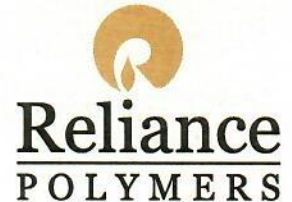


BLOWN – FILM DIVISION.

**TECHNICAL DATA SHEETS OF PURE VIRGIN
MATERIAL USED FOR FILM.**



24FS040

LOW DENSITY POLYETHYLENE FOR GENERAL PURPOSE FILM APPLICATIONS

24FS040 is a film grade Low Density Polyethylene (LDPE) produced by high pressure tubular process. It can be extruded with considerable ease on any conventional LDPE extruder. The polymer has been blended with necessary additives during manufacture to obtain good surface slip and easy openability between two layers of the film.

Typical Characteristics*			
Property	Test Method	Unit	Typical Value**
Melt Flow Index (190°C/2.16 kg)	ASTM D1238	gm/10 min	4.0
Density (23°C)	ASTM D1505	gm/cm ³	0.922
Tensile Strength at Break (MD/TD)	ASTM D882	MPa	18/16
Elongation at Break (MD/TD)	ASTM D882	%	250/400
Dart Impact Strength (F-50)	ASTM D1709/A	g/μm	2.0

*Typical Characteristics and not to be taken as specifications

** Typical Values (Mechanical) with 40 μ film made with 1 mm die gap & 2.0 BUR

Applications

High slip grade for shopping bags, general purpose packaging.

Regulatory Information

- Meets the requirements stipulated in standard IS : 10146 on "Specification for Polyethylene for safe use in contact with foodstuffs, pharmaceuticals, and drinking water". It also conforms to the positive list of constituents as prescribed in IS : 10141. The grade and the additives incorporated in it also comply with the FDA:CFR Title 21, 177.1520, Olefin polymers.

Storage Recommendations

- Bags should be stored in dry / closed conditions at temperatures below 50°C and protected from UV / direct sunlight.



1020FA20

LOW DENSITY POLYETHYLENE FILM GRADE

1020FA20 is a film grade and can be processed easily on conventional blown film lines. The grade is manufactured without any slip additive to facilitate adhesion during lamination.

TYPICAL CHARACTERISTICS*

PROPERTY	TEST METHOD	UNIT	TYPICAL VALUE**
Density (23OC)	ASTM D 792	g/cc	0.920
Melt Flow Index (1900 C / 2.16 Kg)	ASTM D 1238	g/10 min.	2.0
Tensile Strength at Break (MD / TD)	ASTM D 882	MPa	20.0 / 19.0
Elongation at Break (MD / TD)	ASTM D 882	%	275 / 425
Dart Impact Strength (F50)	ASTM D 1709/A	g / μ m	3.0

* Typical characteristics and not to be taken as specifications

** Typical value (Mechanical) with 40 μ film made with 0.7 mm die gap & 2.5 BUR

APPLICATIONS:

Adhesive lamination film / Foam film

Regulatory Information

- Meets the requirement stipulated in standard IS: 10146 on "Specification for Polyethylene for safe use in contact with foodstuff, pharmaceutical, and drinking water". It also conforms to the positive list of constituents as prescribed in IS: 10141. The grade and the additives incorporated in it also comply with the FDA:CFR Title 21,177,1520, Olefin polymers

Storage Recommendations

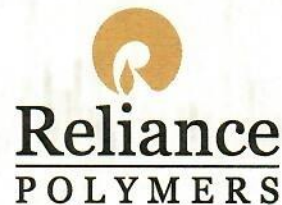
- Bags should be stored in dry/closed conditions at temperatures below 50°C and protected from UV / direct sunlight.

Reliance Industries Limited, Product Application & Research Center (PARC)

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April 2017



F46003 HIGH DENSITY POLYETHYLENE

BLOW MOULDING & BLOWN FILM GRADE

F46003 is a High Density Polyethylene grade suitable for general purpose blown film & extrusion blow moulding applications. Articles blown from this grade exhibit moderate to good stiffness. The resin offers good melt strength, ESCR and impact resistance.

