

NYLON SOLUTIONS

Aegis® OXCE Resin

Description

Aegis® OXCE resin is an oxygen scavenging polyamide composition formulated specifically for use in high-performance packaging applications where high gas barrier is required. This product is useful in injection and extrusion molding applications. Aegis® OXCE offers high oxygen barrier, even at high humidity, good carbon dioxide barrier, easy processing (particularly in the PET co-injection stretch blow molding process), excellent delamination resistance and clarity.

Typical Properties	Typical Value		Test Method
	English	Metric	
Physical Properties			
Density	72.4 lb/ft ³	1.16 g/cm ³	D1505
Bulk Density	47 lb/ft ³	0.75 g/cm ³	ISO 60
Mechanical Properties			
Tensile Strength @ yield	13,080 psi	90.2 MPa	ISO 527
@ break	7,790 psi	53.7 MPa	
Elongation @ yield	4.4 %	4.4 %	ISO 527
@ break	130 %	130 %	
Flexural Strength	17,100 psi	118 MPa	ISO 178
Flexural Modulus	432,000 psi	2980 MPa	
Thermal Properties			
Melt Index @ 280°C / 2.16 kg		23 g/10 minutes	ISO 1133
Melt Index @ 260°C / 2.16 kg		13 g/10 minutes	
Deflection Temperature @ 66 psi	158°F	70°C	D648
Under Load (DTUL) @ 264 psi	145°F	62.7°C	
Melting Point, T _m	457°F	236°C	DSC
Glass Transition, T _g	165°F	74°C	DSC
Gas Barrier Properties			
Oxygen Transmission Rate (OTR)*	< 0.003	< 0.05	
80% RH 23 C (Cast film)	cc mil/100 in ² /atm.day	cc 25µm/m ² /atm.day	
Carbon Dioxide Transmission Rate	1.6	25	
80% RH 23 C (Oriented film)	cc mil/100 in ² /atm.day	cc 25µm/m ² /atm.day	

*During scavenging period. After scavenger is consumed, OTR is approximately 0.5-1 cc mil/100 in²/atm.day.

Product Testing Guidelines

Aegis® OXCE resin is specifically formulated for use as the barrier layer in multilayer co-injection stretch blow molded bottles. A loading of 5% to 8% Aegis® OXCE resin is recommended for most applications.

Package Testing

Oxygen Transmission/Ingress Testing

Oxygen transmission testing of multilayer bottles containing Aegis® OXCE resin should be conducted at conditions of 100% RH air outside of bottle and 50% RH nitrogen inside bottle. Bottle testing should be done in accordance with the guidelines set forth by the test equipment manufacturer. A 100% RH air environment can be achieved with a plastic liner filled with moistened sponge material. Aegis® resins are activated by the presence of moisture; an induction time is typically observed before the full activation of the resin. For oxygen ingress testing for total package oxygen, we recommend testing of multilayer bottles containing Aegis® OXCE resin at conditions of 100% RH air inside of bottle (fill bottles with de-oxygenated water) and ambient (or higher/lower) RH outside of bottle.

Carbon Dioxide Transmission Testing

Carbon dioxide transmission testing of multilayer bottles containing Aegis® OXCE resin is recommended at application-specific conditions (e.g. 100% RH carbonated water inside bottle, ambient RH outside bottle). Three regimes are typically observed in data which depicts the percent loss of carbon dioxide versus time in multilayer bottles. They are: (1) a steep negative slope over a 24-48 hour period due to pressure loss from bottle due to elastic, plastic and creep deformation, (2) a moderating (decreasingly negative slope) due to adsorption, absorption and diffusion of carbon dioxide into the inner PET layer, and (3) steady-state diffusion of carbon dioxide through the total multilayer structure. This third regime demonstrates the steady-state barrier performance of the total three-layer structure.

Product Processing Guidelines

Aegis® OXCE resin is specifically formulated to process in injection or co-injection systems, including systems that utilize a ram or plunger process to deliver the melt.

Screw Design

A general purpose screw with feed, transition and metering sections, a 20:1 L/D (flight length of screw/outside diameter of screw) and a compression ratio of 3:1- 4:1 (depth of feed section/depth of metering section) is recommended.

