

MPM[®] 1113

Beta Nucleant Masterbatch

Introduction: MPM[®] 1113 is a pelletized masterbatch containing a high performance proprietary beta nucleant formulation in a polypropylene homopolymer resin. This masterbatch can be added to non-nucleated and some pigmented polypropylene polymers including homopolymers, random copolymers, and impact copolymers, in order to produce high levels of beta phase crystallinity in extruded sheets, films, and pipes, as well as injection molded parts. When extruded sheets are stretched in the solid state to produce oriented films, these films will develop microvoids causing them to become white/opaque in appearance and undergo a reduction in density. In thermoforming applications beta nucleation broadens the processing window and produces final parts that have improved material distribution and higher strength and rigidity, thereby allowing the parts to be down-weighted. In polypropylene pressure pipe applications, the use of MPM[®] 1113 leads to improved impact strength and improved long term creep performance, as well as excellent chemical resistance. MPM[®] 1113 may also be used by resin manufacturers and compounders to produce a fully formulated beta nucleated polypropylene resin.

Material Description: Brown pellets.

Chemical Name: Polypropylene homopolymer carrier resin plus proprietary additives

Empirical Formula: N.A.

CAS #: 9003-07-0 (polypropylene)

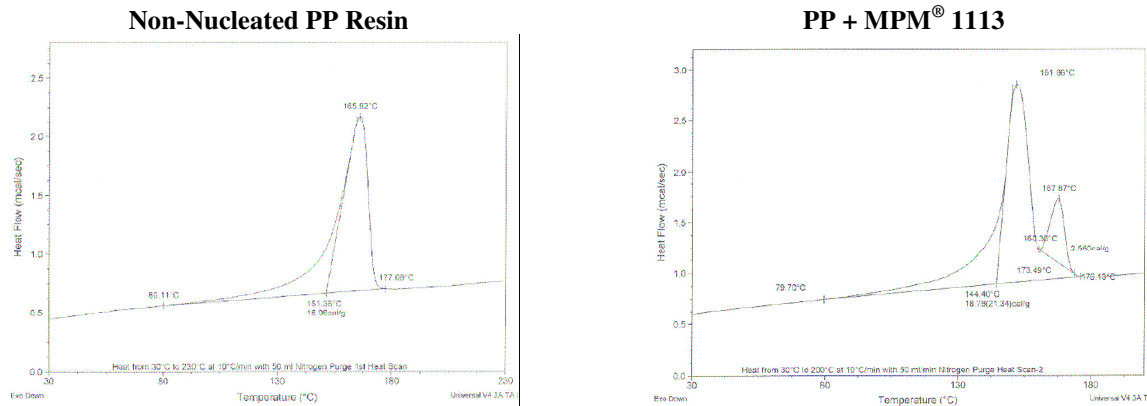
Physical Properties:

Melt Flow Rate:	18 g/10 min.
Melting Range:	Dual melting peaks ⁽¹⁾ : 150 – 155 °C for the beta crystal phase 162 – 167 °C for the alpha crystal phase

Specific Gravity (20°C): 0.90 g/cm³

(1). As measured on a 2% let-down of the masterbatch in polypropylene homopolymer resin on the second heat using Differential Scanning Calorimetry (DSC). (after cooling from the melt at 10 °C/min., and re-heating at 10 °C/min.)

Typical DSC Curves for Non-nucleated PP vs a PP resin containing MPM® 1113:



Applications:

MPM® 1113 is specifically designed to beta nucleate a non-nucleated polypropylene resin when used at addition levels in the range of 0.20% to 2.0%. The major application areas for beta nucleated polypropylene include opaque and matte finish oriented film, breathable, microporous film, opaque thermoformed parts, pressure pipe, and opaque or translucent injection molded parts. Beta nucleated polypropylene is not suitable for applications requiring high clarity.

Advantages:

- Can be added at the extruder hopper to produce sheet with high levels of beta crystallinity.
- Stretching the sheet either monoaxially or biaxially produces opaque, microporous film with lowered density, high strength, and enhanced printability. Under the proper conditions the stretched sheet can exhibit high levels of vapor transmission or “breathability”.
- Broadens the processing window for thin gauge thermoforming, and produces thermoformed containers with more uniform material distribution and improved crush strength and rigidity, with lower sidewall density. The microvoiding effect can reduce the need for TiO₂ pigment in order to produce white containers.
- In pressure pipe applications the BNX® MPM 1113 results in improved impact strength, improved long term creep resistance, and excellent chemical resistance.
- Beta nucleation improves the impact strength and ductility of injection molded polypropylene without leading to a significant decrease in modulus.
- All of the components of the masterbatch are FDA approved for food contact applications.
- The MPM® 1113 does not impart color into the final film or part that is made.
- This masterbatch can also be provided with various pigments, in order to color match the end-use application (for example: pressure pipes).

Loading

Instructions:

The loading data and results are based on laboratory work (and field-testing) under controlled conditions and do not necessarily indicate the result that the buyer or user will attain. For this reason, we strongly recommend testing of your own system under the actual conditions of processing and end-use prior to full scale testing. The generally recommended loading concentration range is between 0.20% and 2.0% depending on the base polypropylene resin, the processing conditions used, and the presence of any other additives that may have slight nucleating characteristics such as certain pigments. When added to polypropylene resins that already contain certain weak nucleating additives, the higher end of the addition range should be used. For polypropylene resin manufacturers, where a powdered form of the MPM® 1113 would be added during the finishing operation following polymerization, the appropriate addition level would be in the range of 0.20% to 0.40%.

Packaging:

MPM® 1113 is available in pellet form and is packaged in either fiber drums or Gaylord boxes, with an inner PE liner.

FDA Status:

The components of this product fall under one or more of the following categories for use in contact with food:

- Colorants listed in 21 CFR 178.3297 “*Colorants for Polymers*”.
- Components that are exempt from regulation under 21 CFR 170.39 “*Threshold of Regulation for Substances Used in Food Contact Articles*”.
- Polymers and/or additives listed in the appropriate parts of 21 CFR (174, 175, 176, 177, 178, 181, 184, and 186).
- Substances that, based on legal opinion, supplier certification, and/or extraction results from food-simulating solvents, are not food additives and are acceptable for this application in full compliance with the Federal Food, Drug, and Cosmetic Act and all applicable food additive regulations.
- Substances that are GRAS (Generally Recognized as Safe) for direct addition to food or for use in contact with food.
- Substances that are “Prior Sanctioned” for use in this application.

Processing:

In order to maximize the beta crystal content of extruded sheet, the cast roll should be heated to at least 80 °C, and should preferably be in the range of 90 – 130 °C. It is also important that no other additives which nucleate the alpha crystalline form, such as clarifying agents, be present in the beta nucleated polypropylene material. Mayzo will provide technical assistance to customers in order to help them optimize the processing conditions for their particular application.

Toxicity & Safety:

This material is not intended for use in products for which prolonged contact with mucous membranes or abraded skin, or implantation within the human body is specially intended, unless the finished product has been tested in accordance with the Food and Drug Administration and/or other applicable safety testing requirements. Because of wide range of such potential uses, Mayzo, Inc. is not able to recommend this material as safe and effective for such uses and assumes no liability for any such uses. Read and understand the Material Safety Data Sheet before using or handling this product.

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