

Kraton® D SBS

The Kraton D SBS family of polymers is versatile with a combination of high strength, wide range of hardness, and low viscosity for easy thermoplastic melt processing or processing in solution. The SBS block copolymers are composed of blocks of styrene and butadiene. It is the material of choice for footwear and the modification of bitumen/asphalt. It is also very useful in pressure sensitive adhesives, hot melt spray diaper adhesives, construction adhesives, impact modification of styrenics, thermoformed clear rigid packaging, and compounds.

Kraton D (SBS) 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-1101AF	SBS	31	72	16	0	4	-		
D-1101JS	SBS	31	69	16	0	4	-		
D-1102CS	SBS	29.5	70	17	0	1.2	6		
D-1116ES	SBS	23	63	16	0	9	-		
D-1118AS	SBS	33	74	78	0	0.63	10		
D-1152ES	SBS	29.5	70	17	0	1	7		
D-1153ES	SBS	29	70	-	0	1.7	3		
D-1155JP	SBS	40	87	-	0	0.7	14		
D-1184AF	(SB)n	31	75	16	0	20	-		
D-1184CS	(SB)n	31	75	16	0	20	-		
D-1186CS	(SB)n	30	74	10	0	21	-		
D-1192ES	SBS	30	70	-	0	1.5	-		
D-1403P	(SB)n	75	93	-	0	0.22	11		
D-1431P	(SB)n	75	93	-	0	0.25	8.5		
D-1493P	(SB)n	75	93	-	0	0.22	11		
D-1494P	(SB)n	75	93	-	0	0.25	8.5		
D-2104Z	D Compnd	-	41	-	-	-	22		-
D-2109Z	D Compnd	-	48	-	-	-	15	-	-
D-2122X	D Compnd	-	52	-	-	-	26		-
D-4141K	SBS oiled	31	50	17	28.5	1	11		
D-4150K	SBS oiled	31	45	17	33	0.85	13		
D-4153ES	SBS oiled	35	45	-	30.5	-	30		
D-4158K	SBS oiled	31	41	16	33	4.8	-		
D-4272CS	SBS oiled	53	89	10	28.5	-	-		
D-4274ES	SBS oiled	49	82	10	31	-	20		
D-KX220ES	SBS	32	-	7	0	1.1	-		

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-1101 Polymer is a clear linear block copolymer based on styrene and butadiene, with bound styrene of 31% mass. It is supplied from Europe in five physical forms, identified as follows in the grade nomenclature:

- D-1101CS supplied as porous pellets dusted with an amorphous silica
- D-1101CU supplied as undusted porous pellets
- D-1101CM supplied as powder dusted with an amorphous silica
- D-1101CMU supplied as an undusted powder
- D-1101AF supplied as "fluffy" crumb dusted with an amorphous silica

KRATON D-1101 Polymer is used as a modifier of bitumen and polymers. It is also suitable as an ingredient in formulating compounds for footwear applications and may be used in formulating adhesives, sealants and coatings.

The absence of a dusting agent in KRATON D-1101CMU Polymer results in a powder which shows a strong tendency to re-agglomerate on storage. This grade is recommended as a modifier of bitumen emulsions where the presence of a high amount of silica dusting agent may be prejudicial.

Product properties

Property	Physical Form	Test Method	Units	Typical Value	Sales Specification (where applicable)
Bound styrene	All	KM ^d 03	%mass	31	30 - 32
Volatile matter	S,U,M,MU F	KM ^d 04	%mass	0.3	0.3 max.
				0.3	0.5 max.
Ash	S U,MU M F	ISO 247-B	%mass	0.3	0.4 max.
				0.1	0.2 max.
				4.0	2.5 - 5.0
				0.5	1.0 max.
Total extractables	All	KM ^d 05	%mass	1.0	1.0 max.
Solution viscosity ^a	All	KM ^d 06	Pa.s	4.0	3.0 - 5.0
Antioxidant content	All	KM ^d 08	%mass	≥0.14	0.14 min.
Melt flow rate 200°C/5kg	All	ISO 1133	g/10 min	<1	-
Specific gravity	All	ISO 2781		0.94	-
Bulk density	F S,U,MU,M	ASTM D1895 Method B	Mg/m ³	0.3	-
				0.4	-
Hardness ^b Shore A, 30s	All	ISO 868		72	-
Tensile strength ^c	All	ISO 37	MPa	33	-
Modulus 300% ^c	All	ISO 37	MPa	2.9	-
Elongation at break ^c	All	ISO 37	%	880	-

(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.

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.

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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.**

For further information:

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Fax: +1-832-204-5459

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Fax: +44-(0)1829-770-961

In South America

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In Asia Pacific

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	Hong Kong	+852-250-80-657
	Taiwan	+886-2-2545-1538
	South East Asia / India	+91-11-628-4324
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KRATON D-1101 Polymer
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Description

KRATON™ D-1102 Polymer is a clear linear block copolymer based on styrene and butadiene, with bound styrene of 29.5% mass. It is supplied from Europe in three physical forms, identified as follows in the grade nomenclature:

- D-1102CS supplied as porous pellets dusted with an amorphous silica
- D-1102CU supplied as undusted porous pellets
- D-1102CM supplied as powder dusted with an amorphous silica

KRATON D-1102 Polymer is used in formulating adhesives, sealants and coatings and as a modifier of polymers and bitumen. It is also used in compounds for technical and footwear applications.

Product properties

Property	Physical Form	Test Method	Units	Typical Value	Sales Specification (where applicable)
Bound styrene	All	KM ^d 03	%mass	29.5	28.5 - 30.5
Volatile matter	All	KM ^d 04	%mass	0.3	0.3 max.
Ash	S	ISO 247-B	%mass	0.3	0.4 max.
	U			0.1	0.2 max.
	M			4.0	2.5 - 5.0
Total extractables	All	KM ^d 05	%mass	1.0	1.0 max.
Solution viscosity ^a	All	KM ^d 06	Pa.s	1.2	0.9 - 1.5
Antioxidant content	All	KM ^d 08	%mass	≥0.14	0.14 min.
Melt flow rate 200°C/5kg	All	ISO 1133	g/10 min	6	-
Specific gravity	All	ISO 2781		0.94	-
Bulk density	All	ASTM D1895	Mg/m ³	0.4	-
		Method B			-
Hardness ^b Shore A, 30s	All	ISO 868		70	-
Tensile strength ^c	All	ISO 37	MPa	33	-
Modulus 300% ^c	All	ISO 37	MPa	2.9	-
Elongation at break ^c	All	ISO 37	%	880	-

(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.