Typical Characteristics*			
Property	Test Method	Unit	Typical Value **
Density (23°C)	ASTM D1505	g/cc	0.946
Melt Flow Index (190°C/2.16 kg)	ASTM D1238	g/10 min	0.30
Tensile Strength at Yield (MD/TD)	ASTM D882	MPa	29/26
Ultimate Tensile Strength (MD/TD)	ASTM D882	MPa	45/40
Elongation at break (MD/TD)	ASTM D882	%	780/950
Dart Impact Strength, F50 (38 mm Dart, 66 cm height)	ASTM D1709	g/μm	2
Tear Strength (MD/TD)	ASTM D1922	g/μm	0.4/4.5

*Typical Characteristics and not to be taken as specifications

**Typical values (Mechanical) with 40 μ film made with 0.75 mm die gap & 2.75 BUR

Applications

Used for producing blown film and is recommended for use in carry bags and co-extruded film structures. General purpose blow moulded containers

Regulatory Information

- Meets the requirements stipulated in standard IS : 10146 on "Specification for Polyethylene for safe use in contact with foodstuffs, pharmaceuticals, and drinking water". It also conforms to the positive list of constituents as prescribed in IS : 10141. The grade and the additives incorporated in it also comply with the FDA:CFR Title 21, 177.1520, Olefin polymers.

Storage Recommendations

- Bags should be stored in dry/closed conditions at temperatures below 50°C and protected from UV/direct sunlight.

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Updated as of May, 2007

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 ^o C & 2.16 Kg)	ASTM D 1238	gm/10 min	0.90
Density @ 23 ^o 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 ^o)	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 warrant 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 confirms 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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**F19010****F18010****LINEAR LOW DENSITY POLYETHYLENE
BLOWN FILM GRADE**

These are Butene comonomer based Linear Low Density Polyethylene (LLDPE), with optimum levels of antioxidants. The grades are designed for blown film applications. They have excellent draw down characteristics with very good impact strength and tear resistance.

F19010: With Slip & Antiblock

F18010: Without Slip & Antiblock

TYPICAL CHARACTERISTICS*

PROPERTY	TEST METHOD	UNIT	TYPICAL VALUE
Density (23°C)	ASTM D 1505	g/cc	0.918
Melt Flow Index (190°C / 2.16 Kg)	ASTM D 1238	g/10 min.	1.0
Film Properties**			
Tensile Strength at Yield (MD / TD)	ASTM D 882	MPa	12.5 / 12.0
Ultimate Tensile Strength (MD / TD)	ASTM D 882	MPa	38.0 / 30.0
Elongation at Break (MD / TD)	ASTM D 882	%	700 / 800
Dart Impact Strength, F50 (38 mm dart, 66 cm height)	ASTM D 1709	g/ mic.	3.5
Haze	ASTM D 1003	%	14
Tear Strength (MD / TD)	ASTM D 1922	g/μm	3.3 / 10.3

* Typical characteristics and not to be taken as specifications

** Typical properties measured on 40 μm film made with 1.8 mm die gap & 2.50 BUR on F18010.

APPLICATIONS:

Mono & Multilayer Blown films for liner bags, lamination films, films for liquid packaging and consumer packaging. Non Slip & Anti block grades for Stretch Cling films, Lamination & Protection films

Regulatory Information

Meets the requirement stipulated in standard IS: 10146 on "Specification for Polyethylene for safe use in contact with foodstuff, pharmaceutical, and drinking water". It also conforms to the positive list of constituents as prescribed in IS: 10141. The grade and the additives incorporated in it also comply with the FDA:CFR Title 21,177,1520, Olefin polymers

Storage Recommendations

- Bags should be stored in dry/closed conditions at temperatures below 50°C and protected from UV / direct sunlight.

Reliance Industries Limited, Product Application & Research Center (PARC)

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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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TECHNICAL DATA SHEET

Polmann PPA MB -03 4FD

Highlights

PPA-MB-034FD a blended fluoropolymer processing additive masterbatch designed for improved performance in polyolefin resins. It promotes flow of the material by slipping the polymer within the extruder on the screw. The additive contains 3% fluoropolymer powder and 97% granular polyolefin.

