

# Aegis® PIR-H135MP Nylon 6 Extrusion Grade Homopolymer



## Description

**Aegis® PIR-H135MP** resin from AdvanSix contains 100% post-industrial recycled (PIR) raw materials<sup>1</sup> while providing the same top performance and processability as Aegis® H135MP, its standard, non-recycled counterpart. Aegis® PIR-H135MP is a lubricated and nucleated, high viscosity, nylon 6 extrusion grade homopolymer for cast or blown film applications. It conforms to FDA requirements of 21 CFR 177.1500 as well as EU Directive 2011/10/EC. Aegis® PIR-H135MP homopolymer possesses the combination of strength, toughness and thermoforming properties associated with nylon 6 as well as excellent heat, chemical and abrasion resistance.

| Typical Properties                          | Test Method | Unit              | Value         |
|---|-------------|-------------------|---------------|
| <b>Parameter</b>                            |             |                   |               |
| Viscosity, FAV                              | ASTM D-789  |                   | 135           |
| RV @ 96% Sulfuric Acid                      |             |                   | 3.75          |
| Extractable Content                         | SOP-702-307 | %                 | Max. 0.8      |
| Density                                     | ASTM D-792  | g/cm <sup>3</sup> | 1.13          |
| Melt Flow Rate, 235°C/1.0 kg (455°F/1.0 kg) | ASTM D-1238 | g/10 min          | 1.2           |
| <b>Moisture</b>                             |             |                   |               |
| Moisture Content                            | ASTM D-6869 | %                 | Max. 0.08     |
| Moisture (24 Hour)                          | ASTM D-570  | %                 | 1.6           |
| Moisture (50% RH)                           | ASTM D-570  | %                 | 2.7           |
| Moisture (Saturation)                       | ASTM D-570  | %                 | 9.5           |
| <b>Thermal</b>                              |             |                   |               |
| Melting Point                               | ASTM D-3418 | °C (°F)           | 220°C (428°F) |

| Film Properties                                 | Test Method | Unit                       | Value |
|---|-------------|----------------------------|-------|
| <b>Gas Barrier @ 23°C (73°F)/0% RH</b>          |             |                            |       |
| Oxygen Permeability                             | D-3958      | cc/m <sup>2</sup> /day     | 40.3  |
| Water Vapor Permeability @ 38°C (100°F)/100% RH | F-1249      | gm-mil/m <sup>2</sup> /day | 992   |
| Nitrogen Permeability                           |             | cc/m <sup>2</sup> /day     | 14.0  |
| Carbon Dioxide Permeability                     |             | cc/m <sup>2</sup> /day     | 72.8  |

<sup>1</sup>Using an industry-accepted mass balance method, AdvanSix allocates recycled material into 100% PIR Aegis® resins. PIR grades are certified by an independent third-party organization (SCS Global Services) for recycled content, with annual audits.

The values presented in this data sheet are typical values and are not to be interpreted as product specifications.

| Film Properties (continued)          | Test Method | Unit   | Value (MD)* | Value (TD)* |
|--------------------------------------|-------------|--------|-------------|-------------|
| <b>Mechanical</b>                    |             |        |             |             |
| Tensile Modulus, 23°C (73°F)         | ASTM D-882  | MPa    | 640         | 610         |
| Tensile Yield, 23°C (73°F)           | ASTM D-882  | MPa    | 30          | 30          |
| Tensile Strength, 23°C (73°F)        | ASTM D-882  | MPa    | 100         | 100         |
| Elongation, 23°C (73°F)              | ASTM D-882  | %      | 350         | 360         |
| Graves Tear, 23°C (73°F)             | ASTM D-1004 | N      | 2540        | 2230        |
| Elmendorf Tear Strength, 23°C (73°F) | ASTM D-1922 | N      | 840         | 1140        |
| Puncture Strength, 23°C (73°F)       | ASTM D-5478 | grams  | 940         | -           |
| Puncture Index, 23°C (73°F)          | ASTM D-5478 | gm/mil | 480         | -           |

\*Note: MD = Machine Direction and TD = Traverse Direction. Test samples obtained from 2-mil thick unoriented cast film.

| Molded Properties                        | Test Method | Unit    | Value (MD)* |
|--|-------------|---------|-------------|
| <b>Mechanical</b>                        |             |         |             |
| Tensile Modulus, 23°C (73°F)             | ASTM D-882  | MPa     | 3,130       |
| Tensile Strength, 23°C (73°F)            | ASTM D-882  | MPa     | 80          |
| Yield Elongation, 23°C (73°F)            | ASTM D-882  | %       | 3.7         |
| Flexural Modulus, 23°C (73°F)            | ASTM D-790  | MPa     | 2,690       |
| Flexural Strength, 23°C (73°F)           | ASTM D-790  | MPa     | 100         |
| Notched Izod, 23°C (73°F)                | ASTM D-256  | J/m     | 60          |
| Heat Deflection Temperature, 23°C (73°F) | ASTM D-648  | °C (°F) | 57 (135)    |

Processing conditions for test specimens: melt temperature = 240°C (464°F); mold temperature = 80°C (176°F).

## Processing Guidelines

### Material Handling

Aegis® PIR-H135MP is supplied in sealed containers and drying prior to processing is not required. However, higher moisture is the primary cause of processing issues. If drying becomes necessary, a dehumidifying or desiccant dryer operating at 80°C (176°F) is recommended. Drying time is dependent on moisture level. More information about safe handling procedures can be obtained by requesting the Safety Data Sheet on [AdvanSix.com](https://www.advanSix.com).

## Extrusion Guidelines

### Melt Viscosity vs. Temperature

Melt Temperature: 220°C (428°F)

Melt Temperature Range: 232°C (450°F) to 271°C (520°F).

Two key factors affect the melt viscosity (stiffness or fluidity of the melt):

1. The molecular weight (Mw) of the resin: Higher Mw resins will have a higher melt viscosity than lower Mw resins.
2. Temperature of the melt for any given Mw resin: Higher process temperatures will provide a more fluid melt viscosity than lower process temperatures.

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## Typical Barrel Profile for Cast Films

Barrel: 230-260°C (446-500°F)

Adapter: 260-266°C (500-510°F)

Die: 260°C (500°F)

Process Melt Temperature: 260-270°C (500-518°F)

## Typical Barrel Profile for Tubular (Blown) Films

Barrel: 246-254°C (474-490°F)

Adapter: 260°C (500°F)

Die: 254°C (490°F)

Process Melt Temperature: 254-260°C (490-500°F)

## Screw Parameters

Metering Section: 40%

Transition Section: 3 to 4 flights

Feed Section: Balance of screw length

Compression Ratio: 3.5:1 to 4.0:1

L/D Ratio: 24:1

## Metering Section Flight Depth

| Screw Diameter | Recommended Depth |
|----------------|-------------------|
| 1"             | 0.055"            |
| 1.5"           | 0.060"            |
| 2"             | 0.070"            |
| 2.5"           | 0.080"            |
| 3.5"           | 0.100"            |
| 4.5"           | 0.115"            |
| 6"             | 0.135"            |

Note: The values in this data sheet are for natural color resins only. Colorants or other additives may alter some or all of these properties. The data listed here fall within the normal range of product properties, but should not be used to establish specification limits nor used alone as the basis of design.



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## Contact AdvanSix

To learn more about the benefits of Aegis® Nylon Resins, visit

[AdvanSix.com/NylonSolutions](https://AdvanSix.com/NylonSolutions) or call:

**1-844-890-8949** (toll free, U.S./Can.)

**+1-973-526-1800** (international)

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