



TUFLIN™ HSE-1003 NT 7

Linear Low Density Polyethylene Resin

Overview

- Industrial pallet wrap stretch film applications
- Premium film packaging applications
- Complies with U.S. FDA 21 CFR 177.1520 (c) 3.1a
- Consult the regulations for complete details.

TUFLIN™ HSE-1003 NT 7 Linear Low Density Polyethylene Resin is an ethylene-hexene-1 copolymer designed for cast stretch film applications such as industrial pallet wrap. Films containing HSE-1003 offer outstanding puncture, toughness and load holding properties.

Additive

- Antiblock: No
- Slip: No
- Processing Aid: No

| Physical | Nominal Value (English) | Nominal Value (SI) | Test Method |
|----------------------------------|----------------------------|-------------------------|-------------|
| Density | 0.918 g/cm ³ | 0.918 g/cm ³ | ASTM D792 |
| Base Density ¹ | 0.918 g/cm ³ | 0.918 g/cm ³ | Dow Method |
| Melt Index (190°C/2.16 kg) | 2.5 g/10 min | 2.5 g/10 min | ASTM D1238 |
| Films | Nominal Value (English) | Nominal Value (SI) | Test Method |
| Film Puncture Energy | | | Dow Method |
| 0.80 mil (20 µm) | 34.0 in·lb | 3.84 J | |
| 2.0 mil (51 µm) | 73.0 in·lb | 8.25 J | |
| Film Puncture Force | | | Dow Method |
| 0.80 mil (20 µm) | 9.00 lbf | 40.0 N | |
| 2.0 mil (51 µm) | 19.0 lbf | 84.5 N | |
| Film Puncture Resistance | | | Dow Method |
| 0.80 mil (20 µm) | 319 ft·lb/in ³ | 26.4 J/cm ³ | |
| 2.0 mil (51 µm) | 252 ft·lb/in ³ | 20.8 J/cm ³ | |
| Film Toughness | | | ASTM D882 |
| MD : 0.80 mil (20 µm) | 2520 ft·lb/in ³ | 209 J/cm ³ | |
| MD : 2.0 mil (51 µm) | 3080 ft·lb/in ³ | 255 J/cm ³ | |
| TD : 0.80 mil (20 µm) | 3250 ft·lb/in ³ | 269 J/cm ³ | |
| TD : 2.0 mil (51 µm) | 4040 ft·lb/in ³ | 334 J/cm ³ | |
| Secant Modulus | | | ASTM D882 |
| 2% Secant, MD : 0.80 mil (20 µm) | 21400 psi | 147 MPa | |
| 2% Secant, MD : 2.0 mil (51 µm) | 20600 psi | 142 MPa | |
| 2% Secant, TD : 0.80 mil (20 µm) | 22600 psi | 156 MPa | |
| 2% Secant, TD : 2.0 mil (51 µm) | 20500 psi | 142 MPa | |
| Tensile Strength | | | ASTM D882 |
| MD : Yield, 0.80 mil (20 µm) | 1630 psi | 11.2 MPa | |
| MD : Yield, 2.0 mil (51 µm) | 1480 psi | 10.2 MPa | |
| TD : Yield, 0.80 mil (20 µm) | 1530 psi | 10.5 MPa | |
| TD : Yield, 2.0 mil (51 µm) | 1450 psi | 9.98 MPa | |
| MD : Break, 0.80 mil (20 µm) | 7220 psi | 49.8 MPa | |
| MD : Break, 2.0 mil (51 µm) | 5560 psi | 38.4 MPa | |
| TD : Break, 0.80 mil (20 µm) | 5240 psi | 36.1 MPa | |
| TD : Break, 2.0 mil (51 µm) | 6410 psi | 44.2 MPa | |
| Tensile Elongation | | | ASTM D882 |
| MD : Break, 0.80 mil (20 µm) | 520 % | 520 % | |
| MD : Break, 2.0 mil (51 µm) | 720 % | 720 % | |
| TD : Break, 0.80 mil (20 µm) | 830 % | 830 % | |
| TD : Break, 2.0 mil (51 µm) | 900 % | 900 % | |



| Films | Nominal Value (English) | Nominal Value (SI) | Test Method |
|--------------------------------------|--------------------------------|---------------------------|--------------------|
| Dart Drop Impact | | | |
| 0.80 mil (20 µm) | 130 g | 130 g | ASTM D1709A |
| 0.80 mil (20 µm) | < 100 g | < 100 g | ASTM D1709B |
| 2.0 mil (51 µm) | 270 g | 270 g | ASTM D1709A |
| 2.0 mil (51 µm) | 170 g | 170 g | ASTM D1709B |
| Elmendorf Tear Strength ² | | | ASTM D1922 |
| MD : 0.80 mil (20 µm) | 180 g | 180 g | |
| MD : 2.0 mil (51 µm) | 780 g | 780 g | |
| TD : 0.80 mil (20 µm) | 620 g | 620 g | |
| TD : 2.0 mil (51 µm) | 1100 g | 1100 g | |
| Ultimate Stretch ³ | | | Dow Method |
| 0.8 mil (20.3 µm) | 330 % | 330 % | |
| 2.0 mil (50.8 µm) | 520 % | 520 % | |
| Unstretched Cling | | | ASTM D5458 |
| 0.8 mil (20.3 µm) | 210 g | 210 g | |
| 2.0 mil (50.8 µm) | 280 g | 280 g | |
| Thermal | Nominal Value (English) | Nominal Value (SI) | Test Method |
| Vicat Softening Temperature | 210 °F | 98.9 °C | ASTM D1525 |
| Melting Temperature (DSC) | 255 °F | 124 °C | Dow Method |
| Optical | Nominal Value (English) | Nominal Value (SI) | Test Method |
| Gloss | | | ASTM D2457 |
| 20°, 0.800 mil (20.3 µm) | 156 | 156 | |
| 20°, 2.00 mil (50.8 µm) | 146 | 146 | |
| 45°, 0.800 mil (20.3 µm) | 95 | 95 | |
| 45°, 2.00 mil (50.8 µm) | 91 | 91 | |
| Haze | | | ASTM D1003 |
| 0.800 mil (20.3 µm) | 1.0 % | 1.0 % | |
| 2.00 mil (50.8 µm) | 4.0 % | 4.0 % | |
| Extrusion | Nominal Value (English) | Nominal Value (SI) | |
| Melt Temperature | 525 °F | 274 °C | |

Extrusion Notes

Fabrication Conditions For Cast Film:

- EGAN/Davis-Standard 5 layer cast line
- Melt Temperature: 525 °F (274 °C)
- Chill Roll (primary/secondary) Temperature: 70 °F (21 °C)
- Line Speed: 0.8 mil = 600 fpm (183 m/min); 2.0 mil = 200 fpm (61 m/min)
- Output: 0.8 mil = 416 lb/hr; 2.0 mil = 341 lb/hr
- Die width: 36in. (914 mm)
- Die gap: 25 mil (0.65 mm)
- Air gap: 3 in. (76 mm)

Notes

These are typical properties only and are not to be construed as specifications. Users should confirm results by their own tests.

¹ 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.

² Method B

³ On-Pallet Testing; Highlight Industries Inc. test method.