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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

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For further information:

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KRATON D-1102 Polymer
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Description

KRATON™ D-1116 Polymer is a clear block copolymer based on styrene and butadiene, with bound styrene of 22.8% mass. It is supplied from Europe in two physical forms, identified as follows in the grade nomenclature:

- D-1116ES supplied as porous pellets dusted with an amorphous silica
- D-1116EM supplied as milled powder dusted with an amorphous silica (made available on request)

KRATON D-1116 Polymer is used as a modifier of bitumen and polymers, and in compounds for technical and footwear applications. It may also be used in formulating adhesives, sealants and coatings.

Product properties

Property	Physical Form	Test Method	Units	Typical Value	Sales Specification (where applicable)
Bound styrene	All	(Infra-Red) ^b	%mass	22.8	21.5 - 24.1
Volatile matter	All	KM ^b 04	%mass	0.2	0.3 max.
Ash	S	ISO 247-B	%mass	0.2	0.35 max.
	M		4.0	2.5 - 5.0	
Total extractables	All	KM ^b 05	%mass	1.0	1.4 max.
Solution viscosity ^a	All	KM ^b 06	Pa.s	2.5	2.0 - 3.0
Antioxidant content	All	KM ^b 08	%mass	≥0.4	0.4 min.
Specific gravity	All	ISO 2781		0.94	-

(a) Measured on 20% mass solution in toluene at 25°C using a Brookfield viscometer, LTF or LTV model

(b) 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.

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.

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Safety and Handling Precautions

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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

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K0402 [2]
Europe/Africa
May 2006

Kraton® D1118 polymer

Data Document

Description

Kraton® D1118 polymer is a clear, diblock copolymer based on styrene and butadiene, with a bound styrene of 33% mass. It is supplied from Europe in the physical form identified below

- D1118AS supplied as dusted porous pellets
- D1118AM supplied as dusted powder

Kraton D1118 polymer is used as a modifier of bitumen or thermoplastics and in compound formulations. It may also find use as an ingredient in formulating adhesives, sealants and coatings.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Bound styrene	KM03	%mass	31.0 - 35.0
Volatile matter	KM04	%mass	≤ 1.0
Ash ^[a] ^[b]	ISO 247-B	%mass	0.15 - 0.65 (S)
Ash ^[a] ^[b]	ISO 247-B	%mass	2.5 - 5.0 (M)
Total extractables	KM05	%mass	≤ 1.0
Solution viscosity	KM06	Pa.s	0.47 - 0.79
Antioxidant content	KM08	%mass	0.14 - 1.0

[a] Product forms "S" or "T"

[b] Product form "M"

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

Property	Test Method	Units	Typical Value
Styrene / Rubber ratio		%	33/67
Diblock content		%	78
Solution viscosity	KM06	Pa.s	0.63
Specific gravity	ISO 2781	Mg/m ³	0.94

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 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 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 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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K0402 DDa-03E
D1118 polymer

K0331
Europe/Africa
June 2003

Kraton® D-1152 polymer

Data Document

Description

Kraton® D-1152 polymer is a clear linear block copolymer based on styrene and butadiene, with bound styrene of 29.5 % mass. It contains an anti-oxidant. Kraton D-1152 is supplied from Europe in two physical forms indicated as follows in the grade nomenclature:

- D-1152ES supplied as porous pellets dusted with an amorphous silica
- D-1152EU supplied as undusted porous pellets

Kraton D-1152 Polymer is used in the modification of polymers and in compounds for technical and footwear applications. It is also used in formulating adhesives, sealants and coatings and as a modifier for bitumen.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Melt Flow Rate, 200°C, 5kg	ISO 1133	g/10 min	4.5 -9.5 (EU)
Melt Flow Rate, 200°C, 5kg	ISO 1133	g/10 min	3.5 - 13.5 (ES)
Bound styrene	BMS0407	%mass	28.5 - 30.5
Volatile matter	KM04	%mass	0.3 max.
Ash	ISO 247-B	%mass	ES 0.1-0.4 EU 0.1 max
Total extractables	BMS 0487	%mass	1.0 max
Antioxidant content	BMS 0407	%mass	0.1 min.

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

Property	Test Method	Units	Typical Value
Solution viscosity ^[a]	BMS0380	Pa.s	1.0
Specific gravity	ISO 2781	Mg/m ³	0.94
Bulk density	ASTM D1895 method B	Mg/m ³	0.4

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

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

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K0331 DDc-03E
D-1152 polymer

K0438
Asia Pacific
Mar 2006

Kraton® D-1155J Polymer

Data Document

Description

Kraton® D-1155J polymer is a clear linear block copolymer based on styrene and butadiene with bound styrene of 40% mass. It is supplied from Japan in the following physical forms.

- D-1155JP supplied as dusted dense pellets
- D-1155JS supplied as dusted crumb

Kraton D-1155J is used as a modifier of polymers and in formulating adhesives, sealants and coatings. it may also find use in compounds for technical and footwear applications.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Volatile matter (Product form "JS")	KM04	% mass	1.0 max.
Volatile matter (Product form "JP")	KM04	% mass	0.2 max.
Ash	ISO 247-B	%mass	0.2 max.
Melt Flow, 200°C, 5 kg	ISO 1133	g/10 min	1.8 - 4.2

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

Property	Test Method	Units	Typical Value
Hardness Shore A, 30 s			87
Bound styrene		%mass	40
Melt flow rate 200°C/5kg		g/10 min	3.0
Specific gravity			0.96
Tensile strength		MPa	28
Elongation at break		%	800
300% modulus		MPa	2.9

Packaging

Kraton Polymer D1155JP is packaged in paper bags weighing 25 kg. Kraton Polymer D1155JS is packaged in paper bags weighing 20 kg.

