



Technical Data Sheet

DOW™ LDPE 640I Low Density Polyethylene Resin

Description

Dow™ LDPE 640I Low Density Polyethylene Resin is a general-purpose liner resin for thin gauge applications requiring good drawdown and excellent toughness.

Main Characteristics

- Low density polyethylene (LDPE)
- A barefoot general purpose general liner resin
- For blown and cast film extrusion
- Optimum gauge range: 0.8-3.0 mil

Complies with

- U.S. FDA 21 CFR 177.1520 (c) 2.2.
- U.S. FDA -DMF
- EU, No 10/2011
- Canadian HPFB No Objection (With Limitations)
- U.S. Pharmacopoeia (USP) - Class VI

Consult the regulations for complete details.

Additive

- Antiblock: No
- Slip: No
- Processing aid: No

Typical Properties¹

Physical	Nominal Value	Unit (English)	Nominal Value	Unit (SI)	Test Method ²
Density	0.920	g/cm ³	0.920	g/cm ³	ASTM D792
Base Density ³	0.920	g/cm ³	0.920	g/cm ³	Internal Method
Melt Index (190°C/2.16 kg)	2.0	g/10 min	2.0	g/10 min	ASTM D1238
Environmental Stress-Cracking Resistance (ESCR)	2.00	hr	2.00	hr	ASTM D1693
Mechanical	Nominal Value	Unit (English)	Nominal Value	Unit (SI)	Test Method
Tensile Strength ⁴					ASTM D638
Yield	1300	psi	8.96	MPa	
Break	1600	psi	11.0	MPa	

1. Typical properties: these are not to be construed as specifications. Users should confirm results by their own tests.
2. ASTM: American Society for Testing and Materials
3. Base density is estimated using the assumption that every 1000 ppm of antiblock in the finished product raises the density of the polymer by 0.0006 g/cm³. Base density is the estimated density of the polymer if it did not contain any antiblock.
4. Plaque molded and tested in accordance with ASTM D4976.

Typical Properties (Cont.)

Mechanical	Nominal Value	Unit (English)	Nominal Value	Unit (SI)	Test Method
Tensile Elongation ⁴					ASTM D638
Yield	4.0	%	4.0	%	
Break	600	%	600	%	
Flexural Modulus — 2% Secant ⁴	34000	psi	234	MPa	ASTM D790
Films	Nominal Value	Unit (English)	Nominal Value	Unit (SI)	Test Method
Film Puncture Resistance					Internal Method
1.0 mil (25 µm), Cast Film	45.0	ft-lb/in ³	3.72	J/cm ³	
2.0 mil (51 µm), Blown Film	35.0	ft-lb/in ³	2.90	J/cm ³	
Film Toughness					ASTM D882
MD: 1.0 mil (25 µm), Cast Film	1790	ft-lb/in ³	148	J/cm ³	
MD: 2.0 mil (51 µm), Blown Film	1920	ft-lb/in ³	159	J/cm ³	
TD: 1.0 mil (25 µm), Cast Film	2310	ft-lb/in ³	191	J/cm ³	
TD: 2.0 mil (51 µm), Blown Film	2230	ft-lb/in ³	184	J/cm ³	
Secant Modulus					ASTM D882
2% Secant, MD: 2.0 mil (51 µm), Blown Film	26200	psi	181	MPa	
2% Secant, TD: 2.0 mil (51 µm), Blown Film	30000	psi	207	MPa	
Tensile Strength					ASTM D882
MD: Yield, 1.0 mil (25 µm), Cast Film	1850	psi	12.7	MPa	
MD: Yield, 2.0 mil (51 µm), Blown Film	1790	psi	12.3	MPa	
TD: Yield, 1.0 mil (25 µm), Cast Film	1460	psi	10.0	MPa	
TD: Yield, 2.0 mil (51 µm), Blown Film	1760	psi	12.1	MPa	
MD: Break, 1.0 mil (25 µm), Cast Film	4970	psi	34.3	MPa	
MD: Break, 2.0 mil (51 µm), Blown Film	3600	psi	24.8	MPa	
TD: Break, 1.0 mil (25 µm), Cast Film	3240	psi	22.3	MPa	
TD: Break, 2.0 mil (51 µm), Blown Film	3330	psi	23.0	MPa	
Tensile Elongation					ASTM D882
MD: Break, 1.0 mil (25 µm), Cast Film	260	%	260	%	
MD: Break, 2.0 mil (51 µm), Blown Film	420	%	420	%	
TD: Break, 1.0 mil (25 µm), Cast Film	700	%	700	%	
TD: Break, 2.0 mil (51 µm), Blown Film	670	%	670	%	
Dart Drop Impact					ASTM D1709A
1.0 mil (25 µm), Cast Film	45	g	45	g	
2.0 mil (51 µm), Blown Film	150	g	150	g	
Elmendorf Tear Strength					ASTM D1922
MD: 1.0 mil (25 µm), Cast Film	190	g	190	g	
MD: 2.0 mil (51 µm), Blown Film	500	g	500	g	
TD: 1.0 mil (25 µm), Cast Film	130	g	130	g	
TD: 2.0 mil (51 µm), Blown Film	280	g	280	g	

