

Aegis® PIR-H135ZP Nylon 6 Extrusion Grade Homopolymer



Description

Aegis® PIR-H135ZP resin from AdvanSix contains 100% post-industrial recycled (PIR) raw materials¹ while providing the same top performance and processability as Aegis® H135ZP, its standard, non-recycled counterpart.

Aegis® PIR-H135ZP is a high viscosity, nylon 6 extrusion grade homopolymer for cast and blown film applications. Aegis® PIR-H135ZP combines the strength, toughness and thermoforming of nylon 6 with excellent heat, chemical and abrasion resistance. It also meets the food contact materials requirements of US FDA regulation 21 CFR 177.1500 as well as EU Directive 2011/10/EC.

Typical Properties	Test Method	Unit	Value
Parameter			
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 ³	1.13
Melt Flow Rate, 235°C/1.0 kg (455°F/1.0 kg)	ASTM D-1238	g/10 min	1.2
Moisture			
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
Thermal			
Melting Point	ASTM D-3418	°C (°F)	220°C (428°F)

Film Properties	Test Method	Unit	Value
Gas Barrier @ 23°C (73°F)/0% RH			
Oxygen Permeability	D-3958	cc.25µm/m ² /day (cc.mil/100 in ² /day)	40.3 (2.6)
Water Vapor Permeability @ 38°C (100°F)/100% RH	F-1249	gm.25µm/m ² /day (gm.mil/100 in ² /day)	992 (64)
Nitrogen Permeability		cc.25µm/m ² /day (cc.mil/100 in ² /day)	14.0 (0.9)
Carbon Dioxide Permeability		cc.25µm/m ² /day (cc.mil/100 in ² /day)	72.8 (4.6)

Film properties continued on page 2.

¹Using 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.

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Film Properties (continued)	Test Method	Unit	Value (MD)*	Value (TD)*
Mechanical				
Tensile Modulus, 23°C (73°F)	ASTM D-882	MPa	660	640
Tensile Yield, 23°C (73°F)	ASTM D-882	MPa	30	30
Tensile Strength, 23°C (73°F)	ASTM D-882	MPa	90	90
Elongation, 23°C (73°F)	ASTM D-882	%	330	330
Graves Tear, 23°C (73°F)	ASTM D-1004	N	2,170	2,380
Elmendorf Tear Strength, 23°C (73°F)	ASTM D-1922	N	860	990
Puncture Strength, 23°C (73°F)	ASTM D-5478	grams	1,050	-
Puncture Index, 23°C (73°F)	ASTM D-5478	gm/mil	470	-

*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)*
Mechanical			
Tensile Modulus, 23°C (73°F)	ASTM D-882	MPa	2,630
Tensile Strength, 23°C (73°F)	ASTM D-882	MPa	80
Yield Elongation, 23°C (73°F)	ASTM D-882	%	4.1
Flexural Modulus, 23°C (73°F)	ASTM D-790	MPa	2,610
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)	55 (131)

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

Processing Guidelines

Material Handling

Aegis® PIR-H135ZP 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://www.advanSix.com/NylonSolutions) or call:

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

+1-973-526-1800 (international)

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AdvanSix

300 Kimball Drive, Suite 101
Parsippany, NJ 07054



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