

Linear Low Density Polyethylene

Blown Film

Product Description:

010F18S is a Linear Low Density Polyethylene manufactured using Nova Chemical's Sclairtech Solution Polymerization Technology with following features:

- Good processability
- Good mechanical properties
- Contains slip & antiblock

Recommended Applications:

LLDPE 010F18S is recommended for following applications

- Liquid Packaging films
- Heavy duty films
- Multi layer films
- Carrier bags
- Drip laterals

Typical Properties:

Tested Properties	Test Method	UOM	Values*
Resin Properties			
Melt Flow Index (190°C & 2.16 Kg)	ASTM D 1238	gm/10 min	0.90
Density @ 23°C	ASTM D 1505	gm/cm ³	0.918
Mechanical Properties			
Tensile Strength @ Yield (50 mm/min) MD/TD	ASTM D 882	MPa	13/12
Ultimate Tensile Strength (50 mm/min) MD/TD	ASTM D 882	MPa	39/30
Elongation at Break(50 mm/min) MD/TD	ASTM D 882	%	700/850
Dart Impact Strength (38mm dart,66cm height)	ASTM D 1709	g/μ	3.5
Tear Strength	ASTM D 1922	g/μ	3.3/10.2
Coefficient of Friction(Static/Dynamic)	ASTM D 1894		0.22/0.16
Gloss (60°)	ASTM D 523	%	80

* Typical values not to be construed as specification limits. Values may change without any prior notice.

* Mechanical Properties tested on 40μ monolayer film made with 1.8 mm die gap & 2.25 BUR.

Recommended Processing Temperature: 170– 210 °C

Packaging Information:

This material is packed and available in raffia bags with net content of 25.0 Kg only. The raffia bags used conforms to the minimum strength requirements of BIS, however, customer shall take due care while handling the bag. Prolonged exposure of these bags to sunlight may deteriorate the bag's performance and cause spillage and wastage. IOCL does not warranty loss of material due to poor material handling practices.

Regulatory Information:

LLDPE 010F18S shall meet "Specification for Polyethylene for safe use in contact with Foodstuff, Pharmaceuticals and Drinking water" as per IS: 10146-1982. It also conforms to the positive list of constituents as per IS: 10141-1982. The grade and Additives incorporated shall meet with FDA: CFR Title21, 177.1520, Olefin Polymers.

Storage & Handling:

Prevent LLDPE Material from direct exposure to sunlight & heat to avoid quality deterioration. The storage location should be dry, dust free and the storage temperature should not exceed 50°C. Non - compliance to these precautionary measures can lead to degradation

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Linear Low Density Polyethylene

Blown Film

Product Description:

010F18A is a Linear Low Density Polyethylene manufactured using Nova Chemical's Sclairtech Solution Polymerization Technology with following features:

- Good processability
- Good mechanical properties
- Without slip & antiblock

Recommended Applications:

LLDPE 010F18A is recommended for following applications

- Lamination films
- Co-extrusion films
- Drip laterals
- Stretch cling films
- Mulch films

Typical Properties:

Tested Properties	Test Method	UOM	Values*
Resin Properties			
Melt Flow Index (190°C & 2.16 Kg)	ASTM D 1238	gm/10 min	0.90
Density @ 23°C	ASTM D 1505	gm/cm ³	0.918
Mechanical Properties			
Tensile Strength @ Yield (50 mm/min) MD/TD	ASTM D 882	MPa	13/12
Ultimate Tensile Strength (50 mm/min) MD/TD	ASTM D 882	MPa	39/30
Elongation at Break(50 mm/min) MD/TD	ASTM D 882	%	700/850
Dart Impact Strength (38mm dart,66cm height)	ASTM D 1709	g/μ	3.5
Tear Strength	ASTM D 1922	g/μ	3.3/10.2

* Typical values not to be construed as specification limits. Values may change without any prior notice.

* Mechanical Properties tested on 40μ monolayer film made with 1.8 mm die gap & 2.25 BUR.

Recommended Processing Temperature: 170– 210 °C

Packaging Information:

This material is packed and available in raffia bags with net content of 25.0 Kg only. The raffia bags used conforms to the minimum strength requirements of BIS, however, customer shall take due care while handling the bag. Prolonged exposure of these bags to sunlight may deteriorate the bag's performance and cause spillage and wastage. IOCL does not warranty loss of material due to poor material handling practices.

Regulatory Information:

LLDPE 010F18A shall meet "Specification for Polyethylene for safe use in contact with Foodstuff, Pharmaceuticals and Drinking water" as per IS: 10146-1982. It also conforms to the positive list of constituents as per IS: 10141-1982. The grade and Additives incorporated shall meet with FDA: CFR Title21, 177.1520, Olefin Polymers.

Storage & Handling:

Prevent LLDPE Material from direct exposure to sunlight & heat to avoid quality deterioration. The storage location should be dry, dust free and the storage temperature should not exceed 50°C. Non - compliance to these precautionary measures can lead to degradation

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Linear Low Density Polyethylene (LLDPE)

Description:

OPELENE OP1810FS5 is a pelletized butene linear low density polyethylene selected for blown film applications that require excellent drawdown and toughness. These resins exhibit good tensile strength and toughness properties. Applications include heavy duty shipping sacks, trash can liners, commercial and industrial packaging, as well as food and consumer packaging.

Typical Applications: Agriculture Film; Bags & Pouches; Can Liners; Multilayer Packaging Film: Produce bags; Liner film; Retail Carryout Bags; Food Packaging.

