# 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/cm³ | 0.918 | g/cm³ | ASTM D792 |
| Base Density [1] | 0.918 | g/cm³ | 0.918 | g/cm³ | 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/in³ | 30.8 | J/cm³ | |
| 2.0 mil (51 µm) | 290 | ft·lb/in³ | 24.0 | J/cm³ | |
| Film Toughness | | | | | ASTM D882 |
| MD : 0.80 mil (20 µm) | 2450 | ft·lb/in³ | 203 | J/cm³ | |
| MD : 2.0 mil (51 µm) | 2720 | ft·lb/in³ | 225 | J/cm³ | |
| TD : 0.80 mil (20 µm) | 4320 | ft·lb/in³ | 358 | J/cm³ | |
| TD : 2.0 mil (51 µm) | 3160 | ft·lb/in³ | 262 | J/cm³ | |
| 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 | % | |



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| 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 [2] | | | | | 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 [3] | | | | | 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 | |

| Thermal | Nominal Value | (English) | Nominal Value | (SI) | Test Method |
|---|---|---|---|---|---|
| Vicat Softening Temperature | 210 | °F | 98.9 | °C | ASTM D1525 |
| Melting Temperature (DSC) | 253 | °F | 123 | °C | Dow Method |

| Optical | Nominal Value | (English) | Nominal Value | (SI) | Test Method |
|---|---|---|---|---|---|
| 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 | % | |

| 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 = 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.

[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.



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