



# TUFLIN™ HS-7002 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™ HS-7002 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 HS-7002 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 <sup>3</sup>	0.918 g/cm <sup>3</sup>	ASTM D792
Base Density <sup>1</sup>	0.918 g/cm <sup>3</sup>	0.918 g/cm <sup>3</sup>	Dow Method
Melt Index (190°C/2.16 kg)	2.0 g/10 min	2.0 g/10 min	ASTM D1238
Films	Nominal Value (English)	Nominal Value (SI)	Test Method
Film Puncture Energy			Dow Method
0.80 mil (20 µm)	38.0 in·lb	4.29 J	
2.0 mil (51 µm)	78.0 in·lb	8.81 J	
Film Puncture Force			Dow Method
0.80 mil (20 µm)	10.0 lbf	44.5 N	
2.0 mil (51 µm)	20.0 lbf	89.0 N	
Film Puncture Resistance			Dow Method
0.80 mil (20 µm)	372 ft·lb/in <sup>3</sup>	30.8 J/cm <sup>3</sup>	
2.0 mil (51 µm)	290 ft·lb/in <sup>3</sup>	24.0 J/cm <sup>3</sup>	
Film Toughness			ASTM D882
MD : 0.80 mil (20 µm)	2450 ft·lb/in <sup>3</sup>	203 J/cm <sup>3</sup>	
MD : 2.0 mil (51 µm)	2720 ft·lb/in <sup>3</sup>	225 J/cm <sup>3</sup>	
TD : 0.80 mil (20 µm)	4320 ft·lb/in <sup>3</sup>	358 J/cm <sup>3</sup>	
TD : 2.0 mil (51 µm)	3160 ft·lb/in <sup>3</sup>	262 J/cm <sup>3</sup>	
Secant Modulus			ASTM D882
2% Secant, MD : 0.80 mil (20 µm)	20600 psi	142 MPa	
2% Secant, MD : 2.0 mil (51 µm)	20000 psi	138 MPa	
2% Secant, TD : 0.80 mil (20 µm)	21800 psi	150 MPa	
2% Secant, TD : 2.0 mil (51 µm)	19900 psi	138 MPa	
Tensile Strength			ASTM D882
MD : Yield, 0.80 mil (20 µm)	1540 psi	10.6 MPa	
MD : Yield, 2.0 mil (51 µm)	1420 psi	9.82 MPa	
TD : Yield, 0.80 mil (20 µm)	1640 psi	11.3 MPa	
TD : Yield, 2.0 mil (51 µm)	1500 psi	10.3 MPa	
MD : Break, 0.80 mil (20 µm)	8070 psi	55.7 MPa	
MD : Break, 2.0 mil (51 µm)	5560 psi	38.4 MPa	
TD : Break, 0.80 mil (20 µm)	6850 psi	47.2 MPa	
TD : Break, 2.0 mil (51 µm)	5450 psi	37.5 MPa	
Tensile Elongation			ASTM D882
MD : Break, 0.80 mil (20 µm)	480 %	480 %	
MD : Break, 2.0 mil (51 µm)	700 %	700 %	
TD : Break, 0.80 mil (20 µm)	890 %	890 %	
TD : Break, 2.0 mil (51 µm)	800 %	800 %	



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)	330 g	330 g	ASTM D1709A
2.0 mil (51 µm)	210 g	210 g	ASTM D1709B
Elmendorf Tear Strength <sup>2</sup>			ASTM D1922
MD : 0.80 mil (20 µm)	220 g	220 g	
MD : 2.0 mil (51 µm)	790 g	790 g	
TD : 0.80 mil (20 µm)	640 g	640 g	
TD : 2.0 mil (51 µm)	1100 g	1100 g	
Ultimate Stretch <sup>3</sup>			Dow Method
0.8 mil (20.3 µm)	300 %	300 %	
2.0 mil (50.8 µm)	470 %	470 %	
Unstretched Cling			ASTM D5458
0.8 mil (20.3 µm)	220 g	220 g	
2.0 mil (50.8 µm)	310 g	310 g	
<b>Thermal</b>	<b>Nominal Value (English)</b>	<b>Nominal Value (SI)</b>	<b>Test Method</b>
Vicat Softening Temperature	210 °F	98.9 °C	ASTM D1525
Melting Temperature (DSC)	253 °F	123 °C	Dow Method
<b>Optical</b>	<b>Nominal Value (English)</b>	<b>Nominal Value (SI)</b>	<b>Test Method</b>
Gloss			ASTM D2457
20°, 0.800 mil (20.3 µm)	157	157	
20°, 2.00 mil (50.8 µm)	149	149	
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)	1.00 %	1.00 %	
2.00 mil (50.8 µm)	3.00 %	3.00 %	
<b>Extrusion</b>	<b>Nominal Value (English)</b>	<b>Nominal Value (SI)</b>	
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 = 401 lb/hr; 2.0 mil = 340 lb/hr
- Die width: 36 in. (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.

<sup>1</sup> 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/cm<sup>3</sup>. Base density is the estimated density of the polymer if it did not contain any antiblock.

<sup>2</sup> Method B

<sup>3</sup> On-Pallet Testing; Highlight Industries Inc. test method.

