Torlon® AI-10
polyamide-imide

Torlon® AI-10 is a polyamideimide (PAI) powder developed for the performance coatings industry. As a liquid polymer solution, the resin is incorporated into the formulation of engineered coatings; often as the principal primer, binder, or high temperature adhesive component. As a powder, the resin is used in specialty composites and unique dry spray applications.

Coatings based on the Torlon® AI-10 polymer yield durable, abrasion resistant, thermally stable films that do not exhibit unwanted thermoplastic properties. The resin has superior resistance to organic solvents and a wide array of other commercial and industrial chemicals. Outstanding tribological characteristics are afforded both by the resin as well as its unparalleled intra-coat adhesion to fluoropolymers. Coatings based on AI-10 polymer have been shown to be cost effective in electrical/electronic, high temperature decorative and corrosion preventative applications.

Magnet wire insulation and protective coatings for printed circuit boards are some of the electrical uses. Industrial applications include primers and decorative topcoats for cookware, appliances and housewares. AI-10 polymer has been combined with fluoropolymers to produce high-performance, low-friction, corrosion-resistant coatings that provide protection to saw blades, gears, carburetor needles and lawn and garden tools. Torlon AI-10 is also used for high-strength, high-temperature adhesives. Excellent bond strengths have been observed with stainless steel, aluminum and titanium alloys and polyimide films.

A special grade (called AI-10 LM) has been developed to reduce the amount of residual methylene dianline (MDA) monomer to below the 1000ppm level specified in hazard communication regulations.

A water soluable analog of AI-10 (called Torlon® AI-30) is also available.

General		
Material Status	• Commercial: Active	
Availability	• Africa & Middle East • Asia Pacific • Europe	• Latin America • North America
Features	• Abrasion Resistant • Chemical Resistant • Flame Retardant	• Good Adhesion • High Heat Resistance
Uses	• Adhesives • Binder	• Coating Applications
RoHS Compliance	• RoHS Compliant	
Forms	• Powder	
Processing Method	• Coating	• Solution Processing

Physical	Typical Value	Unit
Viscosity [1] (23°C)	1.00	Pa·s

Torlon® AI-10
polyamide-imide

Additional Information	Typical Value	Unit
Non-Volatile Content [2]	90	%

Solubility

Torlon AI-10 resin is supplied as a powder that is readily dissolved in N-methyl pyrrolidone (NMP) and other aprotic solvents. Other organic solvents may be used as diluents to reduce viscosity at lower cost. N-methyl pyrrolidone is hydrophilic, and as such, retains considerable amounts of water. Adding non-polar diluents may be appropriate to aid in the application process and to prevent potential formulation and shelf stability issues.

Pigments and Additives

Pigments and additives can be used with Torlon AI-10 polymer to produce special purpose coating and adhesive formulations. Suitable additives include heat-stable organic and inorganic pigments, fillers and certain epoxy and fluoropolymer copolymers. Due to the inherent color of Torlon AI-10 polymer, care must be taken if white or very pale shades are to be successfully formulated. To prevent the absorption of unwanted moisture, all pigments should be ground in closed milling equipment. Likewise, hydroscopic additives, such as fibers and copolymers, should be dried to appropriate moisture levels prior to being incorporated into the formulation.

Application.

Depending on the aesthetic and performance characteristics required, uniform coatings can be applied by spray, roll, spin or curtain techniques. Usually, dry film thicknesses from 10-20 µm are readily achieved in a single coating pass, with multicoat systems affording the opportunity for additional surface build. Regardless of the method employed, it is essential to assure appropriate preparation of the substrate prior to application of coating. Once complete, application equipment should be purged of coating and cleaned with a true solvent.

Drying/Curing

Coatings based upon Torlon AI-10 resin dry and initiate cure at temperatures as low as 150°C (300°F). However, optimal film properties result after heating for 5 to 20 minutes, depending on the film thickness and the formulation, at 250°C (480°F). In the case of multi-coat systems, an intermediate temperature step at around 200°C (390°F) for 10 minutes may be advisable. For coating formulations employing low solids, a brief flash off period of about 3 to 10 minutes may be recommended prior to initiating cure.

Notes

Typical properties: these are not to be construed as specifications.

[1] 25% in NMP ± 300 mPa-s

[2] ± 1.5%