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Polyethylene

# BorLite™ OPE792

Linear Low Density Polyethylene for Mono-directional Orientation (MDO)

## Description

**BorLite OPE792** is a high molecular weight linear low density polyethylene film grade providing high melt strength for good processing behaviour of primary films on blown film technology as well as excellent draw down on mono directional orientation (MDO) lines. MDO-films made of this product are characterised by very the high toughness and balanced MD/TD tear resistance.

**BorLite OPE792** has been developed especially for property-enhancement of blown films through mono-directional orientation (MDO technology).

## Applications

**BorLite OPE792** is recommended for

Heavy-duty bags
Industrial films
Consumer packaging
Compression packaging
Twist wrap
Label film

## Additives

**BorLite OPE792** contains antioxidant.

## Physical Properties

| Property | Typical Value<br>Data should not be used for specification work | Test Method |
|---|---|---|
| Density | 923 kg/m3 | ISO 1183 |
| Melt Flow Rate (190 °C/5 kg) | 0,9 g/10min | ISO 1133 |
| Melt Flow Rate (190 °C/2,16 kg) | 0,2 g/10min | ISO 1133 |
| Melt Flow Rate (190 °C/21,6 kg) | 22 g/10min | ISO 1133 |
| Melting temperature (DSC) | 124 °C | ISO 11357-3 |
| Vicat softening temperature (10 N) | 101 °C | ISO 306 |

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## MDO-Film properties

Film properties are measured on a 25 µm MD-oriented film sample, DDR 1:6. Primary film produced on a 70mm extruder, BUR=1:2.7, Die gap: 1.2 mm, FLH 2 - 4 DD, thickness 150µm
MD = machine direction, TD = transverse direction.

| Property | | | Typical Value<br>Data should not be used for specification work | Test Method |
|---|---|---|---|---|
| Dart Drop | | | 790 g | ISO 7765-1 |
| Instrumented puncture test | Total Penetration Energy | | 45 J/mm | ISO 7765-2 |
| Haze | | | 14 % | ASTM D 1003 |
| Tensile Stress at Yield | | MD | 170 MPa | ISO 527-3 |
| Tensile Stress at Yield | | TD | 18 MPa | ISO 527-3 |
| Tensile Strain at Break | | MD | 30 % | ISO 527-3 |
| Tensile Strain at Break | | TD | 750 % | ISO 527-3 |
| Tensile Strength | | MD | 170 MPa | ISO 527-3 |
| Tensile Strength | | TD | 19 MPa | ISO 527-3 |
| Tensile Modulus | | MD | 900 MPa | ISO 527-3 |
| Tensile Modulus | | TD | 900 MPa | ISO 527-3 |
| Tear resistance (Elmendorf) | | MD | 165 N/mm | ISO 6383/2 |
| | | TD | 170 N/mm | |

## Processing Techniques

The actual conditions will depend on the type of equipment used.

**Primary film production**:
**BorLite OPE792** is easily processed on conventional blown film extruders. The maximum achievable film thickness strongly depends on the line setup but is above 250µm.
Recommended extrusion temperature is 190-210ºC. Conventional die gaps can be used without shark skin or draw down problems. A gap of ~ 1.5 mm will give the best balance between extruder pressure and physical properties in the film.
Recommended temperature setting is 190°C - from cylinder to die. The minimum melt temperature should be 200°C

**BorLite OPE792** MDO film properties are dependent on choosing the optimal film blowing conditions like Blow Up Ratio (BUR) and Frost Line Height (FLH). Higher impact can be achieved by rising the FLH to 4DD. High BUR (>2) also results in better mechanical properties and better balance in MD/TD.
As a guideline the following conditions should be used.
FLH: 2 - 4 DD
BUR: 2,5 - 3

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**Mono-axial stretching:**
**BorLite OPE792** is preferably stretched on MDO-lines with a draw down ratio (DDR) of 1:5,5 - 6,5. Further the parameters for stretching are preferably (150µm primary film):

| | |
|---|---|
| Heating: | ~ 110°C - 115°C |
| Stretching: | ~ 1:6 |
| Annealing: | ~ 90°C / 110°C |
| Cooling: | ~ 20°C / 40°C |
| Stretching speed: | ~150 - 200m/min |

Please note that the temperature of the heating rolls needs to be adjusted depending on the thickness of the primary film. The higher the thickness the higher temperature needs to be set in order to avoid film rupture.

## Storage

**BorLite OPE792** should be stored in dry conditions at temperatures below 50°C and protected from UV-light. Improper storage can initiate degradation, which results in odour generation and colour changes and can have negative effects on the physical properties of this product.

More information on storage is found in our "Safety data sheet" / "Product safety information sheet".

## Safety

The product is not classified as dangerous.

Please see our "Safety data sheet" / "Product safety information sheet" for details on various aspects of safety, recovery and disposal of the product. For more information, contact your Borealis representative.

## Recycling

The product is suitable for recycling using modern methods of shredding and cleaning. In-house production waste should be kept clean to facilitate direct recycling.

## Related Documents

The following related documents are available on request, and represent various aspects on the usability, safety, recovery and disposal of the product.

"Safety data sheet" / "Product safety information sheet"
Statement on chemicals, regulations and standards
Statement on compliance to food contact regulations
Statement on polymer additives and BSE

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