



Advanced film applications with Borstar® Enhanced Polyethylene

## About Us

Borouge is a leading provider of innovative, value creating plastics solutions. A joint venture between the Abu Dhabi National Oil Company (ADNOC), one of the world's major oil and gas companies, and Austria based Borealis, a leading provider of chemical and innovative plastics solutions, Borouge is a groundbreaking international partnership at the forefront of the next generation of plastics innovation.

Borouge has its headquarters in the United Arab Emirates and Singapore, employs approximately 1,600 people representing more than 40 nationalities and serves customers in more than 50 countries across the Middle East, Asia-Pacific, Indian sub-continent and Africa.

Building on Borealis' unique Borstar® technology and experience in polyolefins for more than 50 years, Borouge provides innovative, value creating plastics solutions for the infrastructure (pipe systems, and power and communication cables), automotive and advanced packaging markets.

In 2010, Borouge tripled its annual production capacity in Abu Dhabi to 2 million tonnes and an additional 2.5 million tonnes per year is scheduled for completion by the end of 2013 to create the world's largest integrated polyolefins plant. Borouge is also investing in plants and logistics hubs in Asia and an Innovation Centre in Abu Dhabi. Today Borouge and Borealis manufacture over 5.4 million tonnes of polyethylene and polypropylene annually. Focused on Value Creation through Innovation they ensure that their customers throughout the value chain, around the world, can always rely on superior products and security of supply.

Borouge is committed to the principles of Responsible Care® and together with Borealis proactively contributes towards addressing the world's water and sanitation challenges through their Water for the World™ initiative.

Visit [www.borouge.com](http://www.borouge.com) and see how we are Shaping the Future with Plastics.



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## Introduction

Packaging converters are always looking for innovations that will help provide new types of packaging options, improve the appearance of the goods and enhance the shelf life of food.

Typical needs in modern packaging include:

- Balance between toughness and stiffness
- Mechanical resistance
- Low temperature resistance
- High temperature resistance for hot filling of food or industrial goods
- Grease resistance
- Sealing behaviour
- Low blocking force
- Optical properties
- Film appearance
- Moisture barrier
- Oxygen and gas barrier
- Light barrier
- Low migration levels
- Good printability
- Environmentally friendly

## Borstar® Enhanced Polyethylene's main benefits

Borstar Enhanced PE grades are well suited for extrusion on LD/LLD lines including coextrusion and blends, as well as coextrusion with HDPE and Polypropylene.

Basic Properties	FB2230	FB2310	FB1350	FB1460	FB1520
MFR <sub>2</sub> (190°C) [g/10 min]	0.25	0.2	0.15	<1.0	<1.0
MFR <sub>5</sub> [g/10 min]	1.0	0.9	0.7	0.2	0.25
MFR <sub>21</sub> [g/10 min]	22	20	15	6	7
Density [g/cm <sup>3</sup> ]	0.923	0.931	0.935	0.946	0.952
Vicat softening [°C]	101	108	109	125	129
Melting temp [°C]	124	127	128	131	133

All grades exhibit enhanced physical properties in combination with good processability. Borstar FB2230, through its lower density, provides the best performance in sealing. Borstar FB2310, with its combination of increased stiffness and high toughness, is an excellent product for core layers in coextrusion.

Due to Borstar Enhanced PE's melt strength, it reduces seal thinning and deformation during the sealing process.

Table 1: Basic properties of several Borstar Enhanced PE grades

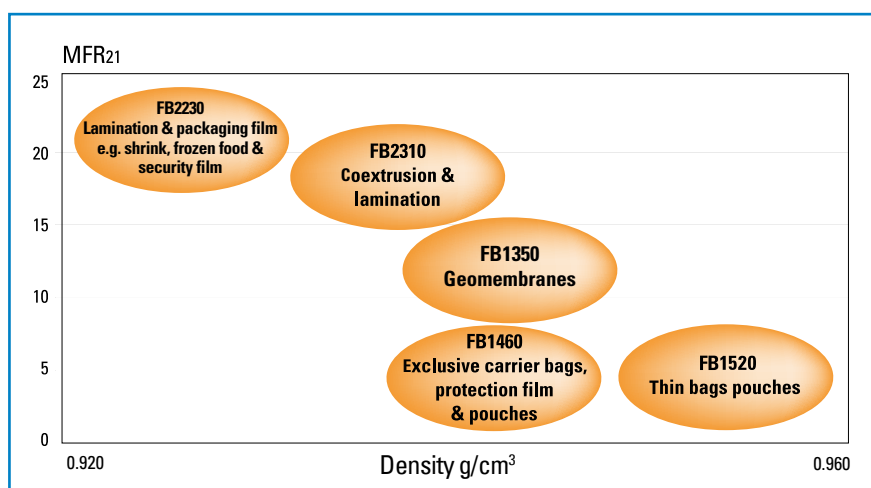


Figure 1: Applications using Borstar Enhanced PE

### The versatile, cost effective alternative

Through a unique combination of superior processability and physical properties, Borstar Enhanced PE offers the extruder, converter, packer and retailer an unparalleled balance of Performance, Productivity & Versatility.