Typical Properties			
Physical	Nominal Value	Unit	Test Method
Base Resin Density (23°C)	0.918	g/cm ³	ASTM D1505
Melt Mass-Flow Rate (190°C/2.16kg)	1.0	g/10 min	ASTM D1238
Peak Melting Temperature	250	°F	
Film	Nominal Value	Unit	Test Method
Dart Drop Impact Strength	100	g	ASTM D1709A
Tensile Strength - MD (Break)	7700	psi	ASTM D882
Tensile Strength - TD (Break)	5100	psi	ASTM D882
Tensile Elongation - MD (Break)	570	%	ASTM D882
Tensile Elongation - TD (Break)	850	%	ASTM D882
1% Secant Modulus - MD	28000	psi	ASTM D882
1% Secant Modulus - TD	32000	psi	ASTM D882
Elmendorf Tear Strength - MD	80	g	ASTM D1922
Elmendorf Tear Strength - TD	400	g	ASTM D1922
Thermal	Nominal Value	Unit	Test Method
Vicat Softening Point	225	°F	ASTM D1525
Optical	Nominal Value	Unit	Test Method
Haze	15.0	%	ASTM D1003
Gloss (45°)	45		ASTM D2457
Additive	Nominal Value	Unit	Test Method
Slip	1700	PPM	
Antiblock	5000	PPM	

*Contains Thermal Stabilizer

Disclaimer:

Typical properties: these are not to be construed as specifications.

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O S T E R M A N

Osterlene® LLB100 (-B, -SA, -SAM)

Osterman & Company - Linear Low Density Polyethylene

Monday, February 11, 2019

General Information

Product Description

- LLB100 is a general-purpose film grade linear low density polyethylene. This resin exhibits excellent toughness and strength when drawn down to thin gauges.
- Suggested applications for LLB100 include blending resin applications, industrial packaging, co-extrusion and industrial liners. Uses include bags, liners and packaging.
- LLB100 meets the requirements of the Food and Drug Administration, 21 CFR Section 177.1520. This regulation allows the use of this olefin polymer in "...articles or components of articles intended for use in contact with food." Specific limitations may apply. Contact your Osterman sales representative for more information.

General

Material Status	• Commercial: Active		
Availability	• Africa & Middle East • Asia Pacific	• Europe • Latin America	
Additive	• -B: Antiblock: No; Slip: No	• -SA: High Antiblock; High Slip	• -SAM: Medium Antiblock; Medium Slip
Features	• Butene Comonomer • Food Contact Acceptable	• General Purpose • High Strength	• High Toughness • Low Density
Uses	• Bags • Blending	• Liners • Packaging	
Agency Ratings	• FDA 21 CFR 177.1520		
Processing Method	• Extrusion		

ASTM & ISO Properties ¹

Physical	Nominal Value	Unit	Test Method
Density	0.919	g/cm ³	ASTM D1505
Melt Mass-Flow Rate (MFR) (190°C/2.16 kg)	1.0	g/10 min	ASTM D1238
Films	Nominal Value	Unit	Test Method
Tensile Strength - MD (Break)	6200	psi	ASTM D882
Tensile Strength - TD (Break)	4700	psi	ASTM D882
Tensile Elongation - MD (Break)	540	%	ASTM D882
Tensile Elongation - TD (Break)	800	%	ASTM D882
Dart Drop Impact	75	g	ASTM D1709
Elmendorf Tear Strength - MD	120	g	ASTM D1922
Elmendorf Tear Strength - TD	350	g	ASTM D1922
Optical	Nominal Value	Unit	Test Method
Gloss (45°)	40		ASTM D2457
Haze	18.0	%	ASTM D1003

Notes

¹ Typical properties: these are not to be construed as specifications.

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For more information and technical assistance contact:

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SUPERIOR FLEXIBLE PACKAGING RESINS

Marlex® D139FK Polyethylene

METALLOCENE LINEAR LOW DENSITY POLYETHYLENE (mLLDPE)

This metallocene linear low density polyethylene is an ethylene-hexene copolymer tailored for blown film applications that require:

- Superb clarity
- Excellent gloss
- Exceptional toughness
- Outstanding heat seal

Typical blown film applications include:

- Seal layer in coextrusions
- Heavy duty packaging
- Clarity packaging

Nominal Resin Properties	English	SI	Method
Melt Index, 190 °C/2.16 kg	---	1.0 g/10 min	ASTM D1238
Density	---	0.918 g/cm ³	ASTM D1505
Slip	1000 ppm	1000 ppm	---
Antiblock	5000 ppm	5000 ppm	---
Process Aid	Yes	Yes	---

Nominal Blown Film Properties @ 1 mil ¹	English	SI	Method
Haze	9 %	9 %	ASTM D1003
Gloss, 60°	103	103	ASTM D2457
COF	0.15	0.15	ASTM D1894
Dart	---	600 g/mil	ASTM D1709
Elmendorf Tear MD/TD	---	230/440 g/mil	ASTM D1922
Tensile Strength at Yield MD/TD	1850/1400 psi	14/10 MPa	ASTM D882
Tensile Strength at Break MD/TD	8300/6650 psi	59/49 MPa	ASTM D882
Tensile Elongation at Break MD/TD	450/560 %	450/560 %	ASTM D882
1 % Secant Modulus MD/TD	24000/27300 psi	165/188 MPa	ASTM D882
Seal Initiation Temperature ²	216 °F	102 °C	ASTM F88

1. Produced on a LLDPE line at 2.5:1 BUR, 80 mil die gap, 8 in die, 250 lb/h, 400 °F melt temperature

2. Temperature at which 0.3 lb/in heat seal strength is achieved. 0.5 s dwell, 30 psi pressure, 11.8 in/min separation rate.

