PRODUCT BULLETIN

August 2023

DION® 382E

Powdered Bisphenol-A Fumarate Resin

DESCRIPTION

DION® 382E is a powdered, monomer-free, bisphenol-A fumarate polyester. DION® 382E is typically used as a styrene-soluble binder for fiberglass reinforcement products. DION® 382E when mixed with monomer produces parts with high crosslinking density and excellent corrosion resistance in a wide range of aggressive environments.

BENEFITS & FEATURES

- Batch-to-batch consistency and uniformity from production utilizing Statistical Process Control (S.P.C) & Statistical Quality Control (S.Q.C) techniques
- High tensile properties with chopped strand mat reinforcement. Propoxylated bisphenol-A fumarate based resin without solvents, crosslinking monomer, or external flow additives
- High molecular weight, coupled with melting and rheological properties permits production of thermoformable mat with good properties & excellent corrosion resistance with styrene version laminates
- Solubility with styrene and most organic solvents leads to good appearance, workability, and air release upon preparation of FRP laminates
- Welds together adjacent glass filaments without wicking or icing associated with solvent or water-based binder systems, this translates to minimal binder usage to achieve necessary mat tensile strength Uncrosslinked solid which behaves as an amorphous low melting point thermoplastic before curing
- Items properly fabricated with DION® 382E, after monomer conversion, can be used for food, beverage and water storage due to components being listed under FDA 177.2420 Title 21

PROPERTIES – LIQUID

Property[1]	Unit	382E
Acid Number	mg/g	15 (max)
Ring & Ball Softening Point	°C/°F	100/212
Mesh Size:		
on U.S. #35	%	0.5 (max)
thru U.S. #100	%	30.0 (max)
thru U.S. #200	%	10.0 (max)
Average Particle Size	Microns	10.0 (max)
Viscosity[2]	cps	500
Bulk Density	lb/cu.ft	35
Melt Index, 2,160gm @ 115°C	g/10 min	10.5
Tg, by DSC, midpoint, 10°C/min ramp		
First Heat	°C/°F	63/145
Second Heat	°C/°F	56/133

1) All properties at 25°C/77°F unless otherwise noted
2) 50% in styrene

APPLICATION

APPLICATION PROPERTIES

DION® 382E is widely used as a binder for chopped strand mat where good transparency or compatibility is desired for various reinforced plastics. Upon dissolution in styrene it will co-react with polyester laminating resins. The chemical structure of DION® 382E affords excellent corrosion resistance and the mat products are universally suitable for premium as well as general purpose applications.

An outstanding property in DION® 382E is that high mat tensile strengths are possible, while still affording a binder which dissolves styrene at a rate sufficient to permit good appearance, de-aeration, and workability during laminate construction. The binding strength is made possible by the high molecular weight and structure of DION® 382E.

Apart from chemical composition, binding efficiency is affected by particle size distribution, and alternate particle size versions can be offered. The choice of particle size depends on the weight of the glass mat produced, on the texture of the glass strand, and the effectiveness of mechanical distribution. Generally, lighter mats require finer particle size versions. Particle size distribution of DION® 382E is carefully controlled once the proper distribution is specified. Excessively large particles do not detract from binding strength, but result in wasted material. Likewise, too small particles, can afford insufficient mass to bridge and weld together adjacent glass filaments. Moreover, small particles may preferentially fall through the mat before they are fused. DION® 382E particles are irregularly shaped so they have a tendency to cling to the mat before fusion.

Processes for applying and fusing the binder vary widely. Typical usage is 2.5-4% by weight of the glass mat, depending on the desired degree of rigidity. Competitive solvent or water based emulsions tend to require more usage on a solid basis, because much of the binder tends to coat individual filaments without affording a weld to adjacent filaments. Moreover, the dry application system afforded by DION® 382E greatly reduces energy requirements and eliminates many enrironmental problems.

Stoving conditions will vary, but typically involve about 1.5 minutes at 160-220°C, depending on the furnace and mat thickness. The operation is designed to melt the binder to weld together the fibers at contact points. Overheating must be avoided to prevent the binder from homopolymerizing (yielding a stiff mat) to prevent discoloration. Generally, each operation must be individually optimized in accordance with heat transfer to the mat to assure the binder is optimally fluidized without overheating.

PREFORM APPLICATIONS

Because of its high molecular weight and melting characteristics, DION® 382E is finding growing use in various preform applications involved in RTM and SRIM. Preforms made from DION® 382E can exhibit good shape retention without the need for crosslinking or curing agents which yields stiffness that can be hard on mold surfaces. Furthermore, DION® 382E can afford shorter thermoforming cycles and lower temperatures to minimize discoloration problems with glass sizings.

Since DION® 382E represents a dry system, the need for evaporation of carrier fluids is avoided. This is especially advantageous in thick, multi-ply preforms since fiberglass is a good thermal insulator. The absence of water is an extra advantage whenever the preform is intended for urethane applications. Furthermore, preforms made from DION® 382E tend to be relatively resilient, which accelerates the cooling rate by allowing air to enter the preform whenever pressure is relaxed after the mat is thermoformed. DION® 382E may be limited in practicality for preform applications involving intricate shapes or where high fluid velocities are involved during RTM or SRIM injection. Individual testing is required, and Polynt should be consulted on the possible supply of specialized versions of the binder.

Refer to Polynt's Composites Applications Guide ("Cookbook") for equipment and application recommendations. Each user must determine the suitability of this product to his/her particular mode of operation and intended end-use application. A Polynt representative will be available to assist in the proper selection of all Polynt products available for commercial use.

SHELF LIFE & STORAGE

The shelf life of DION® 382E is 4 years from the date of manufacture from Polynt. To maximize usage life and maintain optimum properties, resins and gel coats should be stored in the original closed container at temperatures below 23°C/73°F and away from ignition sources and sunlight. Keep containers sealed to prevent moisture pick-up and monomer loss.

SAFETY & WARRANTY

To receive a copy of our safety and warranty information, please email safetyandwarranty@polynt.com.