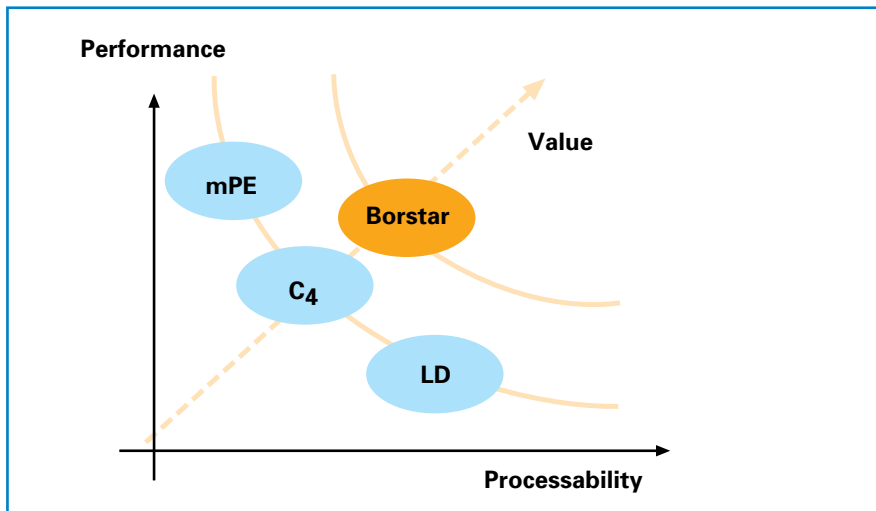


Figure 2: Borstar Enhanced PE provides an unparalleled balance of Performance, Productivity and Versatility

#### Performance

- Unique property balance in a wide range of applications.
- Design freedom – unique surface appearance and printing properties.

#### Productivity

- Easy, consistent processing and converting, less scrap.
- Bubble stability, longer runs, higher outputs.

#### Versatility

- Saving in material usage.
- Simplified material handling - less grades.

## Performance

Unique property balance in a wide range of applications.

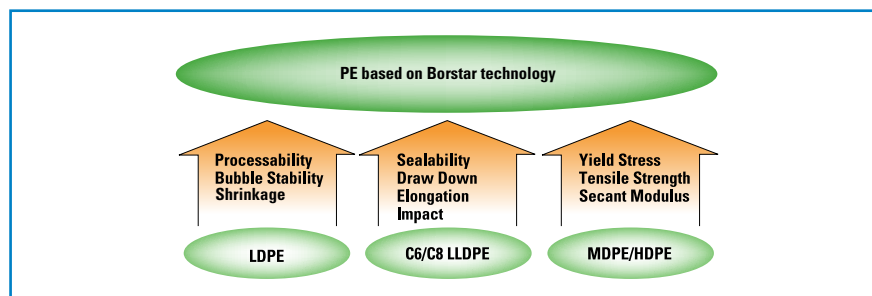


Figure 3: Optimal balance of properties with Borstar Enhanced PE

### Thinner films

The unique combination of stiffness and mechanical properties such as tear, impact and yield strength offers a genuine downgauging potential.

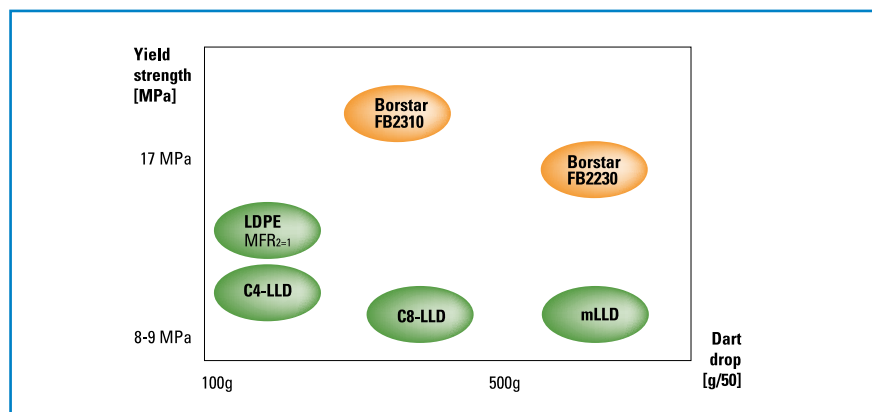


Figure 4: Unique combination of yield and impact strength

### Stronger films

Borstar Enhanced PE grades demonstrate superior dart drop index compared to conventional PE products, providing a competitive alternative to higher cost materials.

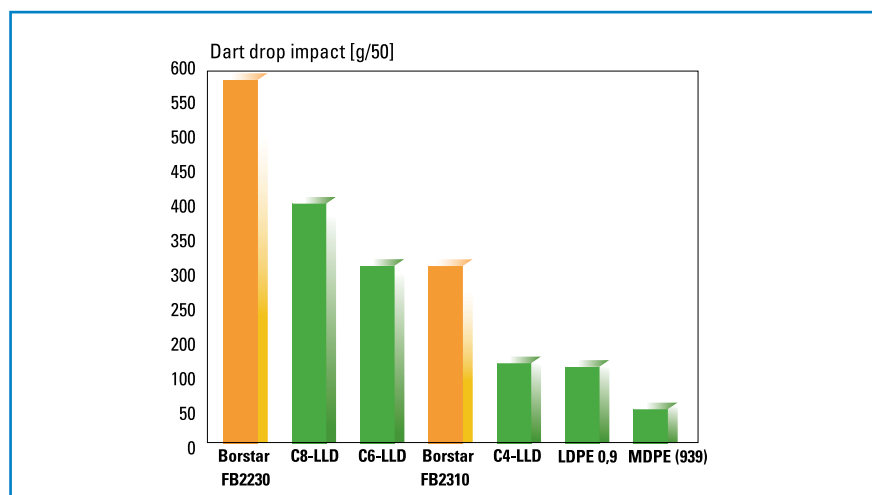


Figure 5: Superior dart drop index compared to conventional PE

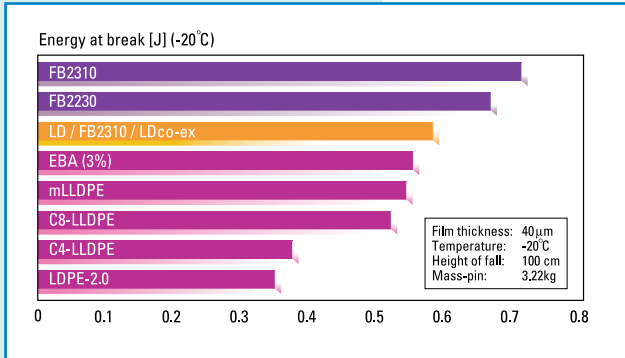


Figure 6: Borstar Enhanced PE outperforms conventional materials in terms of its toughness at low temperature