Revision Date: July, 2016

Another quality product from



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LL7410D2

Linear Low Density Polyethylene Resin

Special Characteristics : InnoPlus LL7410D2 resin is a linear low density polyethylene with butene comonomers. This grade offer the excellent machinability on conversion lines. Film extruded from InnoPlus LL7410D2 have high tensile strength, elongation, good toughness and outstanding puncture strength. It is available for tubular blown film processing.

Antiblock: 5,000 ppm / Slip: 1,500 ppm

Typical Applications : InnoPlus LL7410D2 is recommended for producing the general purpose film, liner, food packaging, heavy duty and agricultural film.

Typical Properties :

Properties	InnoPlus LL7410D2	Unit	Test Method
<i>Physical Properties</i>			
Melt Index (190 °C, 2.16 kg)	1.0	g/10 min	ASTM D1238
Density	0.918	g/cm ³	ASTM D792
Melting Point	121	°C	ASTM D2117
Vicat Softening Point	101	°C	ASTM D1525
<i>Film Properties*</i>			
Tensile Strength at Break (MD/TD)	34 / 26	MPa	ASTM D882
Elongation at Break (MD/TD)	550 / 700	%	ASTM D882
Tensile Modulus, 1% Secant (MD/TD)	190 / 220	MPa	ASTM D882
Dart Impact Strength	100	g	ASTM D1709
Tear Strength (MD/TD)	91 / 350	g	ASTM D1922
Haze	17	%	ASTM D1003
Gloss (45°)	50	-	ASTM D2457
<i>* film properties obtained from 25 microns film which was blown film extruded at blow up ratio 2</i>			
<i>Mechanical Properties (Based on compression specimens)</i>			
Tensile Strength at Yield	110	kg/cm ²	ASTM D638
Tensile Strength at Break	280	kg/cm ²	ASTM D638
Elongation at Break	790	%	ASTM D638
Flexural Modulus	3100	kg/cm ²	ASTM D790
Durometer Hardness	52	Shore D	ASTM D2240
Notched Izod Impact Strength	45	kg.cm/cm	ASTM D256

Processing Condition :

The recommended temperature setting is in the range of 160 - 180 °C for extruder and 170 - 190 °C for die zone.

Note : Properties reported here are typical values of the product, not to be considered as specifications.

PTT Chemical makes no representations as to the accuracy or completeness of the information contained herein.



OSTERMAN

Osterlene® LLB100C (-B, -SA)

Osterman & Company - Linear Low Density Polyethylene

Monday, February 17, 2020

General Information

Product Description

- LLB100C is a general-purpose film grade linear low density polyethylene. This resin exhibits excellent toughness and strength when drawn down to thin gauges.
- Suggested applications for LLB100C include blending resin applications, industrial packaging, co-extrusion, industrial liners and garment bags.

General

Material Status	• Commercial: Active		
Availability	• Africa & Middle East	• Europe	
	• Asia Pacific	• Latin America	
Additive	• -B: Antiblock: No; Slip: No	• -SA: High Antiblock; High Slip	
Features	• General Purpose	• High Strength	
	• Good Drawdown	• High Toughness	
Uses	• Bags	• Film	• Liners
	• Blending	• Industrial Applications	• Packaging
Processing Method	• Coextrusion	• Extrusion	

ASTM & ISO Properties ¹

Physical	Nominal Value	Unit	Test Method
Density	0.928	g/cm ³	ASTM D1505
Melt Mass-Flow Rate (MFR) (190°C/2.16 kg)	1.3	g/10 min	ASTM D1238
Density - Base	0.925	g/cm ³	Internal Method
Films	Nominal Value	Unit	Test Method
Tensile Strength - MD (Break)	5250	psi	ASTM D882
Tensile Strength - TD (Break)	3200	psi	ASTM D882
Tensile Elongation - MD (Break)	450	%	ASTM D882
Tensile Elongation - TD (Break)	500	%	ASTM D882
Dart Drop Impact	110	g	ASTM D1709
Elmendorf Tear Strength - MD	250	g	ASTM D1922
Elmendorf Tear Strength - TD	600	g	ASTM D1922
Optical	Nominal Value	Unit	Test Method
Gloss (45°)	25		ASTM D523
Haze	30.0	%	ASTM D1003

Legal Statement

Contact your Osterman Customer Service Representative for potential food contact application compliance (e.g. FDA, EU, HPFB).

Notes

¹ Typical properties: these are not to be construed as specifications.

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SABIC[®] LLDPE 118P

LINEAR LOW DENSITY POLYETHYLENE

DESCRIPTION

SABIC[®] LLDPE 118P is a butene linear low density polyethylene resin typically used for food applications. It contains an antioxidant inspired by nature offering advantages versus conventional stabilizers:

- Produced with no phosphorus or sulphur based additives
- Improved processing stability at a much reduced concentration
- No Specific Migration Limit (SML free)

Films produced from this resin typically have good puncture resistance, high tensile strength, good hot tack properties and low gel levels.

Typical applications for SABIC[®] LLDPE 118P are (frozen) food bags and lamination films.

Film properties. Film of 50 µm and BUR=2 has been produced on Kiefel IBC with 140 kg/h. Die size 200 mm, die gap 2,7 mm.

This product is not intended for and must not be used in any pharmaceutical/medical applications.

