safety reasons (risk of fire and product degradation) and are not necessarily recommended for processing. Degradation of the polymer (polymer breakdown) will start at lower temperatures depending on the specific processing conditions. Therefore, operating below these temperatures does not guarantee the absence of product degradation.

Kraton Polymers' products (the neat resin or the base product) are high molecular weight polymers which by all accounts are non-toxic and biologically inactive.

Warranty

The information contained in this publication is, to the best of Kraton Polymers' knowledge, true and accurate, but any recommendations or suggestions that may be made are without guarantee, since the conditions of use and storage are beyond Kraton Polymers' control. The customer understands that it shall make its own assessment to determine the suitability of a Kraton Polymers' product for a particular purpose. Further, nothing contained herein shall be construed as a recommendation to use any Kraton Polymers product in conflict with existing patents. All products purchased from or supplied by Kraton Polymers are subject to terms and conditions set out in the applicable contract, order acknowledgement and/or bill of lading. Kraton Polymers warrants only that its products will meet those specifications designated therein.

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