### Toughness at low temperature

Borstar Enhanced PE outperforms conventional materials in the market today in terms of its toughness at low temperature, making the material ideal for the production of frozen food packaging.

### Sealability – Faster conversion with no seal breaks or deformities

The sealing behaviour of Borstar Enhanced PE is characterised by a beneficial balance of hot tack force and seal strength.

Pure Borstar Enhanced PE has a broader sealing window than LDPE, its copolymers and standard C<sub>4</sub> LLDPE.

### Cost reduction whilst maintaining or improving film properties

Used as the core layer with other sealing layers, Borstar Enhanced PE’s inherent melt strength supports the sealing layer and avoids deformation, leading to

faster conversion with no seal breaks. The broader sealing window and higher hot tack force and seal strength enables cost reduction through less usage of expensive mPE, C<sub>8</sub> sealing materials.

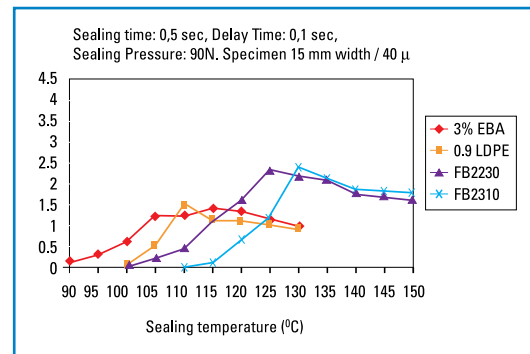


Figure 7: Borstar Enhanced PE exhibits a broad sealing window

### Resistance to aggressive environments (ESCR)

It is well understood that bimodality, with Borstar Enhanced PE, has superior ESCR compared to competitive PEs with narrower MWD.

Tested with	10% igepal solution
FB2230	no failure in 5000 hrs
FB2310	no failure in 5000 hrs

Table 2: Borstar Enhanced PE exhibits high ESCR

### Low taste and odour

Borstar Enhanced PE, due to its low additive content, exhibits low migration and consequently low taste and odour, making it ideal for food packaging applications. All products fulfill the specific food packaging regulations in European countries as well as 2002/72/EC and FDA in the US.

### Pack integrity

All factors considered, packs produced in Borstar Enhanced PE will have less tendency for breakage.

### Design freedom – unique surface and printing properties.

#### Matt and smooth surface

Borstar Enhanced PE grades used pure or in monolayer structures exhibit a matt and smooth surface onto which print registration is excellent – ideal for stylish pack design where readability or easy write on is needed.

#### Easy to open

The smooth surface is non-blocking making “easy to open” pack design possible. The low COF also gives easy control of surface properties in lamination.

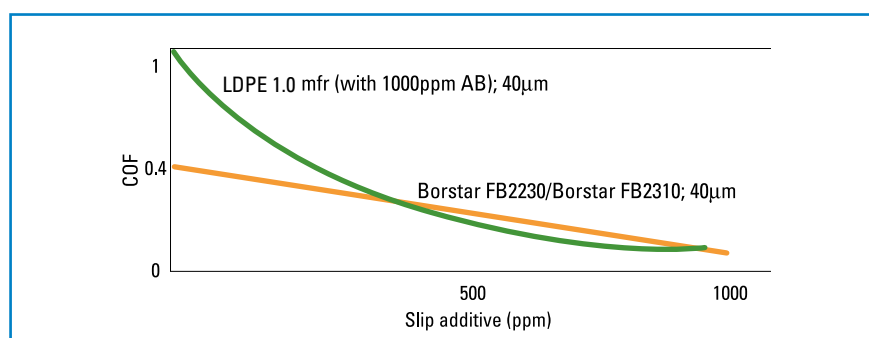


Figure 8: The low COF gives easy control of surface properties in lamination

#### Printing is easier and cheaper

Less energy is needed to achieve corona treatment levels and less decay in surface tension over time occurs compared with LDPE. The low migration level of additives also provides robustness to the quality of the corona treatment.

#### Lower cost colouration

The inherent surface properties also mean less colour masterbatch is needed – such masterbatches traditionally shorten the lifetime of the corona treatment, as well as impact the mechanical properties of the film.

#### Good optics in coextruded structures

The matt surface effect is removed when Borstar Enhanced PE is used in core layers of coextruded structures, achieving highly transparent films.

