



Laser+® W (AF405)

polyethylene terephthalate resin

General

Laser+® W (AF405) polyethylene terephthalate (PET) resin is a copolymer formulated for conversion to PET jugs and containers with thick wall by conventional or two-stage processing technology where high chemical resistance is needed.

Product Description

Bi-orientation of Laser+® W (AF405) by injection/stretch blow molding provides optimal barrier and mechanical properties, including superior stress crack resistance. It performs exceptionally well in the manufacture of jugs and containers made from thick-wall preforms, where heat up rate and temperature profile through the wall are important. Laser+® W (AF405) is engineered to improve acetaldehyde (AA) performance without sacrificing intrinsic viscosity (IV). Laser+® W (AF405) offers superior heat absorption and processing control, even at higher blowing speeds. A slower crystallization rate enables high injection molding output.

Sales Specifications

Property	Value	Test Method
Intrinsic Viscosity	0.82 ± 0.02	AP-QAR-SOP-0012
Color L* CIE	78 min	AP-QAR-SOP-0011
Color b* CIE	-0.5 ± 2.0	
Acetaldehyde	2 ppm max	AP-QAR-SOP-0010

Product Information

Certification

Laser+® W (AF405) is ideally suited for food packaging applications. A Product Regulatory Information Sheet (PRIS) for Laser+® W (AF405) is available upon request.

Typical Properties

Property	Value	Test Method
Moisture Content ¹	0.25% max	AP-QAR-SOP-0013
Fines ¹	0.05% max	AP-QAR-SOP-0014
Crystallinity	>40%	AP-QAR-SOP-0016
Melt Point, nominal	242°C	AP-QAR-SOP-0016

¹ As packaged

These values represent the anticipated performance data for these polyester resins and intermediates; they are not intended to be used as design data. We believe this information is the best currently available on the subject. It is offered as a possible helpful suggestion in the experimentation you may care to undertake along these lines. It is subject to revision as additional knowledge and experience is gained. No guarantee of results, assumption of obligation or liability whatsoever in connection with this information is made. This publication is not a license to operate under, or intended to suggest infringement of, any existing patents.

CAUTION: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, see "Medical Caution Statement"

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Product Information

Material Drying

Proper drying of polyethylene terephthalate (PET) is essential to produce a high-quality part (container, film, etc.) with optimum physical properties. PET is hygroscopic, meaning that when it is exposed to humid atmospheres, it will absorb moisture. In PET, the moisture is not only on the surface but diffuses slowly through the whole pellet and is firmly held by molecular attraction. Before processing the PET, this moisture must be removed. Carefully controlled drying of all PET is an essential requirement for optimum processing performance and final product properties. If drying is not carried out properly, loss in molecular weight, process control and mechanical properties of the PET material may occur during melt processing due to hydrolytic degradation.

Drying of PET polymer involves the diffusion of absorbed moisture from the interior of the polymer chip to its surroundings and, subsequently, the removal of moisture from the bulk of polymer chips. Moisture removal can be achieved by heating the polymer chip under dry air or vacuum. In an air-drying system, heated and dehumidified air flows up through a chip bed and returns to the dehumidifier. The key requirements for a reliable drying process are:

Dehumidified air dew point: This should not be allowed to rise above -34°F (-37°C) and should preferably be -40°F (-40°C) or lower, as measured after the desiccant bed. Always check the correct regeneration temperatures and frequency are being used.

Dehumidified air flow through the chip bed: Most dryers operate at around 1 ft³ per minute (28.3 L/min) of airflow per 1 lb./hr. (0.45 kg/hr.) of PET chip as a minimum requirement, with the airflow at the correct temperature and dew point.

Chip residence time (drying time): A minimum chip residence time for PET of four hours and preferably six hours is recommended. This is the theoretical drying time, which is calculated by dividing dryer capacity throughput. Extended periods of high temperature can adversely affect the polymer processing conditions. In the event of a stoppage for an extended period, dry polymer can be stored in the dryer-hopper by reducing the air temperature to 240°F (116°C) (or even lower) while maintaining dry airflow through the dryer hopper.

Dehumidified air temperature: Correctly designed equipment should operate at temperatures up to 329°F (165°C) measured on entry to the dryer hopper, with an absolute maximum of 347°F (175°C) to prevent possible discoloration.

Drying temperature: The temperature difference of the pellet compared to the temperature of the dehumidified air must not be greater than 50°F (10°C) measured at the dryer exit.