TYPICAL PROPERTY VALUES

Revision 20181012

PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
POLYMER PROPERTIES			
Melt Flow Rate			
at 190 °C and 2.16 kg	1.0	dg/min	ISO 1133
Density	918	kg/m ³	ASTM D1505
OPTICAL PROPERTIES			
Gloss (45°)	53	%	ASTM D2457
Haze	13	%	ASTM D1003
FILM PROPERTIES			
Impact strength	23	kJ/m	ASTM D4272
Tear strength TD	140	kN/m	ISO 6383-2
Tear strength MD	40	kN/m	ISO 6383-2
Puncture resistance	630	J/m	SABIC method
Tensile test film			
Yield stress TD	12	MPa	ISO 527-3
Yield stress MD	11	MPa	ISO 527-3
Stress at break TD	33	MPa	ISO 527-3
Stress at break MD	44	MPa	ISO 527-3
Strain at break TD	850	%	ISO 527-3
Strain at break MD	650	%	ISO 527-3
Modulus of elasticity TD	210	MPa	ISO 527-3
Modulus of elasticity MD	190	MPa	ISO 527-3
Coefficient of friction	1.2	-	ASTM D1894
Blocking	10	g	SABIC method
Re-blocking	65	g	SABIC method
THERMAL PROPERTIES			
Vicat Softening Temperature			
at 10N (VST/A)	103	°C	ISO 306
DSC test			

HAO - Linear Low Density Polyethylene

LL1121F6**PRODUCT DESCRIPTION**

LLDPE ethylene-alfa-olefin copolymer resin for general packaging application.

APPLICATIONS

Product used for general packaging, including agriculture film.

TYPICAL PROPERTIES

Properties		Typical Value	Unit	Test Method
Melt Flow Index (190°C/2.16 kg)		1.0 - 1.1	g/10 min	ASTM D1238
Density		0.919 - 0.920	g/cm ³	ASTM D1505
Tensile Strength at Break	MD	49 - 51	Mpa	ASTM D882
	TD	38 - 40		
Elongation at Break	MD	740 - 760	%	ASTM D882
	TD	990 - 1,010		
Haze		14.0	%	ASTM D1003
Dart Drop Impact Strength, F50		165 - 175	g/mil	ASTM D1709

ADDITIVE

Antiblock	3500 ppm
Slip	1200 ppm
Other	NONE

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Linear Low Density Polyethylene

LL1119F**PRODUCT DESCRIPTION**

LLDPE butene resin for general packaging application.

APPLICATIONS

Product used for general packaging, including agriculture film.

TYPICAL PROPERTIES

Properties		Typical Value	Unit	Test Method
Melt Flow Index (190°C/2.16 kg)		1.0 - 1.1	g/10 min	ASTM D1238
Density		0.918 - 0.919	g/cm ³	ASTM D1505
Tensile Strength at Break	MD	35 - 37	Mpa	ASTM D882
	TD	23 - 25		
Elongation at Break	MD	490 - 510	%	ASTM D882
	TD	740 - 760		
Haze		15.0	%	ASTM D1003
Dart Drop Impact Strength, F50		115 - 125	g	ASTM D1709A

ADDITIVE

Antiblock	5500 PPM
Slip	1000 PPM
Other	NONE

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SABIC® LLDPE 118WJ

Linear low density polyethylene for Blown film

Description

SABIC® LLDPE 118WJ is a butene linear low density polyethylene resin for general purpose applications. Films produced from this resin are tough with excellent puncture resistance, high tensile strength and good hottack properties. The resin contains anti block and slip erucamide. SABIC® LLDPE 118WJ is TN-PP free.

Application

Typical applications for SABIC® LLDPE 118WJ are shipping sacks, ice bags, frozen food bags, liners, carrier bags, garbage bags, agriculture films, lamination and coextruded films, shrink film (for blending with LDPE), industrial consumer packaging and high clarity film if blended with (10-20%) LDPE.

Film properties

Film of 50 µm and BUR=2 has been produced on Kiefel IBC with 140 kg/h. Die size 200 mm, die gap 2,7 mm.

The product mentioned herein is in particular not tested and therefore not validated for use in pharmaceutical/ medical applications.

Typical data.

Revision 20121112

Properties	Units SI	Values	Test methods
Polymer properties			
Melt flow rate (MFR) at 190 °C and 2.16 kg	dg/min	1.0	ISO 1133
Density ¹⁾	kg/m ³	918	ISO 1183 (A)
Formulation			
Slip	mg/kg	1500	SABIC method
Anti block	mg/kg	3500	SABIC method
Anti oxidant		+	SABIC method
Optical properties			
Gloss (45°)	%	42	ASTM D 2457
Haze	%	20	ASTM D 1003A
Film properties			
Impact strength	kJ/m	22	ASTM D 4272
Tear strength TD	kN/m	120	ISO 6383-2
Tear strength MD	kN/m	40	ISO 6383-2
Puncture resistance	J/m	380	SABIC method
Tensile test film			ISO 527-3
Yield stress TD	MPa	11	
Yield stress MD	MPa	11	
Stress at break TD	MPa	30	
Stress at break MD	MPa	37	
Strain at break TD	%	800	
Strain at break MD	%	600	
Modulus of elasticity TD	MPa	180	
Modulus of elasticity MD	MPa	160	
Coefficient of friction	-	0.1	ISO 8295
Blocking	g	15	SABIC method
Re-blocking	g	10	SABIC method
Thermal properties			

1) Base resin

Linear Low Density Polyethylene (LLDPE)

Description:

OPELENE OP1810FA3 is a pelletized linear low density polyethylene selected for film extrusion applications that require excellent drawdown and toughness. These resins have excellent puncture resistance, elongation and heat seal strength. Typical applications include heavy duty shipping sacks, trash can liners, commercial and industrial packaging, as well as food and consumer packaging.