Properties

Pellet Shape / Size:	Pellets Cylindrical
Color Appearance:	Pale white to light amber
Base Resin:	LLDPE
Pellet Count:	200 ± 50 number / 5 gm
Moisture Content %:	Less than 0.05
Fluoropolymer Content %:	3 ± 0.5
Food Contact:	Complies with EU and Bureau of Indian Standards 9833 according to our suppliers.
Dispersion:	Excellent.
Application Usage:	The masterbatch is to be used in application such as extrusion of films, tapes, pipes and molding.

Advantages

- PPA-MB-03 4FD has significantly more effectiveness than conventional fluoroelastomers in polyolefin formulations. It has been specially designed for reduced interactions with other polyolefin additives. PPA-MB-03 4FD will give improved processing at lower fluoropolymer concentration levels than conventional fluoroelastomer.
- Processing improvements in all types of polyolefins.
- Ease of feeding when high blend ratios are required.
- Ease of handling.
- Easily dispersed due to fine particle starting point.
- Uniformity of low ratio blends is improved over pellet blends.
- Additionally in Woven sack (Raffia) it reduces water carrying & tape breakage.

Disclaimer:

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CAUTION: Do not use in medical applications.

POLYBRIGHT

PolyBright are optical brighteners specially designed for plastic applications. These OB masterbatches enhance the brightness of plastics by means of absorption of UV wavelengths and re-emitting them in the visible range.

Key Characteristics

- ✓ Improve film and fiber brightness.
- ✓ Improve product gloss and shine.
- ✓ Improve Color of reprocessed material
- ✓ Reduce Yellowness of Reprocessed material / regrinds



Bright as marble

Product Code	Active Content	Base Polymer	Dosage	Applications
OB 01	1%	PE	0.20 - 1.0%	Film, Pipes, Foam, BM containers
OB 04	0.8%	PE	0.20 - 1.0%	Film, Pipes, Foam, BM containers
D47 / 10 / 052	1%	PS	0.20 - 1.0%	Pipes, Sheets,
D72 / 10 / 055	5%	PET	0.20 - 1.0%	Film

Applications

- Reprocessed PP resin
- Reprocessed PE resin
- Improvement in film brightness and shine
- Fibers



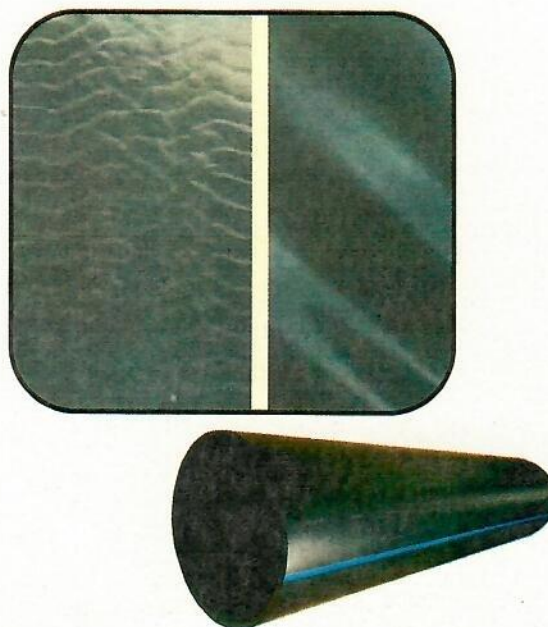
White as surf

POLYPPA

These masterbatches are high performance fluoroelastomers used in processing of polyolefinic polymers. They function by continuously coating the die with a lubricating fluoro polymer which aids in processing polymers which are highly susceptible to melt fracture due to high stresses they undergo at the die exit. They are used in all extrusion processes like LLDPE blown film, HDPE Pipes, PP sheets and foams and HDPE Blow molding. They are highly desirable during processing hexane, octene and metallocene - LLDPE which have greater tendency to melt fracture