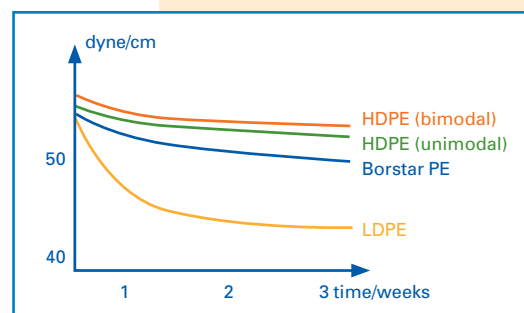


Figure 9: Less decay in surface tension over time occurs with Borstar Enhanced PE

## Productivity – Easy, consistent processing and converting, less scrap

Borstar Enhanced PE can:

- Be processed at the highest extrusion rates.
- Be easily processed on most blown film machinery.
- Improve bubble stability.
- Show less tendency for bubble breaks.
- Reduce waste production.
- Improve production efficiency.
- Be easily coextruded with other PEs.
- Give comparable outputs to conventional LDPE.

Conventionally, LLDPE films or their rich blends with LDPE can only be produced at lower extrusion rates, due to limitations either in bubble stability, pressure or cooling capacity.

Borstar Enhanced PE does not behave in this way - high outputs can be expected when used pure or in LD rich blends.

A typical example in heavy duty films is a loss of up to 30% output with a rich LLD/LDPE blend compared to LDPE. Borstar Enhanced PE can be processed pure at more or less the same output rates as pure LDPE.

The molecular structure (see Borstar Technology section) of Borstar Enhanced PE yields high zero shear viscosity and shear thinning behaviour close to LDPE, resulting in high, stable extrusion output over a range of film thicknesses with improved extrusion and film bubble stability.

### **Easily processed on most lines**

Borstar Enhanced PE runs easily on LD or HD lines in mono, coextrusion or blend structures.

### **Maximum production efficiency**

The combination of excellent bubble stability and extremely low tendency to bubble breaks further provide stable production at high efficiency.

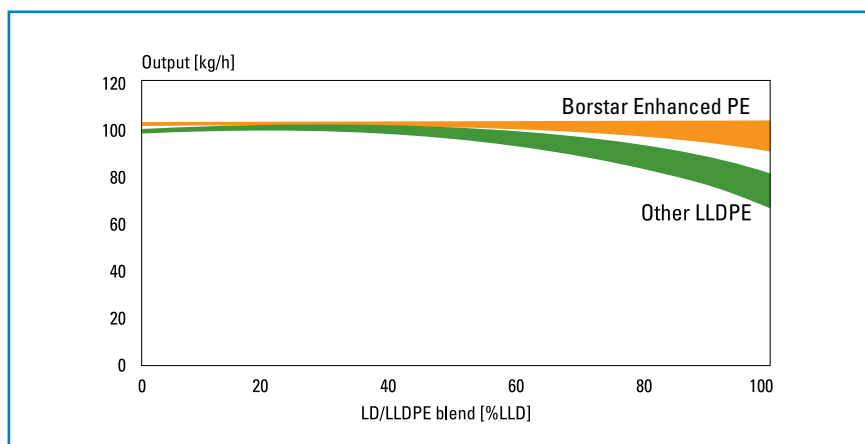


Figure 10: Relative assessment of Borstar Enhanced PE outputs compared to other LLDPE

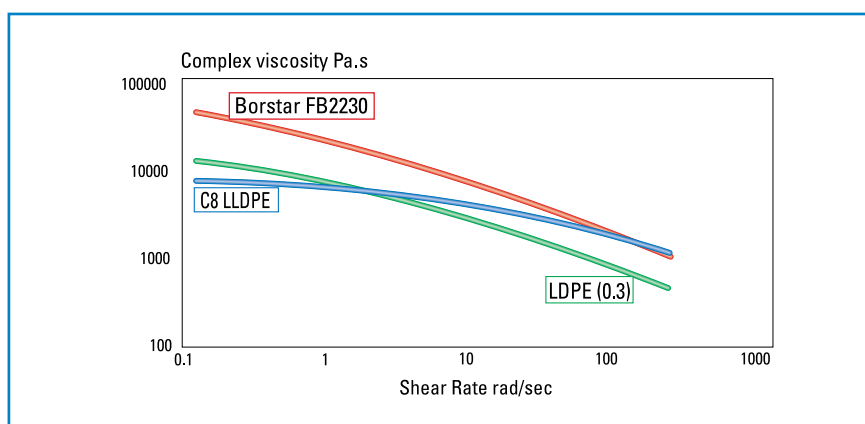


Figure 11: Viscosity behaviour of Borstar Enhanced PE shows similarity to LDPE in contrast to conventional LLDPE

### No melt fracture – even at narrow die gaps

The similarity of shear thinning behaviour to LDPE is very beneficial with respect to melt fracture, often referred to as shark skin. This is practically absent for Borstar Enhanced PE products even at die gaps of 1.0 mm.

Borstar Enhanced PE products are therefore processed most beneficially with narrow die gaps in contrast to conventional LLDPE.

### High speed packaging conversion

With the increased stiffness and toughness balance along with the matt and non-blocking surface, Borstar Enhanced PE products are ideal for high speed converting and packaging in a wide range of machines and applications - such as high speed bag making, collation shrink, FFS packaging, and in-line liner making. Easy opening and excellent unfolding behaviour make installation of bag-in-box and other liners very convenient.

## Versatility – Savings in material usage

### Drawdown ability - one Borstar grade replaces several non-Borstar materials

With Borstar, a thickness range from below 10 µm to more than 200 µm is achievable whilst maintaining good bubble stability.

The bubble stability of conventional LLDPE is often too low for the extrusion of thick as well as thin films, while LDPE has the classical problem of draw down versus MFR. Borstar Enhanced PE is the solution.

Coextruded structures, combining blends of different PEs in each structure, may be achieved with a single Borstar Enhanced PE material and in most cases with thinner film and vastly reduced thickness variations.