General:

Material Status	• Commercial: Active
Availability	• North America
Application	• Agriculture Film; Bags & Pouches Can Liners; Film Wrap; Food Packaging Film; Liner film; Retail-Carry Out Bags Shrink Film
Uses	• Flexible Packaging
Processing Method	• Blown Film

ASTM & ISO Properties			
Physical	Nominal Value	Unit	Test Method
Base Resin Density (23 C)	0.918	g/cm ³	ASTM D1505
Product Density (23 C)	0.923	g/cm ³	ASTM D1505
Melt Mass-Flow Rate (190 C/2.16kg)	1.0	g/10 min	ASTM D1238
Film	Nominal Value	Unit	Test Method
Tensile Strength - MD (Break)	6600	psi	ASTM D882
Tensile Strength - TD (Break)	4700	psi	ASTM D882
Tensile Elongation - MD (Break)	580	%	ASTM D882
Tensile Elongation - TD (Break)	725	%	ASTM D882
Dart Drop Impact Strength, F50	100	g	ASTM D1709
Elmedorf Tear Strength - MD	125	g	ASTM D1922
Elmedorf Tear Strength - TD	330	g	ASTM D1922
Thermal	Nominal Value	Unit	Test Method
Vicat Softening Point	225	Fahrenheit	ASTM D1525
Additive			
Slip	None	PPM	
Antiblock	7000	PPM	

Disclaimer:

Typical properties: these are not to be construed as specifications. Information in this document is accurate to the best of our knowledge at the date of publication. The document is designed to provide users general information for safe handling, use, processing, storage, transportation, disposal and release and does not constitute any warranty or quality specification, either express or implied, including any warranty of merchantability or fitness for any particular purpose. Users shall determine whether the product is suitable for their use and can be used safely and legally.

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PRODUCT DATA SHEET



SASOL

hLLDPE hLLDPE hLLDPE hLLDPE hLLDPE hLLDPE hLLDPE hLLDPE hLLDPE

Linear Low Density Polyethylene

HF1810X

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Houston, TX 77079

Email:
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Date of issue: February 21, 2019

www.sasol.com

Melt Index: 1.0 g/10min

Density: 0.918 g/cm³

Features

- LLDPE Hexene copolymer
- Outstanding mechanical properties and processability
- Good heat sealing range

Applications

- General purpose packaging
- Heavy duty bags and high speed thin films
- Blown stretch film
- Blending into LDPE

Additives

- Antioxidant
- TNPP Free

Typical properties (not to be construed as specifications)		Value (English)	Value (SI)	Method
Resin Properties	Melt Index (190°C/2.16kg)	1.0 g/10min	1.0 g/10min	ASTM D1238
	Density	0.918 g/cm ³	0.918 g/cm ³	ASTM D792
	Base Density ⁽¹⁾	0.918 g/cm ³	0.918 g/cm ³	Sasol Method
Film Properties	Tensile strength at yield MD	2330 psi	16.0 MPa	ASTM D882
	Tensile strength at yield TD	2240 psi	15.4MPa	ASTM D882
	Tensile strength at break MD	8800 psi	60.7 MPa	ASTM D882
	Tensile strength at break TD	6990 psi	48.2 MPa	ASTM D882
	Tensile Elongation at break MD	580 %	580 %	ASTM D882
	Tensile Elongation at break TD	800 %	800 %	ASTM D882
	1% Secant Modulus MD	38000 psi	262 MPa	ASTM D882
	1% Secant Modulus TD	37000 psi	255 MPa	ASTM D882
	Elmendorf Tear Strength MD	380 g/mil	380 g/25.4 µm	ASTM D1922
	Elmendorf Tear Strength TD	850 g/mil	850 g/25.4 µm	ASTM D1922
	Dart Drop Impact Strength (F ₅₀)	120 g/mil	120 g/25.4 µm	ASTM D1709A
	Haze	12%	12%	ASTM D1003
	Gloss (45°)	50%	50%	ASTM D2457

(1) Base density is calculated assuming that the product doesn't contain any antiblock additive.

The above values were measured on a 0.8 mil (20 µm) film produced on a 2.5 in (63.5 mm) blown film extruder, using 448°F (231°C) melt temperature, with a 2.5:1 BUR, a die diameter of 6 in and a die gap of 70 mil (1.8 mm).

Extrusion

Applications

- Heavy duty films
- Liners
- Food packaging
- Commercial packaging

Characteristics

- Hexene Comonomer
- Excellent toughness, strength and drawdown
- Good heat seal
- Low gel count

Status: This material complies with FDA regulations in 21 CFR, section 177.1520.

Property	Value	Unit	Method
Melt Index, MI ₂	1.0	g/10min	D 1238
Density	0.918	g/cm ³	D 792
Tear Strength MD/TD	410/650	g	D 1922
Notch Drop Impact F ₅₀	230	g	D 1709A
Low Friction Puncture	11	in-lb/mil	
Tensile Strength MD/TD	6400/5500	psi	D 882
Elongation MD/TD	1500/1600	psi	D 882
Modulus, 1% Secant MD/TD	540/820	%	D 882
Impact Modulus, 1% Secant MD/TD	24700/29000	psi	D 882
Shrinkage	12	%	D 1003
Heat Seal (45°)	50		D 2457

Resin Grades	Slip/Antiblock	Process Aid
LLDPE H1920.B	Barefoot	None
LLDPE H1920.A	None / High	None
LLDPE H1920.SA1	Medium / Medium	None
LLDPE H1920.SA2	High / High	None

Additives Legend

PPM Range	Medium PPM	High
Slip	1000-1350	1500-
Antiblock	3500-5500	6000-

Test specimens with a 1.0mil thickness was used for testing.

Information, to our knowledge, is believed to be correct. The use of this product in its actual conditions are beyond our control and the responsibility for this product is the customer's sole responsibility. User must make their own decisions regarding its suitability for their equipment and final

Technical Data Sheet

Petrothene GA501021



Linear Low Density Polyethylene

Product Description

The *Petrothene* GA501 series of resins is pelletized linear low density polyethylene selected by customers for film extrusion applications that require excellent drawdown and toughness. These resins have excellent puncture resistance, elongation and heat seal strength. Typical applications include heavy duty shipping sacks, trash can liners, commercial and industrial packaging, as well as food and consumer packaging. GA501 is available without additives or fully formulated with slip and antiblock additives.

