

Aegis® CSDE Generation II Resin

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 Generation II resin has a good carbon dioxide barrier and is particularly useful for carbonated soft drink applications.

Typical Properties	Typical Values		Test Method
	English	Metric	
Physical Properties			
Density, g/cm ³	73.7 lb/ft ³	1.18 g/cm ³	ASTM D-1505
Bulk Density	45.6 lb/ft ³	0.73 g/cm ³	ISO 60
Thermal Properties			
Melting Temperature (T _m)	428°F	220°C	(ISO 11357) DSC
Glass Transition Temperature (T _g)	156°F	69°C	(ISO 11357) DSC
Gas Barrier Performance (Cast Film)			
Oxygen Permeability @ 23°C (73°F), 80% RH	1.02 cc.mil/(100 in ² .atm.day)	15.8 cc.25 μm/m ² .atm.day	
Carbon Dioxide Transmission Rate @ 23°C (73°F), 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. A loading of 5% to 8% Aegis® CSDE Generation II resin is recommended for most applications.

Package Testing

Oxygen Transmission/Ingress Testing

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

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

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Carbon Dioxide Transmission Testing

Carbon dioxide transmission testing of multilayer bottles containing Aegis® CSDE Generation II 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® CSDE Generation II 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® CSDE Generation II 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® 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, a hopper dryer temperature of 50°C (122°F) is suggested.

It is recommended to check the moisture level of Aegis® CSDE Generation II 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.

Processing Conditions for AEGIS® CSDE Generation II

A typical processing temperature profile for Aegis® CSDE Generation II is provided below.

Processing Temperature Profile

Location	Temperature Setting °C/°F
Feed	35 (95)
Zone 1	245 (473)
Zone 2	265 (509)
Zone 3	265 (509)
Zone 4	265 (509)
Zone 5	265 (509)
Nozzle	265 (509)
Manifold	265-280 (509-536)

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.

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Contact AdvanSix

To learn more about the benefits of Aegis® Nylon Resins, visit AdvanSix.com/NylonSolutions or call: **1-844-890-8949** (toll free, U.S./Can.) **+1-973-526-1800** (international)

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February 2018-5, Printed in U.S.A.
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