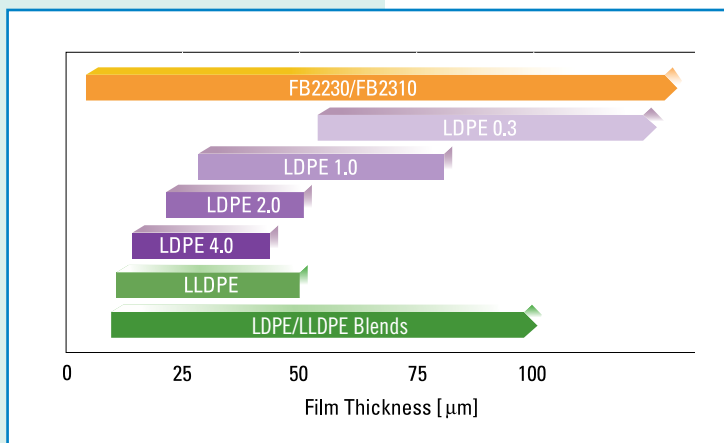


Figure 12: The best flexibility to produce a large span of film thickness is achieved with Borstar Enhanced PE

### Ideal for coextrusion

Coextrusion technology is becoming increasingly common. Using Borstar Enhanced PE in one or more layers of such coextruded films will provide advantages in processability, physical properties, sealability and aesthetics of the final films.

### Ideal for blending

Using Borstar Enhanced PE instead of conventional C<sub>4</sub> LLDPE as a blending agent at 15-20% with HMW HDPE enables product and processability improvement.

Borstar Enhanced PE brings improved film stiffness, tear strength and dart drop impact strength.

### Simplified material handling

The versatility of Borstar Enhanced PE enables one Borstar grade to replace several non-Borstar materials, bringing simplified stock and logistics management.

## Borstar technology

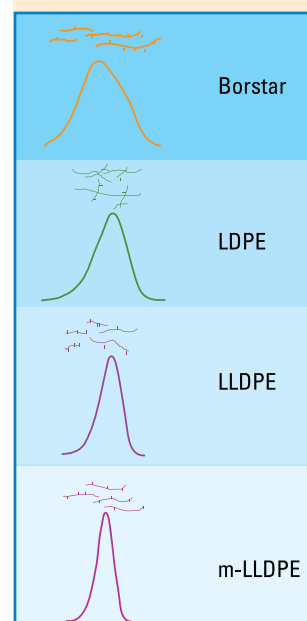
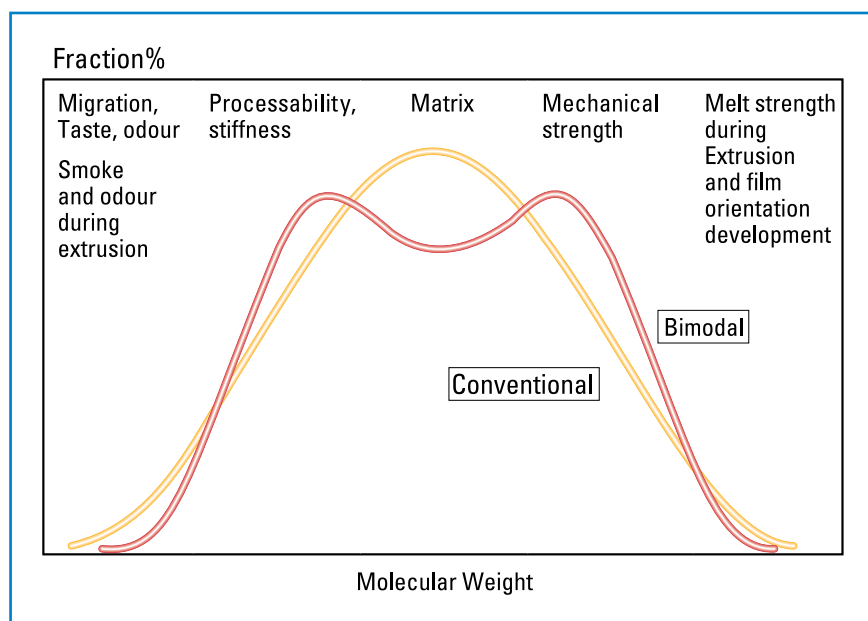
The Borstar polymerisation process enables Borouge to combine the product properties of various conventional PEs into one unique product family.

The fundamental feature of the Borstar technology is its dual reactor operation, which allows production of materials for high performance film packaging in a wider range of densities and MFR with a broad (bimodal) molecular weight distribution and tailored comonomer distribution.

A bimodal PE is a mixture of two very different molecular weights, as can be seen from this MWD curve. Two important features result from this: good processability and good mechanical strength.

Unlike conventional bimodal processes, which are limited to HDPE and MDPE products, Borstar can also produce bimodal LLDPE resins, due to a unique loop and gas phase reactor configuration.

The controlled comonomer distribution results in low taste and odour levels and improved low temperature properties compared to traditional PEs.



## Processing recommendations

Borstar Enhanced PE can be conveniently processed on most blown film extrusion lines. The processing conditions will influence the final film properties.

Due to the linear structure in combination with a rather low MFR of Borstar Enhanced PE materials, high blow up ratio and/or higher frost line height will further improve the mechanical properties.

