Aegis® CSDE Generation II Resin

Effective Date: 1/23/17

Description

Aegis® CSDE Generation II is an injection moldable barrier nylon resin for use in multi-layer PET container applications where enhanced shelf life, transparency and delamination resistance are desired. Aegis® CSDE has a good carbon dioxide barrier and is particularly useful for carbonated soft drink applications.

Typical Properties

PROPERTIES	TYPICAL VALUES		Test Method
	English	*Metric*	
Physical Properties			
Density	73.7 lb/ft^3	1.18 g/cm^3	ASTM D1505
Bulk Density	45.6 lb/ft^3	0.73 g/cm^3	ISO 60
Thermal Properties			
Tm	428°F	220°C	(ISO11357) DSC
Tg	156°F	69°C	(ISO11357) DSC
Gas Barrier Performance (Cast Film)	*English* cc.mil/100in^2.day.atm	*Metric* cc.25µm/m^2.day.atm	
Oxygen Transmission Rate			
23°C 80%RH	1.02	15.8	
Carbon Dioxide Transmission Rate			
23°C 80%RH	3.00	46.5	

Product Testing Guidelines

AEGIS® CSDE Generation II resin is specifically formulated for use as the barrier layer in multilayer co-injection stretch blow molded bottles. We recommend a loading of 5% to 8% **AEGIS® CSDE Generation II** resin for most applications.

Package Testing

Oxygen Transmission/Ingress Testing

We recommend oxygen transmission testing of multilayer bottles containing Aegis® resin 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. For oxygen ingress testing for total package oxygen, we recommend testing of multilayer bottles containing Aegis® resin at conditions of 100% RH air inside of bottle (fill bottles with de-oxygenated water) and ambient (or higher/lower) RH outside bottle.

Carbon Dioxide Transmission Testing

We recommend carbon dioxide transmission testing of multilayer bottles containing Aegis® resin 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 CO_2 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 barrier performance of the total three-layer structure.

Product Processing Guidelines

AEGIS® CSDE Generation II resin is specifically formulated to process in injection or co-injection systems, even 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.

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Material Handling

All Aegis® resins are pre-dried and shipped in foil-lined containers. We recommend discarding any material that is: (1) in damaged/broken packages or (2) stored unsealed in ambient conditions for an extended period of time.

Material Drying

We recommend loading **AEGIS® CSDE Generation II** 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, we suggest a hopper dryer temperature of 50 °C (122 °F).

It is recommended to check the moisture level of **AEGIS® CSDE Generation II** resin prior to processing. Moisture levels of Aegis® resin can be measured by titration or thermal (weight loss) analysis. For thermal analysis, we recommend a 25 g sample, a test temperature of 160 °C (320 °F) and a test time of 7 minutes.

Processing Conditions for AEGIS® CSDE Generation II

A typical processing temperature profile for **AEGIS® CSDE Generation II** is given in Table 1.

Table 1: Processing Temperature Profile

Location	Temperature Setting /°C
Feed	35
Zone 1	245
Zone 2	265
Zone 3	265
Zone 4	265
Zone 5	265
Nozzle	265
Manifold	265-280

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.

Contact AdvanSix
To learn more about the benefits of Aegis® Nylon Resins, visit **Advan6.com** or call:
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