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"Dutch Boy"®

BEN-A-GEL®

New Thickening and Gelling Agent for Water Systems



DUTCH BOY CHEMICALS

A Product Development of
NATIONAL LEAD COMPANY

5-59-55

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"Dutch Boy"®
BEN-A-GEL®

"DUTCH BOY" BEN-A-GEL is a highly purified magnesium montmorillonite which in a new and very efficient thickening agent for water systems. It is supplied as a soft milk-white granular powder of very fine ultimate particle size. Individual particles of BEN-A-GEL, which have been fully hydrated and separated in aqueous dispersion, have an ultimate particle size of less than one micron.

Table of Properties

Composition	Highly beneficiated hydrous magnesium silicate
Color	Milky-white
Form	Soft granular powder
Specific Gravity	2.6
Apparent Density (lbs./gal.)	4 ± 0.5
Moisture (%)	8 ± 2

Average Chemical Analysis, dry basis:

SiO_2	56.7%	CaO	2.8%	Cl	2.5%
Al_2O_3	8.5%	Na_2O	2.5%	F	1.0%
Fe_2O_3	8.5%	K_2O	0.1%	Loss on Ign.	7.7%
MgO	23.8%	Li_2O	1.1%		

Thickening, Gelling, and Emulsion Stabilizing Agent for Water Systems

"DUTCH BOY" BEN-A-GEL is recommended for thickening or gelling all water dispersions. In addition, it is useful as a suspending agent and as a mechanical emulsion stabilizer for oil-in-water systems. Unlike organic gelling agents, such as gelatins, gums, etc., BEN-A-GEL is completely inorganic, and is not subject to microbiological degradation.

Thixotropic and Gelling Efficiency — When properly dispersed, as little as 1% of "DUTCH BOY" BEN-A-GEL will produce a stable basis on commercial preparations which have originally shown poor viscosity stability. Such preparations can be thickened to a thixotropic gel by incorporating 2 to 2.5% BEN-A-GEL. 2.5% of BEN-A-GEL in water alone will produce a heavy thixotropic non-blocking gel. Incorporating 3% or more of BEN-A-GEL yields reasonably firm, solid gels. The gels made with BEN-A-GEL do not thin out upon heating.

Particle Suspension — Hard settling of finely divided insoluble solids in aqueous systems is eliminated by the use of from ½ to 1% of BEN-A-GEL. The continuous gel structure of the BEN-A-GEL in water systems cushions the settling particles and makes true suspension easy.

Emulsion Systems — In concentrations of 1% or less, "DUTCH BOY" BEN-A-GEL acts as an excellent mechanical emulsion stabilizer for emulsions of oils or other immiscible organic liquids in water. It will not affect the efficiency of the normal types of surface-active agents used in these systems. Aqueous systems containing BEN-A-GEL are compatible with a range of polar organic liquids with pH above 5.0.

Latex Paints — The emulsion stabilizing action of BEN-A-GEL is particularly useful in emulsion and latex paints. Its gel-control, syneresis, and butyl-mercurial resistance points, the value of BEN-A-GEL has been demonstrated in the following ways:

1. *Outstanding Resistance to Water Spotting (in acrylic and polyvinyl acetate paints).* The combination of BEN-A-GEL provides exceptional water resistance for both indoor and outdoor use.

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2. *Easy Stain Removal* – BEN-A-GEL promotes quick removal of stains without excessive scrubbing.

3. *Improved Scrub Resistance* – Latex paint films containing BEN-A-GEL will withstand as much as 70% more scrubbing to failure than corresponding control paints containing other thickening agents.

4. *Full Color Development* – The use of BEN-A-GEL in latex paints provides more complete development of color from both organic and inorganic pigments.

5. *Excellent Pigment Wetting and Dispersion* – The improved pigment wetting afforded by BEN-A-GEL minimizes streaking, flooding, and other irregularities in color.

6. *Excellent Bodying Characteristics* – The use of 2 to 4 pounds of BEN-A-GEL per 100 gallons of a latex paint gives a stable and uniform body which is maintained on long-term aging.

7. *Effective Over a Wide Range of pH* – BEN-A-GEL operates efficiently in the pH range of 5.0-10.0. Its bodying action prevents pH drift in latex paints.

BEN-A-GEL may be incorporated into a latex paint in two ways. Wherever possible, it is best to incorporate dry BEN-A-GEL directly into the pigment grind, mixing the dry powder thoroughly into the pigment paste before milling. In some cases, it may be advisable to use a 1.5 to 3.0% masterbatch of BEN-A-GEL in water, which has been prepared separately. This may be added either to the pigment grind, or immediately afterwards, when the pigment and vehicle are blended.

Ceramics – BEN-A-GEL is useful as a suspending agent for ceramic slurries. It will improve the plasticity of the mix, and is recommended for both molding and casting methods of production. In ceramic glaze slips, the addition of 2% of BEN-A-GEL, based on the weight of the solids, will control suspension of the glaze solids in the water slurry. BEN-A-GEL also prevents flow of the glaze by controlling viscosity at the firing temperature. In porcelain and china decorating, for example, where multiple colors and designs are involved, BEN-A-GEL cuts down the undesirable tendency of some overglaze patterns to run or bleed together during firing.

Methods of Incorporation

Dry BEN-A-GEL should be sprinkled or sifted into the required water system, with moderate high shear agitation. A high shear force is essential for uniform dispersion and maximum gelation. Sufficient shear for proper gelation is obtained with a homogenizer or colloid mill, such as a Waring Blendor, a Premier Colloid Mill, rubber mill, pebble mill, kady mill, Dispersator or their equivalents.

The mixing time required for complete gelation will vary to some extent depending upon the particular equipment used. For example, when a Waring Blendor is used for BEN-A-GEL incorporation, the mixer operating should be continued for 5 to 10 minutes in order to insure maximum gelling efficiency.

Dilute BEN-A-GEL dispersions are usually prepared by thinning a 2.5-4.0% BEN-A-GEL masterbatch. The use of a roller mill or colloid mill is recommended for making masterbatch gels above 3.0% concentration, since the gel strength will be too stiff for thorough incorporation by stirring. These masterbatch gels have excellent storage stability and good thinning characteristics.

In thickening oil-in-water emulsions, BEN-A-GEL may be incorporated in either of two ways, depending upon the nature of the ingredients. Addition of a preset oil to the finished emulsion should be compared with incorporation in the water phase prior to the emulsifying step.

Fields of Application

"DUTCH BOY" BEN-A-GEL as a rheology, suspension agent, and emulsion stabilizer in aqueous media is useful in a wide variety of products, including the following:

Creams	Shampoos	Textile Finishes
Lotions	Emulsion Paints	Ceramics
Oil-in-Water Emulsions	Cleaners and Polishes	Roofing Compounds

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