Regulatory Status

For regulatory compliance information, see *Petrothene* GA501021 [Product Stewardship Bulletin \(PSB\)](#) and [Safety Data Sheet \(SDS\)](#).

Status	Commercial: Active
Availability	North America
Application	Agriculture Film; Bags & Pouches; Can Liners; Film Wrap; Food Packaging Film; Heavy Duty Packaging; Lamination Film; Liner Film; Retail Carryout Bags; Shrink Film
Market	Flexible Packaging
Processing Method	Blown Film

Typical Properties	Nominal Value	English Units	Nominal Value	SI Units	Test Method
Physical					
Melt Flow Rate, (190 °C/2.16 kg)	1.0	g/10 min	1.0	g/10 min	ASTM D1238
Base Resin Density, (23 °C)	0.918	g/cm ³	0.918	g/cm ³	ASTM D1505
Product Density, (23 °C)	0.923	g/cm ³	0.923	g/cm ³	ASTM D1505
Film					
Dart Drop Impact Strength, F50	100	g	100	g	ASTM D1709
Tensile Strength at Break					
MD	6600	psi	45.5	MPa	ASTM D882
TD	4700	psi	32.4	MPa	ASTM D882
Tensile Elongation at Break					
MD	580	%	580	%	ASTM D882
TD	725	%	725	%	ASTM D882
1% Secant Modulus					
MD	27000	psi	186	MPa	ASTM D882 [®]
TD	28000	psi	193	MPa	ASTM D882
Elmendorf Tear Strength					
MD	125	g	125	g	ASTM D1922
TD	330	g	330	g	ASTM D1922
Thermal					
Vicat Softening Point	225	°F	107	°C	ASTM D1525
Additive					

Technical Data Sheet

Lotrène® Q2018 Series

Linear Low Density Polyethylene (LLDPE)

Description and Use:

Lotrène® Q2018 Series are Linear Low Density Polyethylene resins produced in a gas phase reactor using butene (C4) co-monomer.

They are designed for blown film applications and can be used in pure form as well as blended with other PE resins, such as LDPE or HDPE and mPE resins for mono extrusion or co-extrusion process to modify film properties.

Lotrène® Q2018 Series are suited for many applications in the field of consumer, industrial, food or hygiene packaging such as freezer film, bread bags, shoppers and bags as well as lamination film and multilayer packaging film.

Additive Package:

Product	Slip (Erucamide) (ppm)	Antiblock (ppm)	Thermal Stabilizers
Q2018N	no	no	Yes
Q2018H	1500	3200	Yes

Values indicated are target values. Actual values might differ from batch to batch.

PROPERTIES:

POLYMER PROPERTIES	VALUE	UNIT	TEST METHOD
Density @ 23 °C *	0.918	g/cm3	ASTM D-792
Melt Flow Index (190 °C /2.16 kg)	2.0	g/10 min.	ASTM D-1238
Crystalline Melting Point	121	°C	Internal
Vicat Softening Point	100	°C	ASTM D-1525 (A120)

Density and MFI are routinely measured during the standard quality control procedure. Other figures are given for information only. This data is not intended for specification purposes.

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Linear Low Density Polyethylene (LLDPE)

Description:

OP1820FS6 is a general-purpose film grade linear low density made using gas-phase technology. OP1820FS6 exhibits excellent toughness and strength when drawn down to thin gauges in blown and cast film applications.

OP1820FS6 meets the requirements of the Food and Drug Administration, 21 CFR Section 177.1520, covering safe use of polyolefin articles intended for direct food contact.

Typical uses:

- Blending resin; Industrial packaging; Industrial liners; Garment bags; Co-Extrusion

Properties			
Physical	Nominal Value	Unit	Test Method
Density (23°C)	0.919	g/cm ³	ASTM D1505
Melt Index (190°C/2.16 kg)	2.0	g/10 min	ASTM D1238
Film	Nominal Value	Unit	Test Method
Tensile Strength - MD (Break)	3900	psi	ASTM D882
Tensile Strength - TD (Break)	2700	psi	ASTM D882
Tensile Elongation - MD (Break)	600	%	ASTM D882
Tensile Elongation - TD (Break)	800	%	ASTM D882
Dart	65	g	ASTM D1709
Elmedorf Tear Strength - MD	110	g	ASTM D1922
Elmedorf Tear Strength - TD	570	g	ASTM D1922
Optical	Nominal Value	Unit	Test Method
Gloss, 45°	40		ASTM D523
Haze	35	%	ASTM D1894
Additive – Talc Based			
Anti-block	7000	PPM	
Slip	1350	PPM	

Disclaimer:

Typical properties: these are not to be construed as specifications.

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SIBUR

Technical Data Sheet PE LL20211 FE Linear Low-Density Polyethylene

PRODUCT DESCRIPTION

LL20211 FE is a butene linear low-density polyethylene containing antiblock and slip additives. The product is designed for the blown extrusion process, offering balanced combination of physical and mechanical properties with high slip and easy opening properties.

TYPICAL APPLICATIONS

LL20211 FE is recommended for the production of mono- and multilayer blown films for general purpose bags, food packaging, lamination and coextruded films, carrier and garbage bags, industrial liners. It is suitable for blending with LDPE in blown film.