Material Handling

Aegis® OXCE resin is pre-dried and shipped in foil-lined containers. It is recommended to discard any material that is: (1) in damaged/broken packages, (2) stored unsealed in ambient conditions for an extended period of time or (3) more than six months older than the manufacturing date (which is printed on the lot number label found on the liner inside the box).

Material Drying

It is recommended to load Aegis® OXCE resin into a desiccant hopper dryer to eliminate moisture pickup during processing. A hopper dryer temperature of 70°C (158°F) - 80°C (176°F) should be used. Hopper dryer temperatures should not exceed 85°C (185°F). Temperatures above 85°C (185°F) may cause material to soften or may cause yellowing of resin. If material is stored in the hopper dryer overnight or for long periods of time, a hopper dryer temperature of 50°C (122°F) is suggested.

It is recommended to check the moisture level of Aegis® OXCE resin prior to processing. Moisture levels can be measured by titration or thermal (weight loss) analysis. For thermal analysis, a 25 g sample, a test temperature of 160°C (320°F) and a test time of seven minutes are recommended.

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

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Processing Conditions for Aegis® OXCE

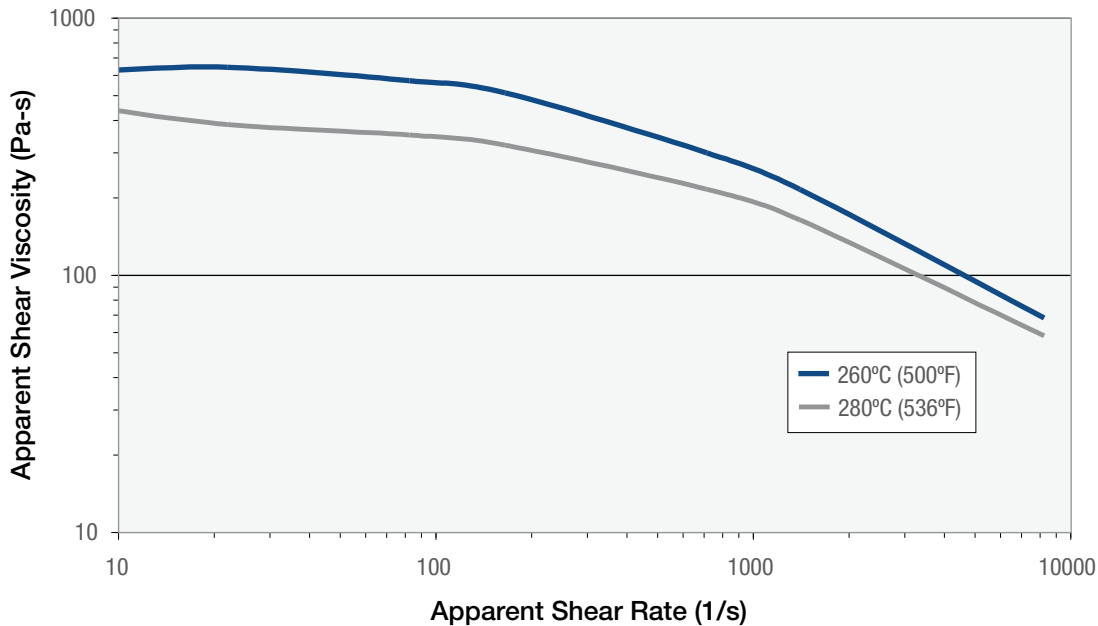
A typical processing temperature profile for Aegis® OXCE is provided below.

Processing Temperature Profile

Location	Temperature Setting °C / °F
Feed	35 (95)
Zone 1	245 (473)
Zone 2	265 (409)
Zone 3	265 (409)
Zone 4	265 (409)
Zone 5	265 (409)
Nozzle	265 (409)
Manifold	265-280 (409-536)

During startup, allow the barrels, nozzle and manifold to reach recommended temperatures before processing. If purging is required, PET can be used for the barrel and manifold.

Aegis® OXCE Melt Rheology



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Contact AdvanSix

To learn more about the benefits of Aegis® OXCE, visit

AdvanSix.com/NylonSolutions or call:

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

+1-973-526-1800 (international)

AdvanSix

300 Kimball Drive, Suite 101
Parsippany, NJ 07054



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