

Laser+® W (K42A)

polyethylene terephthalate resin

Product Information

General

Laser+® W (K42A) polyethylene terephthalate (PET) resin is a copolymer formulated for conversion to PET bottles by conventional single or two-stage processing technology. This product is made using IntegRex® Technology.

Product Description

Bi-orientation of Laser+® W (K42A) by injection/stretch blow molding provides optimal barrier and mechanical properties, including superior stress crack resistance. It performs exceptionally well in the manufacture of water bottles where heat up rate and temperature profile through the wall are important.

Laser+® W (K42A) has been engineered for water bottle use by providing a slightly lower intrinsic viscosity (IV), allowing for a gentle injection molding process, and improved acetaldehyde (AA) performance. Laser+® W (K42A) offers superior heat absorption and processing control, even at higher blow molding speeds. A relatively slow crystallization rate enables high injection molding output.

Sales Specifications

Property	Value	Test Method
Intrinsic Viscosity	0.75 ± 0.02	AP-QAR-SOP-0012
Color L* CIE	69 min	AP-QAR-SOP-0011
Color b* CIE	-5.1 ± 1.4	
Acetaldehyde	1 ppm max	AP-QAR-SOP-0010

Certification

Laser+® W (K42A) is ideally suited for food packaging applications. A Product Regulatory Information Sheet (PRIS) for Laser+® W (K42A) 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	>35%	AP-QAR-SOP-0016
Melt Point, nominal	244°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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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 pellet to its surroundings and, subsequently, the removal of moisture from the bulk of polymer pellets. Moisture removal can be achieved by heating the polymer pellet under dry air or vacuum. In an air-drying system, heated and dehumidified air flows up through a pellet 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 pellet 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 pellet as a minimum requirement, with the airflow at the correct temperature and dew point.

Pellet residence time (drying time): A minimum pellet 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 by 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 340°F (171°C) measured on entry to the dryer hopper, with an absolute maximum of 350°F (177°C) to prevent possible discoloration.

Drying temperature: The ACTUAL pellet temperature should achieve between 300°F (149°C) and 330°F (166°C) measured at the dryer exit.

Important Start-Up and Shut-Down Procedures:

Dryer Start-Up Conditions

- When beginning to dry a "wet" load of pellets, start drying at reduced temperatures 135 to 150°C (275 to 300°F) for 2 hours
- Raise the drying temperature to a maximum of 165°C (330°F) for a single stage drying system for the remaining start-up drying time (2-4 additional hours)

Dryer Running Conditions

- When running the injection molding machine, it is recommended to not exceed 170°C (340°F)
- Absolute maximum drying condition is 175°C (350°F).
- When higher operational temperatures are used, care should be taken if the machine stops production (idle time of 20+ minutes) to reduce the drying temperature down to a maximum of 165°C (330°F) and preferred to be at or below 150°C (300°F).

Shutting Down Dryers

- Ensure pellet temperature is cooled to below 120°C (250°F) prior to shutting down process air blower
- Time required to reduce the pellet temperature varies on ambient conditions, equipment configuration, and air flow capacity
- If pellets reside in drying vessel above the recommended cooled pellet temperature, degradation can occur (IV loss and yellowing)

Note: When a stoppage occurs for an extended period of time, dry resin pellets may be stored in the drying vessel at a reduced air temperature of 115°C (240°F). Drying of these pellets will not then be necessary, only increasing of the pellet temperature will be required to restart the system.