Key Characteristics

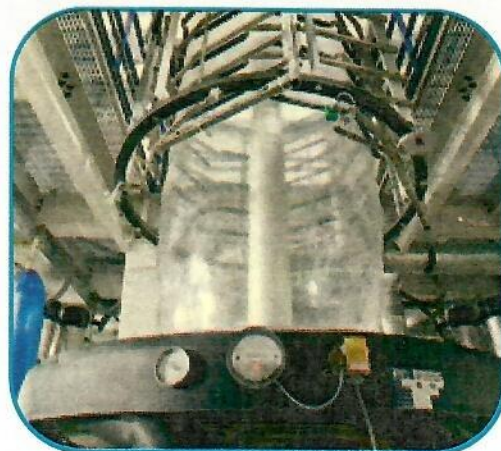
- ✓ 3rd generation PPA
- ✓ Eliminate melt fracture / Shark skin
- ✓ Improve polymer flow in extrusion
- ✓ Increase Productivity
- ✓ Reduce back pressure
- ✓ Reduce die lines / die buildup
- ✓ Reduce gel formation during processing
- ✓ Improve surface finish and gloss



Product Code	Active Content	Base Polymer	Dosage	Applications
PPA 01	3%	PE	0.75% - 1.0%	Film, Pipes, Foam
PPA 02	2%	PE	0.8 - 1.2%	Film, Pipes, Foam, BM containers
PPA 03(PP)	3%	PP	0.75 - 1.0%	Pipes, Sheets
PPA 04	5%	PE	0.3 - 0.75%	Film

Applications

- LLDPE / m-PE Blown Films
- HDPE Pipes
- HDPE Blow Molding
- PP Sheets / Foam / Corrugated Boards



POLYSLIP Additive Masterbatches

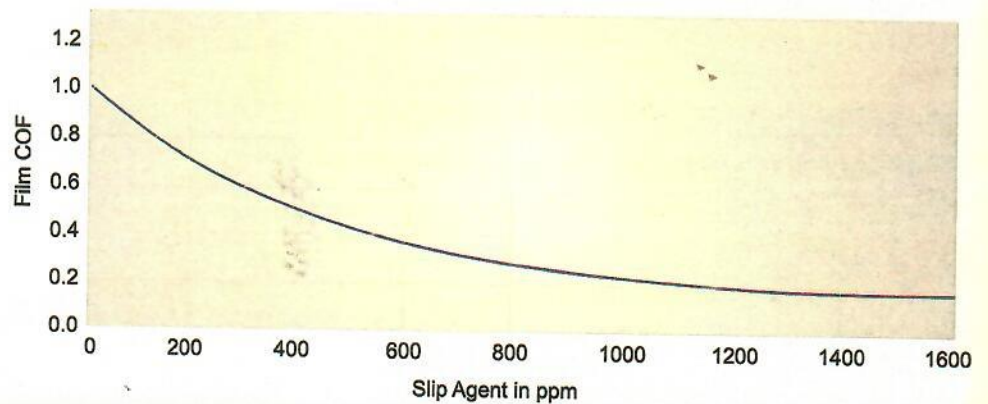
Polyslip additive masterbatches are used to enhance the smoothness of films by reducing the tackiness of resins and bring about a reduction in film coefficient of friction. It functions by migrating to the surface and forming a lubrication layer on it. Slip additives are normally based on fatty acid amides.

Key Characteristics

- ✓ Internal Slip Agent - pseudo viscosity reducers
- ✓ Overcome film tackiness
- ✓ Designed reduction of C.O.F from 1.0 to 0.15
- ✓ Improve Film machinability in FFS Lines
- ✓ Reduce Film-To-Film Adhesion
- ✓ Reduce Film-To-Metal Adhesion
- ✓ Improve Extruder throughput



Slippery as Ice



Product Code	Active Ingredient	Active Content
Slip MB 01	Erucamide	10 %
Slip MB 02 with AB	Erucamide	15 %
Slip MB 05	Erucamide	5 %



Applications

- Blown Film
- Cast Film
- Extruded Sheet
- Extruded Foam