	Borstar Enhanced PE	LDPE	LLDPE
Extruder temperature	190-210°C	<200°C	200°C
Die gap	1.0 – 1.8 mm Narrow	0.8 – 1.5 mm Narrow	1.8 – 2.3 mm Wide
Cooling ring	Mono lip Dual lip	Mono lip	Dual lip
Blow Up Ratio (BUR)	2:1 – 4:1	2:1 – 4:1	2:1 – 4:1
Frost Line Height	Medium – higher 3xD – 6xD	Low – medium 3xD – 5xD	Low 2xD – 3xD

Table 3: Recommended processing parameters for Borstar Enhanced PE



Borstar Enhanced PE bubble shape

Typical LDPE/LLDPE bubble shape

## Application examples

### 1. Stand up pouches

PE films, mono and coextruded, are used for a variety of stand up pouches as the main component in duplex and triplex laminated structures. PE-based stand up pouches are typically used for packaging of beverages, non-retorted food and non-food products.

#### Key advantages with Borstar Enhanced PE:

High ESCR	⇒	Shelf life and no breakage
Increased stiffness	⇒	Pouch rigidity and handling
	⇒	Downgauging, resulting in cost savings
High toughness	⇒	Downgauging, resulting in cost savings
	⇒	Design freedom
High seal strength	⇒	Less risk of product spoilage
	⇒	Reduces seal thinning and deformation during sealing process
Matt surface	⇒	Ease of conversion and filling
Bimodality	⇒	Provides bubble stability and easier processability, thus increasing output
Low migration	⇒	Low taste and odour
Low additive levels	⇒	Compliance to food packaging



## 2. Lamination films

The recent trend in packaging results in a shift from cans and bottles to laminated flexible packaging, regardless of whether it is food or non-food applications. A wide variety of formulations, mainly coextruded and laminated films, provide a range of attributes to ensure product protection, shelf life as well as a good display of the product. The use of Borstar Enhanced PE can improve physical properties in lamination films significantly.

### Key advantages with Borstar Enhanced PE:

Stiffness	⇒	Increased packaging speed
	⇒	Easier film conversion
	⇒	Better print registration
	⇒	Downgauging, resulting in cost savings
Matt surface	⇒	Easy opening/filling
	⇒	Greater design freedom
High toughness	⇒	Package integrity
	⇒	Downgauging, resulting in cost savings
	⇒	Greater design freedom
Low temperature resistance	⇒	High integrity at frozen conditions
Low additive levels	⇒	Compliance to food packaging regulations
	⇒	Reduced risk in lamination
Low migration	⇒	Low taste and odour
Sealing	⇒	Wider sealing window, thus lower failure rates
	⇒	High seal strength, reducing seal thinning and seal deformation
Bimodality	⇒	Provides bubble stability and easier processability, thus increasing output



### 3. Form-Fill-Seal (FFS) applications

PE films are extensively used in a wide range of packaging films. Due to the large number of products being packed, the requirements will vary significantly. The usage of Borstar Enhanced PE products as mono or coextruded structures in FFS films brings numerous advantages.

#### Key advantages with Borstar Enhanced PE:

Versatility	⇒	Replacement of several materials with Borstar
Sealability	⇒	High seal strength, reducing seal thinning and seal deformation
	⇒	Ease of conversion and filling
Matt surface	⇒	Excellent print registration
	⇒	Greater design freedom
	⇒	Cost effectiveness, compared to using additives to achieve soft touch and velvet look
Low migration	⇒	Low taste and odour
Stiffness	⇒	Ease of conversion and filling
Easy opening/filling	⇒	Allows for high packaging speed
Bimodality	⇒	Provides bubble stability and easier processability, thus increasing output





#### 4. Frozen food packaging

Frozen food packaging is one of the most demanding packaging applications. Films employed must have excellent physical properties at low temperature, along with good sealability and generally good printability in frozen food packaging.

Key advantages with Borstar Enhanced PE:		
High mechanical strength	→	Excellent impact resistance at low temperatures from 23°C down to -40°C
	→	Downgauging, resulting in cost savings
Stiffness	→	High speed packaging
	→	Easier film conversion
Matt surface	→	Low blocking, easy to open film
Low migration	→	Low taste and odour

#### 5. Geomembranes

Geomembranes are thick liners and covers for landfills, canals, ponds, and other industrial applications. Rough terrain conditions require the geomembranes to be resistant to tear, puncture, and have high mechanical strength. Borstar Enhanced PE has the specified characteristics for this application. Borstar FB1350 and FB2310 can be used for this application, while Borstar FB2230 is recommended for more flexible geomembranes.

Key advantages with Borstar Enhanced PE:		
Bimodality	→	Increased bubble stability and processability, thus increasing output
High mechanical strength	→	Ability to withstand rough handling
Excellent tear/puncture resistance	→	Offer better protection
Well suited for coextrusion	→	Tailoring the balance of properties
Easy processing	→	Good quality film production
ESCR	→	High degree of resistance to potentially aggressive chemicals



## 6. Heavy Duty Shipping Sacks (HDSS)

Typically, HDSS are used to pack goods weighing more than 20 kg. Twenty years ago, HDSS were 220 µm thick and has since downgauged significantly. From the onset of film formulation decision to filling of polymer bags, Borstar Enhanced PE based films deliver optimal performance and benefits in HDSS.



### Key advantages with Borstar Enhanced PE:

Improved mechanical properties	⇒	Dart impact, puncture at thinner gauges
	⇒	At thinner gauges, film is still stiff and has good creep resistance
Downgauging	⇒	Better or equal mechanical strength with thinner Borstar films compared to conventional PEs
Stiffness	⇒	Bimodality gives bubble stability, easier processability, thus increasing output

## 7. Medium duty FFS

Medium duty FFS are used to pack up to 10 kg goods ranging from garden products, such as seeds, fertilisers, soil, peat, sand to food (e.g. rice, sugar, flour, etc).