Typical Properties (Cont.)

Impact	Nominal Value	Unit (English)	Nominal Value	Unit (SI)	Test Method
Tensile Impact Strength ^{4,5}	70.0	ft-lb/in ³	147	kJ/m ²	ASTM D1822
Hardness	Nominal Value	Unit (English)	Nominal Value	Unit (SI)	Test Method
Durometer Hardness ⁴ (Shore D)	45		45		ASTM D2240
Thermal	Nominal Value	Unit (English)	Nominal Value	Unit (SI)	Test Method
Deflection Temperature Under Load ³ 66 psi (0.45 MPa), Unannealed	101	°F	38.3	°C	ASTM D648
Brittleness Temperature	< -105	°F	< -76.1	°C	ASTM D746
Vicat Softening Temperature	203	°F	95.0	°C	ASTM D1525
Melting Temperature (DSC)	233	°F	112	°C	Internal Method
Peak Crystallization Temperature (DSC)	209	°F	98.3	°C	Internal Method
Optical	Nominal Value	Unit (English)	Nominal Value	Unit (SI)	Test Method
Gloss					ASTM D2457
45°, 2.0 mil (50.8 µm), Blown Film	66		66		
45°, 1.0 mil (25.4 µm), Cast Film	75		75		
Haze					ASTM D1003
2.0 mil (50.8 µm), Blown Film	7.60	%	7.60	%	
1.0 mil (25.4 µm), Cast Film	4.80	%	4.80	%	

Extrusion Notes

Fabrication Conditions For Cast Film:

- Screw A, Size: 2 in. (51 mm); 30:1 L/D
 - Melt Temperature: 501°F (261°C)
 - Screw Speed: 32 rpm
- Screw B, Size: 2.5 in. (63.5 mm); 30:1 L/D
 - Melt Temperature: 501°F (261°C)
 - Screw Speed: 32 rpm
- Screw C, Size: 2.5 in. (63.5 mm); 30:1 L/D
 - Melt Temperature: 501°F (261°C)
 - Screw Speed: 32 rpm
- Screw D, Size: 2.5 in. (63.5 mm); 30:1 L/D
 - Melt Temperature: 501°F (261°C)
 - Screw Speed: 32 rpm
- Screw E, Size: 2 in. (51 mm); 30:1 L/D
 - Melt Temperature: 501°F (261°C)
 - Screw Speed: 32 rpm
- Screw Type: DSB II
- Chill Roll Temperature: 70°F (21°C)
- Line Speed: 400 fpm (123 m/min)

5. Type S.

Typical Properties (Cont.)

Extrusion Notes

Fabrication Conditions for Blown Film:

- Screw Size: 2.5 in. (63.5 mm) 30:1 L/D
 - Screw Type: Single Flight Double Mix
 - Die Gap: 40 mil (1.02 mm)
 - Melt Temperature: 390°F (199°C)
 - Output: 7 lb/hr/in. of die circumference
 - Die Diameter: 6 in.
 - Blow-up Ratio: 2.5:1
 - Screw Speed: 60 rpm
 - Frost Line Height: 25 in. (635 mm)
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