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

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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

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K0438DDa-06J D1155J
D-1155J Polymer
3/29/2006

K0010
Europe / Africa
August 2004

Kraton[®] D-1184 polymer

Data Document

Description

Kraton[®] D-1184 polymer is a clear branched block copolymer based on styrene and butadiene, with bound styrene of 30% mass. It is supplied from Europe in three physical forms, identified as follows in the grade nomenclature:

- D-1184CS supplied as porous pellets dusted with an amorphous silica
- D-1184CM supplied as powder dusted with an amorphous silica
- D-1184AF supplied as "fluffy" crumb dusted with an amorphous silica

Kraton D-1184 polymer is used as a modifier of bitumen in roofing felt coating compounds, roads and pipe coating. It may also be suitable for use in formulating adhesives, sealants and coatings and in the modification of polymers.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Bound styrene	KM03	%mass	29 - 31
Volatile matter	KM04	%mass	0.5 max. (F)
Volatile matter	KM04	%mass	0.3 max. (S,M)
Ash	ISO 247-B	%mass	2.5 - 5.0 (M)
Ash	ISO 247-B	%mass	1.0 max. (F)
Ash	ISO 247-B	%mass	0.4 max. (S)
Total extractables	KM05	%mass	1.4 max.
Solution viscosity ^[a]	KM06	Pa.s	1.00 - 1.40
Antioxidant content ^[b]	KM08	%mass	0.14% min.

^[a] 15%w toluene solution at 25°C

^[b] Only refers to primary antioxidant content

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

Property	Test Method	Units	Typical Value
Melt flow rate 200°C/5kg	ISO 1133	g/10 min	<1
Specific gravity	ISO 2781		0.94
Bulk density	ASTM D1895 method B	Mg/m ³	0.3 (F)
Bulk density	ASTM D1895 method B	Mg/m ³	0.4 (S,M)
Hardness	ISO 868	Shore A (30s)	75
Tensile strength	ISO 37	MPa	27
Elongation at break	ISO 37	%	820
300% modulus	ISO 37	MPa	2.5

Packaging

Kraton Polymers' products 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.

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Warranty

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K0010 DDc-03E
D-1184 polymer

K0011
Europe / Africa
August 2004

Kraton® D-1186 polymer

Data Document

Description

Kraton® D-1186 polymer is a clear branched block copolymer based on styrene and butadiene, with bound styrene of 30% mass. It is supplied from Europe in three physical forms, identified as follows in the grade nomenclature:

- D-1186CS supplied as porous pellets dusted with an amorphous silica
- D-1186CM supplied as powder dusted with an amorphous silica
- D-1186AF / EF supplied as "fluffy" crumb dusted with an amorphous silica

Kraton D-1186 polymer is used as a modifier of bitumen in roofing felt coating compounds, roads and pipe coating. It may also be suitable for use in formulating adhesives, sealants and coatings and in the modification of polymers.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Bound styrene	KM03	%mass	29 - 31
Volatile matter	KM04	%mass	0.3 max. (S,M) 0.5 max. (F)
Ash	ISO 247-B	%mass	0.4 max. (S) 2.5 - 5.0 (M) 1.0 max. (F)
Total extractables	KM05	%mass	1.4 max.
Solution viscosity ^[a]	KM06	Pa.s	1.00 - 1.40
Antioxidant content ^[b]	KM08	%mass	0.14% min.

^[a] 15%w toluene solution at 25°C

^[b] Only refers to primary antioxidant content

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

Property	Test Method	Units	Typical Value
Melt flow rate 200°C/5kg	ISO 1133	g/10 min	<1
Specific gravity	ISO 2781		0.94
Bulk density	ASTM D1895 method B	Mg/m ³	0.4 (S,M) 0.3 (F)
Hardness	ISO 868	Shore A (30s)	74
Tensile strength	ISO 37	MPa	24
Elongation at break	ISO 37	%	800
300% modulus	ISO 37	%	3.0

Packaging

Kraton Polymers' products 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

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DDd-03E
D-1186 polymer

K0017
Europe/Africa
June 2003

Kraton® D-1192 polymer

Data Document

Description

Kraton® D-1192 polymer is a clear linear block copolymer based on styrene and butadiene, with bound styrene of 30% mass. It is supplied from Europe in two physical forms, identified as follows in the grade nomenclature:

- D-1192ES supplied as porous pellets dusted with an amorphous silica
- D-1192EM supplied as powder dusted with an amorphous silica

Kraton D-1192 polymer is used for modification of industrial and paving bitumen. It may also be suitable for use in formulating adhesives, sealants and coatings, and in the modification of polymers.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Apparent molecular mass of triblock	BMS0490	kg/mol	138 - 162
Bound styrene	BMS0407	%mass	28.5 - 32.5
Vinyl polybutadiene content	BMS 0407	%mass	35 min.
Triblock content	BMS 0490	%mass	90 min.
Volatile matter	KM04	%mass	0.3 max.
Ash	ISO 247-B	%mass	2.5 - 5.0 (EM)
Ash	ISO 247-B	%mass	0.1 - 0.4 (ES)
Total extractables	KM05	%mass	1.0 max.
Antioxidant content	KM08	%mass	0.2 min.

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

Property	Test Method	Units	Typical Value
Melt flow rate 200°C/5kg	ISO 1133	g/10 min	<1
Specific gravity	ISO 2781	Mg/m ³	0.94
Bulk density	ASTM D1895 method B	Mg/m ³	0.4
Hardness ^[a]	ASTM 2240	Shore A (10s)	70

^[a] Measured on compression molded slabs

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.

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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K0017 DDc-03E
D-1192 polymer

K0297
North America
1/30/2007

KRATON[®] D1403P

Data Document

Identifier : K297DDc07U

Description

Kraton D1403P is a rigid, styrene/butadiene block copolymer, with a polystyrene content of 75%. It is supplied from North America in the physical form identified below.

- Kraton D1403P -50 supplied as a waxed transparent pellet.

Kraton D1403P is designed for a variety of applications. It has a good balance of stiffness, high strength and ductility as well as high clarity and low gel content.

Sales Specifications

Property	Test Method	Units	Sales Specification Range	Notes
Total Extractables	BAM 905	%w	≤ 1.2	
Haze (plaque)	BAM 1236		≤ 4	
Tensile Elongation	BAM 1013	%	≥ 200	
Melt Flow, 200C/5000g	BAM 903	g/10min	9 TO 13	
Color, YI by Transmission	OTHR WTCaid		≤ 4	

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

Property	Test Method	Units	Typical Value	Notes
Melt Index 200°C, 5 kg	ASTM D 1238	gms/10 min.	11	
Tensile Yield Strength	ASTM D 638	psi	3981	
Vicat Softening Point	ASTM D 1525	°C	92.2	
Refractive Index			1.56	
Hardness, Shore D	ASTM D 2240	Shore D (10 sec)	65	
Mold Shrinkage	ASTM D 955	in/in	0.004	
Haze	ASTM D 1003	%	1.9	
Light Transmittance	ASTM D 1003	%	89.7	
Flexural Modulus	ASTM D 790	psi	265711	
1/8 in. Notched Izod	ASTM D 256	ft-lb/in	0.61	
HDT at 264 psi	ASTM D 648	°C	65.3	
Flexural Strength	ASTM D 790	psi	5809	
Elongation at Break	ASTM D 638	%	200	
Density	ASTM D 297	gm/cc	1.01	
Instrumented Impact Energy	ASTM D 3763	in-lb	340	
HDT at 66 psi	ASTM D 648	°C	80	

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.

