Reinste
Nano Ventures

Nano Precipitated Calcium Carbonate (NPCC) for Plastic Industry

What is Nano Precipitated Calcium Carbonate (NPCC)?

NPCC refers to ultra-fine precipitated calcium carbonate with an average particle diameter of less than 100 nanometers that is used as an additive in various products. Because of its special physical and chemical properties, NPCC has been widely applied in the paint, paper, plastic and rubber industries. Advanced technology allows the synthesis of calcium carbonates in nanoparticles with large surface area. Each particle is surface coated with modifier such as fatty acid, organic coupling agents, to improve dispersion and compatibility with polymer matrix.

Calcium carbonate nanoparticles have been widely used as fillers in polymeric materials with the main purpose of reducing costs however recent works showed that the incorporation of calcium carbonate nanoparticles can lead to higher impact resistance associated with higher elastic modulus.

NPCC expects to have a potential market as the substituted product for other expensive additives, such as carbon black, white carbon black, and titanium dioxide. While the field of nano particle research has exploded in recent years, nano PCCs have been in commercial use for much longer. This have been widely used to make automotive and construction sealants and PVC window profiles.

This ranges from 0.06 microns or 60 nanometers to 0.15 microns or 150 nanometers in median particle size. This is an order of magnitude smaller than the so-called ultrafine ground calcium carbonates, which are typically 0.7 microns. This result in ultrafines that is uniform in shape, size and particle size distribution. These ultrafine PCC particles also act as a semi-reinforcing filler, for strong physical performance. PVC plastisols, urethanes, silicones, polysulfides, and silylated polyethers are some of the types of high performance, long-lived automotive and construction sealants that use nano PCCs.

NPCC for Plastics

Plastic products are everywhere - in our homes, our cars, our workplaces, and where we have fun. Resin manufacturers have developed whole ranges of polymers with ever increasing performance and/or economy which have helped plastics replace more traditional materials such as wood, metal and glass.

Precipitated calcium carbonate is used in several types of plastics as a highly effective impact modifier, rheology control agent and filler. Because it is chemically produced under strict process control, all aspects of the particle size distribution (psd) and particle morphology (shape) are controlled to exacting specifications.

Features

Nano particle size, narrow particle size distribution, Regular particle shape, Special surface treatment

It also:

- Improves Young's modulus
- Improves impact strength
- Improves finish
- Shortens production cycle due
- Improves thermal conductivity

Applications

The super ultra fine particle size and narrow particle size distribution permit exceptionally high filler loading without compromising impact strength or ductility. It has following applications:

- In Plastic Compounding as reinforcing functional filler in extruded weatherable Profiles, Conduits and Pipes. It typically can substitute upto 20% of existing reinforcing Additives such as CPE, MBS or SBS.
- In plastic master batch as pigment / TiO_2 / color extender in PVC, PP, PE, etc. It typically can substitute up to 25% of existing pigment with opacity and whiteness level maintained. Best results can be achieved with good mixing to produce good dispersion and distribution of fine particles in the polymer system.
- In PLASTIC MASTERBATCH (PE, PP MASTERBATCH), best results can be achieved with good mixing to produce good dispersion and distribution of fine particles in the polymer system.

Applicable Scope

Filler and feature-change of PVC,PE,PP,ABS resin, particles of sheath of high standard wires and cables; PVC leathered, Particle of TPR,PVC threads, all type of pipe material and section material ,rubber products etc.

Benefits

- Used in plastic, it has good affinity with resin, so as to increase or adjust the rigidity, tenacity, and bending intensity effectively.
- It may also improve the rheology of plastic processing system, decrease the plasticization temperature so as to improve the stability, heat-resistance and soft as well as increase the processing ability of suppressing and fluidity of modules.
- The rubber made hereby will have a smooth surface, long extensity, high tension-resistance strength, mild temporary reformation as well as good anti-bending capability and high anti-avulsion strength.
- It can be applied in varied modified plastic made from polyethylene, polypropylene, polystyrene, acraldehyde-butadiene-styrene as well as chloridized polyethylene, and it can also be applied in some small parts on the fields of producing plastic mixed steel window, pipe materials, electrical wire skin, cable skin, refrigeratory, electrical fans and air conditions.

RANGE OF NPCC FROM REINSTE

Product Name	Applications	Benefits
Reinste 206T	Used as a functional filler for polysulphide sealant	• Excellent dispersity • Highly effective pre-cure rheology modification and control for good viscosity stability.
Reinste 206M	Used as a functional filler for silicone sealant	• Contributes towards post-cure physical properties in silicon sealant such as excellent sag resistence, low temperature gunnability.
Reinste 206S	• Used as a functional filler for various adhesives and sealants such as silicone sealant, polyurethane sealants • Acrylic sealants used in various construction, sanitary and industrial sectors	• Affordable for various adhesives and sealants. • Good at controlling of rheological and tensile properties.
Reinste - 259	Used as a functional filler for one-component or two-component polyurethane adhesive and sealant	• Provide high performance in adhesive and sealants. • Has low viscosity and high thixotrophy • Reduce cost with high loading lever.
Reinste 501A	• Applied as a plastic additive for PE, PP and PVC. • Acts as a modifier to improve physical properties of plastics.	• Improve Impact strength, tensile strength and bending strength. • Promoted breaking elongation, improved distortion temperature.
Reinste 530	• Used in plastic compounds such as PE, PP and PVC processed by injection molding, blow molding and extrusion. • Used as a cost-reducing filler to extend or replace more expensive resins.	• Improve physical properties of plastic compounds such as Impact strength, tensile strength, bending strength and distortion temperature. • Reduce cost
Reinste 260S	• Designed for use in tyre industry. • Used as a reinforcing agent in rubber compound.	• Increase elongation, tensile strength, H-extrusion and reduce permanent distortion. • Improve aging, tear and abrasion resistance. • Reduce material cost without impacting reinforcing features.
Reinste 520 (NPCC Polystyrene Masterbatch)	• Designed for use in plastic industry. • Designed to use directly with raw material of plastic products.	• Cut the cost about 5%

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