

Technical Data Sheet & Processing Guide

Product Name: ENMAT PHBV resin
Product Code: Y1000P

Revision date: 2011/12/29

ENMAT™ Thermoplastics Resin Y1000P

ENMAT Y1000P is a thermoplastics resin that can be used as a primary composition in the following applications:

- Injection molding
- Thermoforming
- Blown films
- Extrusions

Typical Material Properties

Specific Gravity	1.25
Yield Stress (MPa)	31-36
Tensile Strength (MPa)	39
Elongation at Break (%)	2
Young's Modulus	2800-3500
Flexural Modulus	3520-4170
Vicat softening temperature (°C)	166
Notched Izod Impact (J/m)	22
DSC Melting Point (°C)	170-176

PHBV and ENMAT Pelletized Products - Injection Molding Guide

This information is intended for use only as a guide for the injection molding of Tianan ENMAT™ Y1000P pelletized products. It contains generalized concerns for safety, process conditions, and tooling.

Since injection molding covers a wide arena of applications and polymers, an experimental approach using these products at your facility will have to be completed to determine what tooling and mode of operation will work best. Testing of the molded products is also recommended in order to make sure it meets customer requirements.

1.0 Safety and Handling Precautions

All safety precautions normally followed in the handling and processing of melted thermoplastics should be followed for Tianan ENMAT™ Y1000P.

As with most thermoplastics, melt processing and the variability of those conditions may result in minor decomposition. Crotonic acid, cyclic dimer, carbon monoxide, tetrahydrofuran are minor decomposition products and will increase in levels if the melt temperature exceeds approx. 185 °C.

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The use of monomer fume hoods or exhausts near melt processing equipment is typically recommended.

Tianan ENMAT™ Y1000P resin is considered non-hazardous according to DOT (US Department of Transportation) shipping regulations.

When handling Tianan ENMAT™ Y1000P resin at room temperature, avoid direct skin and eye contact along with conditions that promote dust formation. For further information consult the supplied MSDS.

As with any melted thermoplastic waste, melted Tianan ENMAT™ Y1000P resin waste should be allowed to cool before being placed into any waste container to minimize fire risks.

2.0 Pellet Storage and Blending Recommendation

Tianan ENMAT™ Y1000P resin should be stored in an environment designed to minimize moisture uptake. Product should also be stored in a cool place at temperatures below 122°F (50°C). Product should be kept sealed until ready for loading into the blending and/or drying system. Bulk resin that is stored in closed silos and hoppers for extended periods (more than 6 hrs) should be kept purged with dry air or nitrogen to minimize moisture pickup. In the case of outside storage, the unopened container should be brought into the production area and allowed to equilibrate for a minimum of 24 hours before opening to prevent excessive condensation.

3.0 Resin Properties

Tianan ENMAT™ Y1000P resin is specifically designed for Injection Molding applications. Typical processing temperature settings are given in the table below:

Feed Temperature	135°C	* Note: <i>It is extremely important to heat the mold cavity to at least 60°C to ensure the parts crystallize to their maximum amount in the mold.</i>
Compression Section	145°C	
Metering Section	155°C	
Adapter	160°C	
Die	160°C	
Screw Speed	40-50 rpm	
Mold Temperature *	60°C	

4.0 Drying

Tianan ENMAT™ Y1000P resin can be successfully dried using most standard drying systems. Recommended conditions are provided for standard desiccant based column dryers. It is recommended that Tianan ENMAT™ Y1000P resin should be dried to a maximum of 250 ppm of moisture as measured by a Karl Fischer method.

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A moisture level lower than 250 ppm will not adversely affect the stability of Tianan Tianan ENMAT™ Y1000P resin, but will increase the viscosity stability over time at elevated temperatures. Processes that have unusually long residence times or result in melt temperatures greater than 170°C should only process Tianan ENMAT™ Y1000P resin at moisture levels less than 50 ppm for maximum retention of molecular weight and physical properties. Material is supplied in foil-lined bags. Keep the package sealed until ready for use and promptly dry and reseal any unused material.

Typical Tianan ENMAT™ Y1000P Resin, Raw Material Drying Conditions.

Typical desiccant dryer regeneration temperatures should not exceed 100°C for Tianan ENMAT™ Y1000P resin.

To prevent issues with pellet bridging, sticking or melting, the drying system should be verified to ensure temperature control is adequate during operation as well as during regeneration cycles since valve leakage is common in many systems.

Installation of a water-cooled after-cooler may be necessary to prevent the drying air temperature from exceeding the recommended set point when drying.

5.0 Melt Processing

Prior to introducing Tianan ENMAT™ Y1000P resin into any melt processing system, the system should be properly cleaned and purged to prevent any polymer cross contamination.

Ensure that the feeding and blending equipment is thoroughly cleaned and free from dust and contamination.

Ensure that all potential “dead space” areas such as elbows transitions and slide gates have all dust and granules completely removed. The purging procedures below are recommended for optimal removal of other polymers.

5.1 Tianan ENMAT™ Y1000P Resin Purging Procedure

Following PET, PA, or HDPE or other thermoplastics in your system:

1. Purge with low MFI (<1) PP at normal PET/ PA operating temperatures. Purge 10-30 minutes as necessary. Let system empty as much as possible. Clean out hopper as much as possible.
2. Introduce a high melt flow PP (5-8 MFR) and change to normal Tianan ENMAT™ Y1000P resin operating temperatures.
3. Purge 10-30 minutes as necessary. Let system empty as much as possible.
4. Stop injection molder and completely clean all hoppers, elbow, slide gates, dryers, hopper loaders bins, hopper loader filters and material conveying lines of residual PET, PA or HDPE and PP. Load Tianan ENMAT™ Y1000P resin into material handling system.
5. Transition to Tianan ENMAT™ Y1000P resin and purge following again until melt is clear of any contamination.

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6. At the completion of the run, purge all Tianan ENMAT™ Y1000P resin from the extrusion system, using a moderate to low melt index PP, immediately after completion of the production run.

Notes:

1. It is critical that all drying and conveying/receiving systems be free of any PET or PP and is vacuumed to ensure that there is no remaining polymer dust, before adding Tianan ENMAT™ Y1000P resin.

PET or Nylons will not melt at Tianan ENMAT™ Y1000P resin operating temperatures and will block screens if it is present in the system.

2. The brand of PP used for purging is unimportant, as long as it does not thermally cross-link.

5.2 Injection Mold Machine Recommendations

Tianan ENMAT™ Y1000P resin will injection mold on most conventional equipment. However, it is important to ensure the machine is completely purged of other materials as described above. Additionally, the mold must be heated to at least 60°C to ensure maximum crystallinity and easy ejection of the final part from the mold. If difficulties are encountered with part ejection, even with the mold heated, it is advisable to add a mold release agent such as stearic acid and its derivatives, eucicamide or other known mold release agents. Sodium derivatives should be avoided since these may accelerate degradation of the polymer.

All information on this Data Sheet is based on the present state of our knowledge with no guarantee of any kind whatsoever, whether implied or expressed, since conditions of use are outside our control. Each customer should establish his own rules and take proper steps appropriate to the circumstances within his control and must take responsibility for observing existing laws and regulations. This Data Sheet does not form part of the conditions of sale of our products and is of a general nature.

Some typical injection molded articles are illustrated below:

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