(R) KRATON and the KRATON logo are trademarks owned by the KRATON Polymers Group of Companies

Handling, Processing and Blending

Handling

Normal procedures for handling solids that might form a dust should be followed when handling and storing Kraton D1403P Polymer. Compounding of Kraton D1403P Polymer can cause the temperature to rise. **Do not allow temperature to exceed 450F.** Maintain a fire watch if 450F is reached. For health and safety information, please review the Material Safety Data Sheet on this product.

Kraton D1403P Polymer can accumulate an electrostatic charge when rubbed, chafed or abraded. Suitable precautions should be taken at all times, in particular when emptying bags or other packaging. Equipment should be well-grounded.

Regulatory Status: the components of this product are listed on the US/EPA TSCA inventory of chemical substances. This product may be used as an article or a component of an article for food contact as described in 21 CFR 177.1640 (Polystyrene and rubber modified polystyrene).

Precautions should be taken to ensure the absence of sources of ignition in the storage and processing area.

Processing

Kraton D1403P Polymer can be processed by several conventional high shear methods, including injection molding, blow molding (injection and extrusion), and certain methods of transfer molding and extrusion. Typical extrusion melt temperatures range from 380F to 420F, keeping in the mind the high shear sensitivity of the polymer.

Injection Molding

Typical starting conditions for a reciprocating screw injection molding machine are as follows (the below values are from a 25 ton Arburg injection molding machine).

Typical starting conditions for injection molding

Barrel Temperatures Degrees F Degrees C

Zone 1 (Feed Throat) 340 170

Zone 2 360 180

Zone 3 375 190

Nozzle 400 205

Mold Temperature 80 27

Injection pressure, psig 1100

Back pressure, psi 90

Injection speed, in/sec 0.5

Screw Speed (RPM) 200

Kraton D1403P Polymer can typically be processed using a melt temperature of 450F as the absolute maximum. These values are intended only as guidelines, and the optimum conditions will vary from machine to machine.

Typical starting conditions for a single screw extruder to product sheet are as follows (the below conditions are from a 4" Davis-Standard single screw extruder with a medium compression screw (3:1) specifically designed for clear, impact polystyrene/copolymer sheet extrusion).

Typical starting conditions for extrusion

Temperature Profile Degrees F Degrees C

Zone 1 350 176
Zone 2 370 187
Zone 3 380 193
Zone 4 390 198
Zone 5 400 204
Zone 6 400 204
Screen Pack (if applicable) 385-400 196-204
Breaker Plate (if applicable) 400 204
Gear Pump (if applicable) 400 204
Die 400 204
Melt Temperature Nip Roller (based on sheet thickness) 150-180 65-82
Sheet Temp. at Roll-up (if applicable)
Screw RPM 80-90

Note: Optimum temperatures may vary slightly from these "starting temperatures" recommended.

Thermoforming Conditions

Thermoforming Kraton D1403P copolymer sheet at about 275F (135C) can achieve the best balance of part clarity, reproduction of the mold detail, and part wall distribution. Generally, sheet temperatures colder than 250F (121C) or hotter than 300F (150C) are unsuitable for thermoforming.

Mold Temperature: 70-150F (21-66C)

Note: The best mold temperature for most operations is about 100F (38C).

Blending

Kraton D1403P Polymer can be used alone or blended at any ratio with crystal (general purpose) polystyrene. The polystyrene to be blended should be viscosity matched with Kraton D1403P Polymer to achieve a uniform dispersion, which will help to maintain the low haze characteristics of the two neat resins in the blend.

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.

KRATON POLYMERS MAKES NO OTHER WARRANTY, EITHER EXPRESS OR IMPLIED INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE; OR THAT THE USE OF SUCH INFORMATION OR KRATON POLYMERS PRODUCT WILL NOT INFRINGE ANY PATENT.

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K0299
North America
Issued Sept. 2002

KRATON® D-1431P Polymer

Data Document

Description

KRATON® D-1431P is a rigid, styrene/butadiene block copolymer, with a polystyrene content of 75%. It is supplied from North America in the physical form identified below.

- D-1431P-50 supplied as a waxed transparent pellet.

KRATON D-1431P is designed for a variety of applications. It has a good balance of stiffness, high strength and ductility as well as high clarity and low gel content.

Sales Specifications

<u>Property</u>	<u>Test Method</u>	<u>Units</u>	<u>Sales Specification Range</u>
Melt Flow	BAM 903	gm/10 min.	6-10
Total Extractables	BAM 905	%w	≤ 2.0
Color	BAM 1015	Yellowness Index	≤ 6.0
Haze (Plaque)	BAM 1236		≤ 4
Tensile Elongation	BAM 1013	%	200

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>
Hardness¹	ASTM D-2240	Shore D	67
Density	ASTM D-297	gm/cc	1.01
Mold Shrinkage	ASTM D-955	in/in (mm/mm)	0.004 (0.102)
Tensile Properties¹	ASTM D-638		
Tensile Yield Strength		psi (MPa)	4,057 (28)
Elongation at Break		%	118
Flexural Properties¹	ASTM D-790		
Flexural Modulus		psi (MPa)	270,776 (1,867)
Flexural Strength		psi (MPa)	5,995 (41.3)
Impact Properties¹			
1/8" Notched Izod	ASTM D-256	ft-lbf/in (J/m)	0.64 (34.2)
Instrumented Impact Energy	ASTM D-3763	in-lbf (J)	346.1 (39.1)
Optical properties¹			
Haze	ASTM D-1003	%	1.6
Light transmittance	ASTM D-1003	%	90.4
Refractive Index			1.56
Melt Flow Index, 200°C/5.0 kg	ASTM D-1238	gm/10 min.	8.5
Temperature Resistance			
HDT @ 66 psi	ASTM D-648	°F (°C)	192 (89.1)
HDT @ 265 psi	ASTM D-648	°F (°C)	152 (66.6)
Vicat Softening Point	ASTM D-1525	°F (°C)	200 (93.4)

¹Measured on laboratory prepared injection molded test specimens.

