



Ezebond 412/412A

Ezebond Titanate Coupling Agents are complex organo-inorganic compounds, which act as bridges between organic polymers and inorganic fillers and pigments. They provide an organic molecular layer around the filler surface, which couples the polymer to the filler. Ezebond Titanate Coupling Agents play a multi-functional role including improvement of various mechanical properties at higher filler loadings, reduction in viscosity and improvement in dispersion and flow properties. They help in reducing costs while simultaneously giving considerable benefits in processing conditions.

- Liquid grade for precipitated CaCO₃ manufacturers
- Liquid grade for PVC blowing agent manufacturers
- Powder grade for filled Polypropylene compounds

Ezebond

Ezebond titanates can be used for a wide range of filled polymer systems like: Polyvinyl Chloride (flexible and rigid), Polypropylene, Polyethylene, Epoxy, Polyurethane, Polyester, Polystyrene, and Nylon systems. Ezebond titanates are effective with precipitated or micronised calcium carbonate, talc, clay, silica, red mud, aluminium trihydrate, mica, wollastonite, calcium or aluminium silicates, glass fibres, carbon black, titanium dioxide, zinc oxide, barium sulphate, etc.

Salient Features

Incorporation of Ezebond in filled polymer systems can offer many advantages. Typical improvements are listed below:

- Increases physical properties like tensile and impact strength and allows higher filler loadings
- Improves dispersion of fillers and pigments into polymer systems. End products with better gloss and homogeneity are obtained
- Reduces melt viscosity and improves flow properties. Production is increased considerably
- Reduces energy consumption
- Imparts hydrophobicity
- Acts as an adhesion promoter
- Promotes catalysis process in many polymer systems
- Pigments treated with suitable titanates disperse more rapidly and display better colouring strength
- Pre-coating of blowing agents like AZDC with a suitable titanate ensures increased evolution of nitrogen and helps control cell structure of foamed PVC products

Application Notes

Grades: Two types of Ezebond coupling agents are available:

1. Liquid Grade
2. Powder Grade *

Grade #	Type	Container Size	Applications
EB 412	Liquid	200 L steel drum	For coating of wet ground or precipitated Calcium Carbonate for use in Rigid PVC systems
EB 816	Liquid	200 L steel drum	For Coating of dry ground fillers for use in PVC systems
EB 927	Liquid	200 L steel drum	For Coating of dry ground fillers for use in PP & PE systems
EB 412A	Liquid	200 L steel drum	For use in flexible PVC & Plastisol systems with CaCO ₃
EB 1019A	Powder	Fiber drum	For use in Rigid PVC, PP, PE, PU, PS, Epoxy

EB 1019B	Powder	Fiber drum	For use in Nylon, Acrylic, Alkyd, Mica & glass filled systems
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* Powder grades Ezebond are manufactured using in-house developed, proprietary technology. Special grades of liquid titanates are uniformly dispersed over inorganic composition (trade secret).

Suggested Dosage

How much Ezebond to use? The exact dosage of Ezebond titanate required to obtain optimum performance depends on the processing equipment used as well as on the polymer-filler system. Initial trials should be done with the dosages given below in Table 1. Depending on the results obtained, the dosage should be increased or decreased till the optimum dosage is arrived at.

Table: 1

Application Ref. #	Ezebond Grade	Suggested Dosage	Applications	
A1	EB 412	1% on the weight of Calcium Carbonate	Titanate Coated CaCO ₃	
A2	EB 816	0.5% to 0.75% on the weight of Polymer	Filled PVC	
A2	EB 927		Filled PP, PE	
A3	EB 412A		Filled PVC	
A4	EB 1019A	1% to 2% on the weight of Polymer	<u>Thermoplasts</u>	Filled PP, HDPE, PVC, PS, Eng. Plastics Filled Polyurethane, Epoxy, Polyester
A4	EB 1019B		<u>Thermosets</u>	

FAQs

A1 How to coat Wet inorganic fillers with Ezebond

- Ezebond 412

EB 412 is either emulsified in water using 0.5% to 1% of non-ionic emulsifier or mechanically dispersed in water using a high-speed mixer. The emulsion/dispersion is used to coat wet ground/precipitated calcium carbonate. The coated filler slurry is filtered, dried and used typically in filled rigid PVC systems. (Example: PVC pipes and sections)

A2 How to coat Dry inorganic fillers with Ezebond:

- Ezebond 816
- Ezebond 927

Liquid titanate needs to be properly coated on the filler surface to ensure good performance. Coating should only be done on untreated fillers/extenders. Coated or activated fillers should not be used.

1. Ezebond is first diluted with equal weight of low boiling alcohol/ketone solvent.
2. The untreated filler is charged in a high-speed mixer. The mixer is run at low speed for a couple of minutes to preheat the filler and remove absorbed surface moisture.
3. The diluted titanate solution is added slowly within a minute by spraying or pouring.
4. The mixing is then increased to its maximum and mixing is continued for about 12 minutes until uniform coating is achieved.

Filler coated with EB 927 can be used directly for PP and PE applications.
Filler coated with EB 816 or EB 412 can be used directly for rigid PVC applications.

A3 How to use of EB 412A in Flexible PVC/Plastisols Systems:

Ezebond EB 412A is mixed with a small quantity of plasticizer and sprayed on the resin and untreated filler mix in a high-speed mixer or blender. After thorough mixing is achieved, other ingredients like stabilizers, pigments, lubricants, balance plasticizer, etc are added in the required sequence.

Applications: Film, sheeting, flooring, plastisols for slush moulding, casting gloves, tubing, coated fabrics etc.

A4 How to use of Powder Ezebond in Polymer Systems:

- Ezebond 1019 A
- Ezebond 1019 B

Thermoplasts: (PP, HDPE, PVC)

1. The quantity of Ezebond 1019 A required is first calculated using Table 1
2. Mix Ezebond 1019 A with the filler in a high-speed mixer for 12-15 minutes. The filler used should be of untreated variety i.e. without any surface coating such as Stearic, Stearate etc.
3. Add the resin to the above mixture and blend thoroughly.
4. Add pigments and other additives as required and blend thoroughly. Extrude the blend using a mixing type extruder such as a twin screw extruder

Thermosets: (PU, Epoxy, Polyester):

Ezebond 1019 B is thoroughly mixed with the resin in which fillers are to be added. Fillers, pigments, additives, etc are then added and dispersed as per usual practice.

Other Thermoplastics: (PS, Eng. Plastics)

The procedure is similar to that followed for polyolefins.

Properties

A few examples based on customer feedback:

1. In 40% CaCO₃ filled flexible PVC sheeting, use of EB412A reduced gelling time by 30% and gelling torque by 25%. Tensile strength increased by 20%.
2. Impact strength of HDPE filled with 30% CaCO₃ coated with EB927 increased by 10% over that of the virgin HDPE
3. Processing of CaCO₃ filled PP film compounds with over 100% filler became very easy when EB 101 9A was used. Surface finish was greatly improved.
4. Use of titanate coated CaCO₃ instead of stearic-coated CaCO₃ in rigid PVC formulations increased tensile strength by 20% and impact strength by 10%. Gelling time was reduced by 33%.

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