### Key advantages with Borstar Enhanced PE:

Stiffness	⇒	Easier film conversion
Matt surface	⇒	Easy opening/filling
	⇒	Better print registration
	⇒	Greater design freedom
High toughness	⇒	Package integrity
	⇒	Potential for downgauging
Bimodality	⇒	Provides bubble stability and easier processability, thus increasing output



### 8. Shrink films

Borstar Enhanced PE exhibits significant benefits over LDPE and its blends for collation and pallet shrink.

Key advantages with Borstar Enhanced PE:	
Very low hot shrink forces	⇒ No hole burning
Very high cold shrink forces	⇒ Good collation and holding forces
High mechanical strength	⇒ Good stability during transport and handling
	⇒ Improved film integrity
	⇒ Less film puncture with sharp edges
	⇒ Potential downgauging, resulting in cost savings

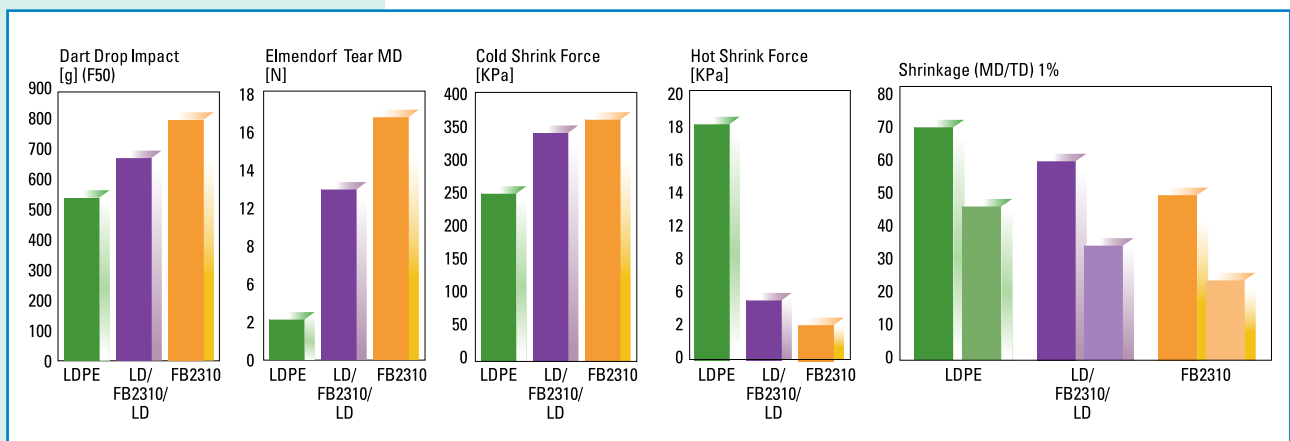


Figure 13: The advantageous properties displayed by Borstar Enhanced PE for shrink film applications

## 9. Security packaging

Plastic envelopes and pouches have been successfully implemented for courier shipments, direct mail and moneybags. This is due to the beneficial properties of plastics like water repellence, toughness, security aspects, efficient production, providing high performance at a beneficial cost.

### Key advantages with Borstar Enhanced PE:

Increased stiffness	⇒	Pouch rigidity and handling potential for downgauging
High toughness	⇒	High protection/security
High seal strength	⇒	Less risk of breakage
Matt surface	⇒	Ease of conversion and opening
	⇒	Facilitates write-on reduced transparency
Processability	⇒	Cost efficient film production



## 10. Exclusive boutique bags

High quality fashion bags benefit from the unique surface finish and design freedom of Borstar Enhanced PEs. Shopper and carry-out bags benefit from its toughness and downgauging potential.

### Key advantages with Borstar Enhanced PE:

Film processability	⇒	Production efficiency
	⇒	Well suited for coextrusion on HDPE lines
Increased stiffness	⇒	Ease of conversion and printing
Toughness	⇒	Less risk of breakage
	⇒	Potential for downgauging
Matt smooth surface	⇒	Print registration
	⇒	Greater design freedom
	⇒	Increased conversion speed
	⇒	Ease of opening





## 11. Tubes

Be it profile extruded or laminated tubes, the benefits offered by Borstar Enhanced PE are enormous - ranging from aesthetics and haptics differentiation to performance enhancements for personal care (cosmetics, toothpaste etc) and food applications.

### Key advantages with Borstar Enhanced PE:

Processability	⇨	Production efficiency well suited for mono or coextrusion
Increased stiffness	⇨	Ease of conversion and printing
Matt, soft touch surface	⇨	Greater design freedom
	⇨	Print registration

## 12. Medical packaging and hygienic films

The packaging needs of the medical industry are characterised by high demands for safety and protection of packed product. These packaging needs are met through coextruded and particularly laminated films, which have to fulfill the requirements both regarding physical properties as well as regulatory aspects.

### Key advantages with Borstar Enhanced PE:

Drug master filings	⇨	Ease of approval
Stiffness	⇨	Ease of conversion and printing
	⇨	Downgauging, resulting in cost savings
High toughness	⇨	Package integrity
Matt surface	⇨	Easy opening/filling
	⇨	Greater design freedom
Low additive levels	⇨	Compliance to regulations
	⇨	Low migration





### 13. Liners

Liners are used in various formats ranging from sheets and pouches to converted bags in sacks, boxes, barrels and containers. The key purpose is to provide a protection and barrier between the product and, for example, the corrugated box.

