

**TECHNICAL DATA SHEET****FB2230-(ENHANCED POLYETHYLENE)****Product Description**

FB2230 is an enhanced polyethylene film grade combining good and flexible extrusion behaviour, excellent draw down and superior mechanical properties. Film made from Borstar FB2230 exhibits high dart impact strength combined with excellent yield, tensile strength and increased stiffness. Toughness is retained at low temperature. The film has high seal strength, good hot tack force and superior ESCR properties. Borstar FB2230 contains antioxidant and low content of anti-blocking agent.

Application:

- FB2230 is well suited for mono and coextrusion in a wide range of applications due to its unique balance of properties. The superior mechanical properties will improve the functionality of the films or allow for substantial material savings (down gauging) compared to conventional PE. Typical applications: Agriculture Film (incl. Greenhouse Film), Lamination (incl. Stand Up Pouches), Security Packaging, Shrink Film, Exclusive Carrier/Boutique bags, Industrial Film, Frozen Food and Compression Packaging.

Origin: Singapore

- Borouge Pte Ltd

| Physical Properties | Value | Unit | Test Method |
|--------------------------------------|--------------|-------------------|--------------------|
| Density | 923 | kg/m ³ | ASTM D 1505 |
| Melt Flow Rate MFR (190°C /2.16 kg) | 0.25 | g/10 min | ASTM D 1238 |
| Melt Flow Rate MFR (190°C /5.0 kg) | 1.0 | g/10 min | ASTM D 1238 |
| Melt Flow Rate MFR (190°C /21.6kg) | 22 | g/10 min | ASTM D 1238 |
| Melting Temperature | 124 | °C | ISO 11357/03 |
| Vicat Softening Temperature A (10 N) | 101 | °C | ISO 306 |
| ESCR – 10% Igepal / F50 | >5000 | Hours | ASTM D 1693 |

Processing Guidelines:

FB2230 can be processed in most types of blown film equipment such as LDPE, LLDPE or HDPE extruders. The balance of draw down properties and bubble stability is superior to conventional LLDPE and LDPE. Thickness of 10 to >200µm can be processed with good bubble stability. Borstar FB2230 is well suited for co-extrusion.

- Recommended extrusion temperature is 190 - 210°C. A die gap of 1.0 - 1.5 mm will give the best balance between extruder pressure and physical properties in the film. Wider die gap gives higher machine direction orientation.

- FB2230 is influenced on the orientation obtained by the running conditions like Blow Up Ratio (BUR) and Frost Line Height (FLH). Higher impact strength can be achieved by raising the FLH. High BUR (>2) also results in improved mechanical properties.

Recommended processing conditions:

- Melt Temperature : 190 – 210°C
- FLH : 2-4 DD
- BUR : >2:1

| Film properties | | Value | Unit | Method |
|-----------------------------|-------|---------|------|---------------|
| Tensile Strength @ Break | MD/TD | 50/40 | MPa | ASTM D 882 |
| Elongation @ Break | MD/TD | 550/750 | % | ASTM D 882 |
| Tensile Strength @ Yield | TD | 12 | MPa | ASTM D 882 |
| Secant Modulus (0.05-1.05%) | MD/TD | 200/250 | MPa | ASTM D 882 |
| Coefficient of friction | | 0.4 | - | ASTM D 1894 |
| Haze | | 65 | % | ASTM D 1003 |
| Gloss | | 15 | | ASTM D 2457 |
| Dart Drop | | 600 | g | ASTM D 1709/A |
| Elmendorf Tear Strength | MD/TD | 300/700 | g | ASTM D 1922 |
| Puncture resistance, force | | 50 | N | ASTM D 5748 |
| Puncture resistance, energy | | 3 | J | ASTM D 5748 |

Storage And Handling:

This product should be stored in dry conditions at temperature bellow 50°C and protected from UV-light. Improper storage can initiate degradation, which results in odor generation and color changes and can have negative effects on physical properties of this product.

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.