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.

Handling, Processing and Blending

Handling

Normal procedures for handling solids that might form a dust should be followed when handling and storing KRATON D-1431P Polymer. Compounding of KRATON D-1431P Polymer can cause the temperature to rise. **Do not allow temperature to exceed 450°F.** Maintain a fire watch if 450°F is reached. For health and safety information, please review the Material Safety Data Sheet on this product.

KRATON D-1431P Polymer can accumulate an electrostatic charge when rubbed, chafed or abraded. Suitable precautions should be taken at all times, in particular when emptying bags or other packaging. Equipment should be well-grounded.

Regulatory Status: the components of this product are listed on the US/EPA TSCA inventory of chemical substances. This product may be used as an article or a component of an article for food contact as described in 21 CFR 177.1640 (Polystyrene and rubber modified polystyrene).

Precautions should be taken to ensure the absence of sources of ignition in the storage and processing area.

Processing

KRATON D-1431P Polymer can be processed by several conventional high shear methods including injection molding, blow molding (injection and extrusion), and certain methods of transfer molding and extrusion. Typical extrusion melt temperatures range from 380°F to 420°F, keeping in mind the high shear sensitivity of the polymer.

Injection Molding

Typical starting conditions for a reciprocating screw injection molding machine are as follows (the below values are from a 25 ton Arburg injection molding machine).

Typical starting conditions for injection molding

Barrel Temperatures	°F	°C
Zone 1 (Feed Throat)	340	170
Zone 2	360	180
Zone 3	375	190
Nozzle	400	205
Mold Temperature	80	27
<hr/>		
Injection pressure, psig	1100	
Back pressure, psi	90	
Injection speed, in/sec	0.5	
<hr/>		
Screw Speed (RPM)	200	

KRATON D-1431P Polymer can typically be processed using a melt temperature of 450°F as the absolute maximum. These values are intended only as guidelines, and the optimum conditions will vary from machine to machine.

Sheet Extrusion

Typical starting conditions for a single screw extruder to product sheet are as follows (the below conditions are from a 4" Davis-Standard single screw extruder with a medium compression screw (3:1) specifically designed for clear, impact polystyrene/copolymer sheet extrusion).

Typical starting conditions for extrusion

Temperature Profile	°F	°C
Zone 1	350	176
Zone 2	370	187
Zone 3	380	193
Zone 4	390	198
Zone 5	400	204
Zone 6	400	204
Screen Pack (if applicable)	385-400	196-204
Breaker Plate (if applicable)	400	204
Gear Pump (if applicable)	400	204
Die	400	204
Melt Temperature	< 440	< 226
Nip Roller (based on sheet thickness)	150-180	65-82
Sheet Temp. at Roll-up (if applicable)	< 120	< 48

Screw RPM	80-90
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Note: Optimum temperatures may vary slightly from these "starting temperatures" recommended.

Thermoforming Conditions

Thermoforming KRATON D-1431P copolymer sheet at about 275°F (135°C) can achieve the best balance of part clarity, reproduction of the mold detail, and part wall distribution. Generally, sheet temperatures colder than 250°F (121°C) or hotter than 300°F (150°C) are unsuitable for thermoforming.

Mold Temperature: 70-150°F (21-66°C)

Note: The best mold temperature for most operations is about 100°F (38°C)

Blending

KRATON D-1431P Polymer can be used alone or blended at any ratio with crystal (general purpose) polystyrene. The polystyrene to be blended should be viscosity matched with KRATON D-1431P Polymer to achieve a uniform dispersion, which will help to maintain the low haze characteristics of the two neat resins in the blend.

End Use Requirements

If the finished article or product 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 COMPANIES ALSO RESTRICT THE USE OF ITS PRODUCTS IN OTHER MEDICAL/HEALTHCARE APPLICATIONS.

Please contact your KRATON Polymers Sales Representative for more details.

THE KRATON COMPANIES HAVE NO SPECIFIC EXPERTISE IN THE MEDICAL/HEALTHCARE MARKET OR APPLICATIONS and do not intend to perform testing, clinical studies or other investigations of the suitability of its products for specific medical/healthcare applications. KRATON polymer 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 COMPANIES IN THE MANUFACTURE, SALE OR PROMOTION OF MEDICAL DEVICES OR MATERIALS.

THE KRATON COMPANIES MAKE NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE (INCLUDING MEDICAL APPLICATIONS) FOR ITS PRODUCTS.

Each customer or user of KRATON polymer 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, British 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 companies are subject to terms and conditions set out in the contract, order acknowledgement and/or bill of lading. The KRATON companies warrant only that its products will meet those specifications designated as such herein or in other publications.

All other information supplied by the KRATON companies 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 companies make 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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K0299 DDb-02U
KRATON D14031 Polymer
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K0348
Global
Issued Feb. 2002

KRATON® D1494P Polymer

Data Document

Description

KRATON® D1494P is a rigid, styrene/butadiene block copolymer, with a polystyrene content of 75%. It is supplied from North America in the physical form identified below.

- D1494P-00 supplied as an unwaxed transparent pellet.

KRATON D1494P is designed for a variety of applications. It has a good balance of stiffness, high strength and ductility as well as high clarity and low gel content.

Sales Specifications

<u>Property</u>	<u>Test Method</u>	<u>Units</u>	<u>Sales Specification Range</u>
Melt Flow	BAM 903	gm/10 min.	6-10
Total Extractables	BAM 905	%w	≤ 2.0
Color	BAM 1015	Yellowness Index	≤ 6.0
Haze (Plaque)	BAM 1236		≤ 4
Tensile Elongation	BAM 1013	%	≥ 200

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>
Hardness¹	ASTM D-2240	Shore D	67
Density	ASTM D-297	gm/cc	1.01
Mold Shrinkage	ASTM D-955	in/in (mm/mm)	0.004 (0.102)
Tensile Properties¹	ASTM D-638		
Tensile Yield Strength		psi (MPa)	4,057 (28)
Elongation at Break		%	118
Flexural Properties¹	ASTM D-790		
Flexural Modulus		psi (MPa)	270,776 (1,867)
Flexural Strength		psi (MPa)	5,995 (41.3)
Impact Properties¹			
1/8" Notched Izod	ASTM D-256	ft-lbf/in (J/m)	0.64 (34.2)
Instrumented Impact Energy	ASTM D-3763	in-lbf (J)	346.1 (39.1)
Optical properties¹			
Haze	ASTM D-1003	%	1.6
Light transmittance	ASTM D-1003	%	90.4
Refractive Index			1.56
Melt Flow Index, 200°C/5.0 kg	ASTM D-1238	gm/10 min.	8.5
Temperature Resistance			
HDT @ 66 psi	ASTM D-648	°F (°C)	192 (89.1)
HDT @ 265 psi	ASTM D-648	°F (°C)	152 (66.6)
Vicat Softening Point	ASTM D-1525	°F (°C)	200 (93.4)

¹Measured on laboratory prepared injection molded test specimens.