Properties	Conditions	Method	Typical values*	Units
Resin properties				
Melt Flow Rate	190 °C/2.16 kg	ISO 1133-1	2	g/10 min
Density		ISO 1183	0.921	g/cm ³
Properties measured on 38 µm film**				
Tensile Strength at Break	MD/TD	ISO 527-1	36/30	MPa
Tensile Stress at Yield	MD/TD	ISO 527-1	11/12	MPa
Elongation at Break	MD/TD	ISO 527-1	900/1100	%
Tear Strength	MD/TD	ASTM D1922	150/380	g/25 µm
Dart Drop Impact Strength		ASTM 1709	120	g
Thermal				
Vicat Softening Temperature	10 N	ISO 306	98	°C

*The values given are typical values measured on the product. These values should not be considered as specification.

**Properties were measured on film extruded at a blow up ratio 2:1 with a melt temperature of 225 °C.

REACH Statement

Polymers are exempt of REACH registration. However, their raw materials which mean monomers and relevant additives have been registered.

PJSC «Sibur Holding» (and its subsidiaries) is committed to fully respect REACH legislation and to use only REACH compliant raw materials.

Safety

See MSDS

January 2019

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PRODUCT DATA SHEET



hLLDPE	hLLDPE	hLLDPE	hLLDPE	hLLDPE	hLLDPE	hLLDPE	hLLDPE	hLLDPE
<h2>Linear Low Density Polyethylene</h2> <h1>HF1820X</h1>				Technical support: Sasol Chemicals North America LLC 12120 Wickchester Lane Houston, TX 77079 Email: PolymersTechnical@us.sasol.com			Sales office: Sasol Chemicals North America LLC 12120 Wickchester Lane Houston, TX 77079 Telephone: (281) 588 3000 Email: PolymersSales@us.sasol.com	

Date of issue: February 21, 2019

www.sasol.com

Melt Index: 2.0 g/10min

Density: 0.918 g/cm³

Features

- LLDPE Hexene copolymer
- Outstanding mechanical properties and unitization holding force

Applications

- Cast stretch film for pallet unitization.
- High-end film packaging.

Additives

- Antioxidant
- TNPP Free

Typical properties (not to be construed as specifications)		Value (English)	Value (SI)	Method
Resin Properties	Melt Index (190°C/2.16kg)	2.0 g/10min	2.0 g/10min	ASTM D1238
	Density	0.918 g/cm ³	0.918 g/cm ³	ASTM D792
	Base Density ⁽¹⁾	0.918 g/cm ³	0.918 g/cm ³	Sasol Method
Film Properties	Tensile strength at yield MD	1540 psi	10.6 MPa	ASTM D882
	Tensile strength at yield TD	1640 psi	11.3 MPa	ASTM D882
	Tensile strength at break MD	8070 psi	55.7 MPa	ASTM D882
	Tensile strength at break TD	6850 psi	47.2 MPa	ASTM D882
	Tensile Elongation at break MD	480 %	480 %	ASTM D882
	Tensile Elongation at break TD	890 %	890 %	ASTM D882
	1% Secant Modulus MD	22500 psi	156 MPa	ASTM D882
	1% Secant Modulus TD	24300 psi	163 MPa	ASTM D882
	Elmendorf Tear Strength MD	280 g/mil	280 g/25.4 μm	ASTM D1922
	Elmendorf Tear Strength TD	813 g/mil	813 g/25.4 μm	ASTM D1922
	Dart Drop Impact Strength (F ₅₀)	165 g/mil	165 g/25.4 μm	ASTM D1709A
	Haze	2.5%	2.5%	ASTM D1003
	Gloss (45°)	95%	95%	ASTM D2457

(1) Base density is calculated assuming that the product doesn't contain any antiblock additive.

The above values were measured on a 0.8 mil (20 μm) film produced on a cast film line at 400 lb/hr, using 525°F (274°C) melt temperature, with a die width of 36 in (914 mm), a die gap of 25 mil (0.65 mm) and an air gap of 3 in (76 mm).



Formosa Plastics®

Formolene® LLDPE

Formolene® L42022E2

Linear Low Density Polyethylene (LLDPE) Resin Butene Copolymer for Film Extrusion Applications

Formolene® L42022E2 is a general-purpose film grade linear low density made using gas-phase technology. Formolene® L42022E2 exhibits excellent toughness and strength when drawn down to thin gauges in blown and cast film applications.

Formolene® L42022E2 meets all requirements of the U.S. Food and Drug Administration as specified in 21 CFR 177.1520, covering safe use of polyolefin articles intended for direct food contact.

Suggested Applications:

Blending Resin	Industrial Liners
Industrial Packaging	Garment Bags
Co-Extrusion	

Nominal Physical Properties:

PROPERTY**	ASTM TEST METHOD	UNIT	VALUE
Density	D1505	g/cc	0.919
Melt Index, Condition E, 190°C/2.16 kg	D1238	g/10 min.	2.0
Dart Impact	D1709	g/mil.	65
Tear Strength	D1922	g/mil.	110/570*
Tensile Strength at Break	D882	psi.	3,900/2,700*
Elongation	D882	%	600/800*
Gloss, 45°	D523		40
Haze	D1003	%	35

* MD / TD

Available in the following additive packages:

Additive	L42022B	L42022E2
Antiblock (ppm)	None	7000
Slip (ppm)	None	1350
Special	-	Additives talc based

Note: Film Properties based on 25 Micron blown film produced with a 2.5:1 Blow Up Ratio. Actual film properties may vary depending on operating conditions and additive packages. Film properties are not intended to be used as specifications.

Published 08/01/04, Revised 01/11/16

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EFDC-7050

LLDPE Film Extrusion Resin

DESCRIPTION

EFDC-7050 is a linear low-density polyethylene (LLDPE) resin for tubular blown film extrusion. Films extruded from EFDC-7050 have good toughness and high tensile strength and puncture resistance. The product offers excellent draw down capability for making thinner gauge films. EFDC contains high levels of slip and antiblocking agent. It offers excellent sealing and machining characteristics for high-speed film converting operations.