Key advantages with Borstar Enhanced PE:		
Increased stiffness	⇒	Film rigidity and handling
	⇒	Potential for downgauging
High toughness	⇒	Improved product protection
High seal strength	⇒	Less risk of product spoilage
Matt surface	⇒	Ease of installation and opening
Processability	⇒	Cost efficient film production



### 14. Agricultural films

Polyethylene can be used in a variety of agricultural films such as greenhouse tunnels, mulching and silage. Crop yield and quality is directly influenced by the choice of film structure.

Key advantages with Borstar Enhanced PE:		
Film processability	⇒	Production efficiency at thin and thick gauges
Increased stiffness	⇒	Good load bearing
	⇒	Easy installation
Matt surface	⇒	Provides crop damage protection
	⇒	Haze appearance, leading to soft light to protect young crops
Toughness	⇒	Less risk of breakage in tough weather conditions
ESCR	⇒	Resistance to crop treatment

## 15. Oriented PE films

Biaxially oriented PE films have traditionally been serving packaging markets like high transparency shrink films, barrier films and candy twist wrap. Other technologies are emerging in the market like monoaxial orientation of PE blown films suitable for producing oriented films beyond 100  $\mu\text{m}$ . This allows penetration of OPE into new applications.

### Key advantages with Borstar Enhanced PE:

Bubble stability	⇒	Improved film production output
Flexible orientation	⇒	Tailoring of properties
Very high mechanical properties	⇒	Significant downgauging
High stiffness	⇒	Good behaviour on packaging machinery
Impact/tear resistance	⇒	Package integrity



### Summary

Borouge offers a range of Borstar Enhanced PE products for high performance flexible packaging. Borstar Enhanced PE products are well suited for a wide range of packaging applications, combining good blown film processability with high mechanical properties.

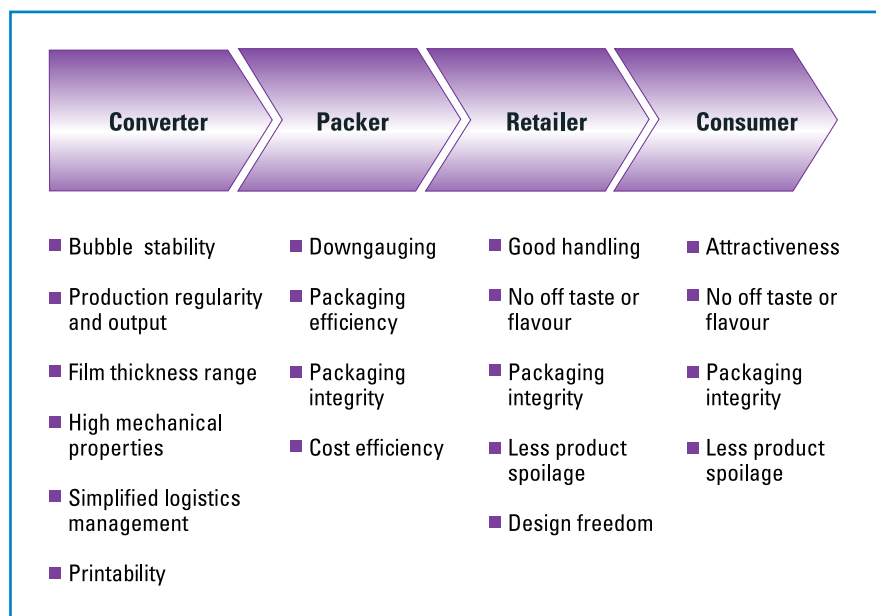
For the film producer Borstar Enhanced PE offers good processability on conventional dies and screws, both in mono and coextrusion processes, improved bubble stability with a more even thickness profile as well as downgauging potential with thickness flexibility.

Blending flexibility with Borstar Enhanced PE is an additional benefit.

For the food packer films made from Borstar will offer far better balance between stiffness and toughness than conventional PE. Impact properties are excellent, especially at low temperatures.

The most important benefit from Borstar Enhanced PE films for the retailer is improved package integrity with less broken packages in the freezers, as well as enhanced sales appeal due to the inherent Borstar matt surface effect which permits innovative design solutions.

Finally the end user will find that packs made from Borstar Enhanced PE have less tendency to break. The nutritional quality of foods packed in Borstar enhanced PE film remains excellent due to inherent low taste and odour properties.



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Borouge Film specialises in supplying innovative plastics polyolefin's for the manufacture of film, fibre, coating and thermoforming solutions through introduction of technologies and solutions such as Borstar®, Borclear™ and Bormod™. Together with Borealis, Borouge benefits from over 50 years of experience in the film markets across Europe, Middle East and Asia. Borouge believes that customer-driven innovation is the only way to achieve and sustain progress.

In the film industry, Borouge has pioneered the development of innovative solutions. Borclear polypropylene for blown PP film with higher heat stability, stiffness and excellent optical properties has opened up new opportunities for blown film producers on conventional air cooled production lines. For cast polypropylene film applications, Bormod has set a new standard of stiffness benefiting multiple packaging end uses.

Through foresight and focus on customer needs, Borouge continues to provide innovative PP and PE solutions for the film industry that add real value throughout the value chain. We also know the high value that our customers in the film industry place on product consistency and processability. We pride ourselves on the performance of our products, and through ongoing investment in upgrades and new plant programmes, we continue to set new records for output efficiency and product reliability. Borouge believes that responsiveness is the foundation of fruitful customer partnerships. Borouge ensures this through highly skilled and experienced technical, marketing and product development people located in Australia, New Zealand, India, China, Hong Kong, Singapore and Abu Dhabi, as well as a diverse sales and agent network around the World.