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.

Handling, Processing and Blending

Handling

Normal procedures for handling solids that might form a dust should be followed when handling and storing KRATON D1494P Polymer. Compounding of KRATON D1494P Polymer can cause the temperature to rise. **Do not allow temperature to exceed 450°F.** Maintain a fire watch if 450°F is reached. For health and safety information, please review the Material Safety Data Sheet on this product.

KRATON D1494P Polymer can accumulate an electrostatic charge when rubbed, chafed or abraded. Suitable precautions should be taken at all times, in particular when emptying bags or other packaging. Equipment should be well-grounded.

Regulatory Status: the components of this product are listed on the US/EPA TSCA inventory of chemical substances. This product may be used as an article or a component of an article for food contact as described in 21 CFR 177.1640 (Polystyrene and rubber modified polystyrene).

Precautions should be taken to ensure the absence of sources of ignition in the storage and processing area.

Processing

KRATON D1494P Polymer can be processed by several conventional high shear methods including injection molding, blow molding (injection and extrusion), and certain methods of transfer molding and extrusion. Typical extrusion melt temperatures range from 380°F to 420°F, keeping in mind the high shear sensitivity of the polymer.

Injection Molding

Typical starting conditions for a reciprocating screw injection molding machine are as follows (the below values are from a 25 ton Arburg injection molding machine).

Typical starting conditions for injection molding

Barrel Temperatures	°F	°C
Zone 1 (Feed Throat)	340	170
Zone 2	360	180
Zone 3	375	190
Nozzle	400	205
Mold Temperature	80	27
<hr/>		
Injection pressure, psig	1100	
Back pressure, psi	90	
Injection speed, in/sec	0.5	
<hr/>		
Screw Speed (RPM)	200	

KRATON D1494P Polymer can typically be processed using a melt temperature of 450°F as the absolute maximum. These values are intended only as guidelines, and the optimum conditions will vary from machine to machine.

Sheet Extrusion

Typical starting conditions for a single screw extruder to product sheet are as follows (the below conditions are from a 4" Davis-Standard single screw extruder with a medium compression screw (3:1) specifically designed for clear, impact polystyrene/copolymer sheet extrusion).

Typical starting conditions for extrusion

Temperature Profile	°F	°C
Zone 1	350	176
Zone 2	370	187
Zone 3	380	193
Zone 4	390	198
Zone 5	400	204
Zone 6	400	204
Screen Pack (if applicable)	385-400	196-204
Breaker Plate (if applicable)	400	204
Gear Pump (if applicable)	400	204
Die	400	204
Melt Temperature	< 440	< 226
Nip Roller (based on sheet thickness)	150-180	65-82
Sheet Temp. at Roll-up (if applicable)	< 120	< 48

Screw RPM	80-90
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Note: Optimum temperatures may vary slightly from these "starting temperatures" recommended.

Thermoforming Conditions

Thermoforming KRATON D1494P copolymer sheet at about 275°F (135°C) can achieve the best balance of part clarity, reproduction of the mold detail, and part wall distribution. Generally, sheet temperatures colder than 250°F (121°C) or hotter than 300°F (150°C) are unsuitable for thermoforming.

Mold Temperature: 70-150°F (21-66°C)

Note: The best mold temperature for most operations is about 100°F (38°C)

Blending

KRATON D1494P Polymer can be used alone or blended at any ratio with crystal (general purpose) polystyrene. The polystyrene to be blended should be viscosity matched with KRATON D1494P Polymer to achieve a uniform dispersion, which will help to maintain the low haze characteristics of the two neat resins in the blend.

End Use Requirements

If the finished article or product 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 COMPANIES ALSO RESTRICT THE USE OF ITS PRODUCTS IN OTHER MEDICAL/HEALTHCARE APPLICATIONS.

Please contact your KRATON Polymers Sales Representative for more details.

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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, British 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

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K0348 DDb-03G
KRATON D1494P Polymer
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K0334
North America
Issued Sept. 2002

KRATON® D2104Z Compound

Data Document

Description

KRATON® D2104Z is an easy processing, general purpose 35 Shore A hardness material designed for a wide variety of applications. It is supplied from North America in the physical forms identified below:

- D2104Z-1002 supplied as a translucent dense pellet.

Sales Specifications

<u>Property</u>	<u>Test Method</u>	<u>Units</u>	<u>Sales Specification Range</u>
Hardness ^a	BAM 1003	Shore A	30 – 40
Specific Gravity	BAM 1014	gm/cc	0.90 – 0.94
Melt Flow, 200°C, 5 kg	BAM 903	gm/10 min.	12 – 22

^aValue on product extruded at 175°C

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	psi	
Machine Direction		1,400
Transverse Direction		1,150 ^b
100% Modulus ^a	psi	
Machine Direction		220
Transverse Direction		75
300% Modulus ^a	psi	
Machine Direction		350
Transverse Direction		150
Elongation ^a	%	
Machine Direction		1,200
Transverse Direction		1,300 ^b

^aInjection molded sample tested at 10 in/min with Die D as per ASTM D412

^bSample did not break at maximum travel

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.

Processing

KRATON D2104Z can be processed by injection molding, extrusion, thermoforming, and other thermoplastic fabricating techniques.

Typical starting conditions for a reciprocating screw injection molding machine are as follows:

Barrel temperatures, °F	
Rear	340 - 360
Front	370 - 390
Nozzle	350 - 380
Mold temperature, °F	50 - 100
Injection pressure, psig	500 – 700
Back pressure, psi	40 - 60
Injection speed	Medium to Fast

These values are intended only as guidelines, and the optimum conditions will vary from machine to machine.

