



Description

Borchi[®] Gel PN is an aqueous solution of an organic ammoniacal zirconium preparation.

Characteristic data

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|---------------------------|-------------------------------|
| Appearance: | pale straw coloured liquid |
| Zirconium content: | 10 % |
| Specific gravity (20 °C): | 1.21 – 1.25 g/cm ³ |
| Non-volatile content: | 9 – 11 % |
| Solubility in water: | miscible |

Properties

Borchi[®] Gel PN is a thixotropic additive for use in waterbased coating systems, as well as in solvent free systems.

Borchi[®] Gel PN can be used in all waterbased coatings containing hydroxyl and carboxyl groups able for interaction. **Borchi[®] Gel PN** works through a reaction of association of the active part of the Zirconium complex with reactive groups on the polymer in emulsion or thickener.

The thixotropic structure achieved through the incorporation of **Borchi[®] Gel PN** results in a high viscosity at rest, preventing settling out of raw materials and syneresis. Upon shear application, this structure breaks almost entirely down to enable flow during coatings application by brush, roller, pad etc. Some degree of this structure being still remaining gives good brush/roller loading and eliminates drips and roller/brush spattering. After shear cessation the thixotropic structure rebuilds at a slower rate than it was broken down so that eliminates brush marks, but recovers fast enough to prevent sagging of the coating. Zirconium crosslinking in the final film increases the scrub resistance of the dried coating film.

Borchi[®] Gel PN is an environment-friendly waterbased additive which contains no VOC contributing raw materials. Some advantages of using this product:

- Environment-friendly
- Effective in a wide range of polymer systems and formulations:
Matt, Silk, Satin, Gloss, One-coat, solvent free paints
- Grants spatter resistance
- Grants sag resistance
- Compatible with other thickeners e.g. cellulosic, acrylics, HEUR
- Good brush, roller and pad loading
- Good flow and levelling



There are two interaction ways of **Borchi® Gel PN** in the coating formulation, which have been established by evaluation in model systems:

- **Borchi® Gel PN** interacts with hydroxyl groups within the coating system producing a hydrogen bond network, which enables to build up a gel structure; this network of loose bonds is easily broken down under shear. The hydrogen bonding does not involve the zirconium, but the hydroxyl groups bound to zirconium.
- **Borchi® Gel PN** reacts with available carboxyl groups in the coating system producing covalent bonds, which enable the build-up of structure more resistant to shear forces. Zirconium reacts strongly with carboxyl groups forming strong bonds (covalent bonds). It is thought that zirconium is direct bound to the carboxylate group. As zirconium could react at more than one point with the carboxylate groups in the polymer chain, there is the possibility for crosslinking.

Applications

Borchi® Gel PN can be used across the spectrum of coating systems:

- Matt, satin and silk emulsions
- Semi-gloss – eggshell
- Gloss systems
- Interior and exterior
- Solvent free

Borchi® Gel PN is compatible with a wide range of polymer types:

- Vinyl acetate, Vinyl versatate polymer systems
- Solvent free polymer systems
- High binding polymers
- Acrylic and Styrene acrylic polymer systems
- Colloid and surfactant stabilized polymers

Use and Dosage

Borchi® Gel PN is compatible and can be used in combination with various thickener types:

- Cellulose ethers e.g. HEC, CMC
- Hydrophobically modified cellulose ethers
- Alkali soluble acrylics, ASE and HASE types
- Polyurethane HEUR thickeners

A complete range of structure from soft/creamy gel to near solid gel can be achieved with **Borchi® Gel PN**. Typical dosages required to achieve the desired degree of consistency:

- Soft gel: < 0.5 %
- Semi-solid emulsions: 0.4 - 1.0 % (typical gel strength 200 g/cm²)
- Solid emulsions: 2 % (typical gel strength 400 g/cm²)

Dosage is given for supply form on total paint formulation.

The final degree of structure achieved depends on:

- level of **Borchi® Gel PN** addition
- pH of the system – optimum pH 7.5 – 8.5
- type of reactive groups present in the system



It is recommended to incorporate **Borchi® Gel PN** after the addition of all the other raw materials. It is essential to ensure that the paint is being stirred during the addition of the **Borchi® Gel PN**. Upon incorporation **Borchi® Gel PN** starts to interact with the coating system. Ensuring that the paint is agitated will eliminate any gel seeds and will result in a homogenous gel structure.

Ideally **Borchi® Gel PN** should be evaluated in a fully formulated paint system, though to give an indication of its suitability; it can be screened in the polymer/emulsion system.

1 % of **Borchi® Gel PN** on total weight of paint is a good starting amount to determine the degree of gel structure achieved. This amount can be adjusted after the first screening to increase or decrease the gel structure obtained. 1 % of **Borchi® Gel PN** on total weight of paint will indicate the degree of interaction between **Borchi® Gel PN** and the emulsion/polymer system.

In order to observe the rate of structure build, it is recommended to take gel strength measurements after 1 hour, 24 hours, 1 week and 4 weeks. Ideally a separate sample should be used for each measurement.

It is important to adjust first the pH value of the polymer system to around pH 8. This will provide the optimum pH range assuring best performances for the **Borchi® Gel PN** and is also typical for the pH of a final coating system.

Storage

Protect from the effects of weathering and store in a cool, dry place at temperatures between 5 and 30 °C. Once opened, containers should be resealed immediately after each removal of the product.

Safety

Please refer to our safety data sheet for information relating to product safety.

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