APPLICATIONS

EFDC-7050 is recommended for the manufacture of thin gauge liner films, garment bags and films for other industrial, food packaging and other general-purpose applications requiring toughness and puncture resistance.

TYPICAL PROPERTIES

Properties		Units	Test Method	Typical Value
Resin Properties				
Melt Index, I _{2,16}		g/10 min	ASTM D 1238	2.0
Density		g/cm ³	ASTM D 1505	0.918
Melting Point		°C	EQUATE	124
Bulk Density		Kg/m ³	ASTM D 1895	530
Blown Film Properties*				
Gauge		Microns		25
Tensile Strength	MD	MPa	ASTM D 882	31
	TD			23
1% Secant Modulus	MD	MPa	ASTM D 882	195
	TD			220
Elmendorf Tear	MD	N/mm	ASTM D 1922	31
	TD			124
Dart Impact, F ₅₀		g	ASTM D 1709A	85
Puncture Energy		J/mm	EQUATE	60
Haze		%	ASTM D 1003	14
Gloss, 45°		-	ASTM D 2457	50

* Film properties are typical of blown film extruded at 2:1 blow-up ratio.

Actual properties may vary depending upon operating conditions and additive package.

ASTM – American Society for Testing and Materials

TYPICAL EXTRUSION CONDITIONS

Barrel Zone 1, °C	180
Barrel Zone 2, °C	210
Barrel Zone 3, °C	200
Barrel Zone 4, °C	190
Adapter, °C	205
Head and Die, °C	205
Melt Temperature, °C	210
Die gap, mm	> 1.8

FOOD CONTACT USAGE

EFDC-7050 can be used for all food contact applications including those designed to hold food during cooking. It conforms to US FDA Regulation 21 CFR 177.1520 as well as EC Directive 90/128/EEC and its amendments to-date. Food contact suitability certificate is available upon request.

AVAILABILITY

EFDC-7050 is supplied in 25-Kg bags in secured pallets of 55 bags (1.375 MT net). It is also supplied in sea bulk containers of up to 15 MT capacity.



STORAGE AND HANDLING

EFDC-7050 is supplied in pellet form and is readily conveyed on conventional polyethylene bulk handling equipment. The bulk handling system should be designed to prevent accumulation of fines and dust particles that can pose an explosion hazard. Ensure all equipment is properly grounded. The product should be stored in a cool dry shaded area away from dust, sunlight and heat. For more details on storage and handling see our Polyethylene Storage and Handling Guide. Also carefully review the Material Safety Data Sheet supplied with this product for health, safety and waste considerations.

IMPORTANT NOTICE

The information supplied in this bulletin to the best of our knowledge is accurate and factual as of the date printed. It is offered solely as a convenience to EQUATE's customers and is intended only as a guide for EFDC-7050. Since the user's specific applications and conditions of use are beyond EQUATE's control, EQUATE makes no warranty or representation regarding results that may be obtained by the user. It shall be the responsibility of the user to determine the suitability of the product for the user's specific application. The information disclosed in this document is not to be construed as a recommendation to use the product in infringement of any patent rights covering the usage.

Linear Low Density Polyethylene

Rotational Molding

Product Description:

042R35A is a medium density polyethylene manufactured using Nova Chemical's Scclairtech Solution Polymerization Technology. 042R35A is a natural colored polymer with very good Processability and good mechanical properties.

Recommended Applications:

LLDPE 042R35A is designed to make:

- Overhead water tanks & Loft tanks
- Septic & Chemical storage tanks
- Toys and Furniture

Typical Properties:

Tested Properties	Test Method	UOM	Values*
Resin Properties			
Melt Flow Index (190°C & 2.16 Kg)	ASTM D 1238	gm/10 min	4.8
Density @ 23°C	ASTM D 1505	gm/cm ³	0.935
Mechanical Properties			
Tensile Yield Strength	ASTM D 638	MPa	15
Ultimate Tensile Strength	ASTM D 638	MPa	20
Elongation at Break	ASTM D 638	%	>600
Flexural Yield Strength	ASTM D 790	MPa	13
Flexural Modulus	ASTM D 790	MPa	450
Notched Izod Impact Strength @ 23°C	ASTM D 256	J/m	>500
Hardness	ASTM D 2240	Shore D	55
Thermal Properties			
Vicat Softening Point (10 N)	ASTM D 1525	°C	117

* Typical values not to be construed as specification limits. Values may change without any prior notice.

* Mechanical properties tested on injection molded specimen.

Recommended Processing Temperature: 170 – 215 °C

Packaging Information:

This material is packed and available in raffia bags with net content of 25.0 Kg only. The raffia bags used conforms to the minimum strength requirements of BIS, however, customer shall take due care while handling the bag. Prolonged exposure of these bags to sunlight may deteriorate the bag's performance and cause spillage and wastage. IOCL does not warranty loss of material due to poor material handling practices.

Regulatory Information:

LLDPE 042R35A shall meet "Specification for Polyethylene for safe use in contact with Foodstuff, Pharmaceuticals and Drinking water" as per IS: 10146-1982. It also confirms to the positive list of constituents as per IS: 10141-1982. The grade and Additives incorporated shall meet with FDA: CFR Title 21, 177.1520, Olefin Polymers.

Storage & Handling:

Prevent LLDPE Material from direct exposure to sunlight & heat to avoid quality deterioration. The storage location should be dry, dust free and the Storage temperature should not exceed 50 °C. Non - compliance to these precautionary measures can lead to degradation of the product causing Color changes, Odor & inadequate product performance. It is advised to process LLDPE material within 06 months after delivery.

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