Normal mold shrinkage for KRATON D2104Z is about 0.025 – 0.027 in/in in the direction of flow.

Since KRATON D2104Z conducts heat well compared to polyolefins, molded parts cool quickly and relatively short cycle times are obtained. Scrap is 100% recyclable.

Polystyrene, low density polyethylene (LDPE), or poly (ethylene-vinyl acetate) color concentrates can be used to color KRATON D2104Z.

End Use Requirements

If the finished article or product 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

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Safety and Handling Precautions

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Warranty

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K334 DDa-02U
KRATON D2104Z Compound
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Description

KRATON™ D2122X is an easy processing 52 Shore A hardness material designed for film applications. It is supplied from North America in the physical form identified below. The product code is N7198 and the Material Safety Data Sheet number is 2804.

- D2122X-2 supplied as a natural color pellet.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Hardness	BAM 1013	Shore A	45 - 55
Melt Flow, 200°C, 5 kg	BAM 903	gm/10 min.	21.0 - 31.0

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

Property	Units	Typical Value
Tensile Strength ^{a,b}	psi	1,200
Elongation ^a	%	1,130
Specific Gravity	gm/cc	0.93
Tear Strength, ASTM D-624, Die C	pli	180

^a/ASTM D-412
^bTypical values on polymer compression molded at 300°F

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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Processing

KRATON D2122X can be processed by injection molding, extrusion, thermoforming, and other thermoplastic fabricating techniques.

Typical starting conditions for a reciprocating screw injection molding machine are as follows:

Barrel temperatures, °F	
Rear	340 - 360
Front	370 - 390
Nozzle	350 - 380
Mold temperature, °F	50 - 100
Injection pressure, psig	500 - 700
Back pressure, psi	40 - 60
Injection speed	Medium to Fast

These values are intended only as guidelines, and the optimum conditions will vary from machine to machine.

Normal mold shrinkage for KRATON D2122X Compound is about 0.025 - 0.027 inch/inch in the direction of flow.

Since KRATON D2122X conducts heat well compared to polyolefins, molded parts cool quickly and realtively short cycle times are obtained.

Scrap is 100% recyclable.

Polystyrene, polypropylene, or poly (ethylene-vinyl acetate) color concentrates can be used to color Kraton D2122X.

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.

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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 Polymer HSE Fact Sheet (ref. K0155), available from your local KRATON Polymers representative.

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Warranty

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K0174 DDa-01U
KRATON D2122X Polymer
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K0247
North America
Nov. 2003

Kraton® D4141K Polymer

Data Document

Description

Kraton® D4141K is an oiled, linear copolymer based on styrene and butadiene with a polystyrene content of 31%. It is supplied from North America in the physical form identified below.

- D4141K-16 - supplied as a dusted porous pellet

Kraton D4141K is used as a modifier of bitumen or thermoplastics and in compound formulations. It may also find use as an ingredient in formulating adhesives, sealants and coatings.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Polystyrene content	BAM 919	%w	29.0 - 33.0
Oil	BAM 905	%w	27.0 - 30.0
Volatile matter	BAM 907	%w	0.7 max.
Dust content ^[a]	BAM 908	%w	0.25 - 0.45
Antioxidant content ^[b]	BAM 937	%w	0.14 - 1.00

^[a] Talc

^[b] 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
Styrene / Rubber ratio		%	31/69
Diblock content		%	17
Solution viscosity ^[c]		cps	1,050
Melt Flow Index 200°C/5.0 kg		gm/10 min.	12
Specific gravity		gm/cc	0.93
Tensile strength ^[d] ^[e]		psi	2,750
Elongation ^[e]		%	1,300
300% modulus ^[e]		psi	250

^[c] 25%w toluene solution at 25°C

^[d] Measured on films cast from a solution in toluene

^[e] ASTM D-412

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.

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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.

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

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K0247 DDd-03U
D4141K Polymer
09/08/2003



K0249
North America
1/11/2007

KRATON[®] D4150K

Data Document

Identifier : K249DDd07U

Description

Kraton D4150K is a linear triblock copolymer based on styrene and butadiene with a polystyrene content of 31%. It is supplied from North America in the physical form identified below.

- Kraton D4150K -16 supplied as a dusted porous pellet.

Kraton D4150K is used as a modifier of bitumen and polymers. It is also suitable as an ingredient in formulating compounds for footwear applications, molded and extruded goods applications and may be used in formulating adhesives, sealants, and coatings. This product is also available as an undusted porous pellet (-00).

Sales Specifications

Property	Test Method	Units	Sales Specification Range	Notes
Polystyrene Content	BAM 919	%w	29 TO 33	
Oil	BAM 905	%w	32.3 TO 34.3	
Volatile Matter	BAM 907	%w	≤ 0.7	
Dust, Talc	BAM 908	%w	0.25 TO 0.45	
Primary Antioxidant Content	BAM 929	%w	0.13 TO 0.35	

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		31/69	
Diblock content	n/a		17	
Solution Viscosity	BAM 922	cps	850	a
Melt Index 200°C, 5kg	n/a	gms/10 Min.	9.5	
Specific gravity	ASTM D4025	gm/cc	0.92	
Hardness	ASTM 2240	Shore A (10s)	45	b
Tensile strength	ASTM D-412	psi	2,800	c
Elongation at break	ASTM D-412	%	1,400	c
300% Modulus	ASTM D-412	psi	160	c

a 25%w toluene solution at 25C

b Typical values on polymer compression molded at 300F.

c Measured on films cast from a solution in toluene.

Packaging

(R) KRATON and the KRATON logo are trademarks owned by the KRATON Polymers Group of Companies

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.

KRATON POLYMERS MAKES NO OTHER WARRANTY, EITHER EXPRESS OR IMPLIED INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE; OR THAT THE USE OF SUCH INFORMATION OR KRATON POLYMERS PRODUCT WILL NOT INFRINGE ANY PATENT.

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K0286
Europe/Africa
June 2005

Kraton® D-4153 polymer

Data Document

Description

Kraton® D-4153 polymer is an oil-extended linear block copolymer based on styrene and butadiene, with bound styrene in the neat polymer of 35% mass.

It contains 40phr paraffinic oil which is classified as not hazardous. Information on the CAS and EINECS registry numbers of the paraffinic oil used for this grade is available on request.

Kraton D-4153 polymer is supplied from Europe in two physical forms as indicated below:

- D-4153ES supplied as porous pellets dusted with an amorphous silica.
- D-4153EM supplied as powder dusted with amorphous silica.

Kraton D-4153 polymer is used in formulating compounds for footwear, technical and general purpose applications. It can also be used in formulating adhesives, sealants and coatings and as a modifier of bitumen.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Bound styrene	BMS0407	%mass	34 - 36
Volatile matter	KM04	%mass	0.3 max.
Ash	ISO 247-B	%mass	2.5 - 5.0 (EM)
Ash	ISO 247-B	%mass	0.15 - 0.35 (ES)
Total extractables	BMS 0487	%mass	29 - 32
Antioxidant content	BMS 0407	%mass	0.10 min.
Melt Flow, 200°C, 5 kg	ISO 1133	gm/10 min	23 - 37
Hardness	ISO 868	Shore A (15s)	43 - 47

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

Property	Test Method	Units	Typical Value
Specific gravity	ASTM D792	Mg/m ³	0.94
Bulk density	ASTM D1895 method B	Mg/m ³	0.4
Tensile strength	ISO 37	MPa	10
Elongation at break	ISO 37	%	900
300% modulus	ISO 37	MPa	2.5
Abrasion	DIN 53516	mm ³	105

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.

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

Warranty

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K0286 DDd-03E
D-4153 polymer

K0359
North America
Nov. 2003

Kraton[®] D4158K Polymer

Data Document

Description

Kraton[®] D4158K is a linear triblock copolymer based on styrene and butadiene with a polystyrene content of 31%. It is supplied from North America in the physical form identified below.

- D4158K-16 supplied as a dusted porous pellet.

Kraton D4158K is used as a modifier of bitumen and polymers. It is also suitable as an ingredient in formulating compounds for footwear applications, molded and extruded goods applications and may be used in formulating adhesives, sealants and coatings.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Polystyrene content	BAM 919	%w	29.2 - 32.2
Oil	BAM 905	%w	32.2 - 34.1
Volatile matter	BAM 907	%w	1.0 max.
Dust content ^[a]	BAM 908	%w	0.25 - 0.45
Solution viscosity ^[b]	BAM 922	cps	1,090 - 2,050
Antioxidant content ^[c]	BAM 929	%w	0.15 - 0.60

^[a] Talc

^[b] 25%w toluene solution at 25°C

^[c] 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
Styrene / Rubber ratio		%	31/69
Diblock content		%	16
Solution viscosity ^[d]		cps	1,570
Melt index 200°C, 5kg		gms/10 min	33
Specific gravity		gm/cc	0.92
Hardness ^[e]		Shore A (10s)	41
Tensile strength ^[f] ^[g]		psi	1,330
Elongation ^[g]		%	1,110
300% modulus ^[g]		psi	230

^[d] 25%w toluene solution at 25°C

^[e] Typical values on polymer compression molded at 300°F

^[f] Measured on compression molded slabs

^[g] ASTM D-412

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).

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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

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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 are non-toxic and biologically inactive.

Warranty

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K0359 DDa-03U D4158K
D4158K Polymer
09/23/2003

K0307
Europe/Africa
June 2003

Kraton[®] D-4272 polymer

Data Document

Description

Kraton[®] D-4272 polymer is an oil-extended branched block copolymer based on styrene and butadiene, with bound styrene in the neat polymer of 53% mass.

It contains 39phr of a paraffinic oil which is classified as non hazardous. Information on the CAS and EINECS registry numbers of the paraffinic oil used for this grade is available on request.

Kraton D-4272 polymer is supplied as porous pellets dusted with an amorphous silica, i.e. D-4272ES.

Kraton D-4272 polymer is used for formulating compounds for footwear and general purpose applications and as a modifier of bitumen.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Bound styrene (neat polymer)	KM03	%mass	52 - 54
Volatile matter	KM04	%mass	0.3 max.
Ash	ISO 247-B	%mass	0.15 - 0.45
Total extractables	KM05	%mass	27 - 30
Antioxidant content	KM08	%mass	0.2 min.
Melt Flow, 200°C, 5 kg	ISO 1133	gm/10 min	13 - 24
Hardness ^[a]	ASTM2240	Shore A (15s)	89 - 91

^[a] Measured on films cast from a solution in toluene

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

Property	Test Method	Units	Typical Value
Specific gravity	ISO 2781		0.94
Bulk density	ASTM D1895 method B	Mg/m ³	0.4
Tensile strength ^[b]	ISO 37	MPa	14.4
Elongation at break ^[b]	ISO 37	%	830
300% modulus ^[b]	ISO 37	MPa	3.9
Abrasion	DIN 53516	mm ³	190

^[b] Measured on injection moulded slabs

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.

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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.

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

Warranty

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K0307 DDd-03E
D-4272 polymer

K0308
Europe/Africa
June 2003

Kraton® D-4274 polymer

Data Document

Description

Kraton® D-4274 polymer is an oil-extended branched block copolymer based on styrene and butadiene, with bound styrene in the neat polymer of 49% mass.

It contains 40phr of a paraffinic oil which is classified as non hazardous. Information on the CAS and EINECS registry numbers of the paraffinic oil used for this grade is available on request.

Kraton D-4274 polymer is supplied in Europe as porous pellets dusted with an amorphous silica, ie. D-4274ES.

Kraton D-4274 polymer is used in formulating compounds for footwear, general purpose applications and as a modifier of bitumen.

Sales Specifications

Property	Test Method	Units	Sales Specification Range
Bound styrene (neat polymer)	KM03	%mass	47 - 51
Volatile matter	KM04	%mass	0.3 max.
Ash	ISO 247-B	%mass	0.15 - 0.45
Total extractables	KM05	%mass	29.5 - 32.5
Antioxidant content	KM08	%mass	0.2 min.
Melt Flow, 200°C, 5 kg	ISO 1133	gm/10 min	14 - 26
Hardness ^[a]	ASTM2240	Shore A (10s)	79 - 83

^[a] Measured on films cast from a solution in toluene

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

Property	Test Method	Units	Typical Value
Specific gravity	ISO 2781		0.94
Bulk density	ASTM D1895 method B	Mg/m ³	0.4
Tensile strength ^[b]	ISO 37	MPa	14
Elongation at break ^[b]	ISO 37	%	890
300% modulus ^[b]	ISO 37	MPa	4.1
Abrasion	DIN 53516	mm ³	175

^[b] Measured on injection moulded slabs

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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