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"Dutch Boy"
BENTONE* 34

*A Gelling Agent for Non-Polar Organic
Liquids and Organic Liquids
of Intermediate Polarity*



A Product Development of
NATIONAL LEAD COMPANY

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"Dutch Boy" BENTONE[®] 34

BENTONE 34 is an organic compound of montmorillonite^{*} supplied as a finely divided one-micron-sized powder. The organic portion is linked to the silicate lattice through a stable chemical bond.

BENTONE 34 will thicken and gel a very wide variety of organic liquids. It is useful wherever an increased body or viscosity control is required. The thickening action imparted by BENTONE 34 is relatively permanent, and unaffected by changes in temperature. Gels formed from BENTONE 34 are of the short, thixotropic type, not often produced in organic liquids by other gelling agents.

The expanded gel-lattice structure formed by BENTONE 34 in organic media provides reinforcing characteristics which contribute to the strength of many viscous compositions. BENTONE 34 also promotes resistance to bleeding in usages where this is a problem.

Fields of Application

Due to the ability of "DUTCH BOY" BENTONE 34 to gel organic media, it is useful in the following products:

Paints	Rolling Compounds
Varnishes	Shoring Compounds
Emulsions	Adhesives
Inks	Fuels
Wood Preservatives	Coatings
Paint and Varnish Removers	Water Mover Compounds
Waxes	Hydraulic Fluids
Composites ^{**}	Non-toxic Pharmaceutical Preparations ^{***}

The modifications of "DUTCH BOY" BENTONE 34 in the fields listed above, suggest its further application in many other products.

^{*}Montmorillonite is a hydrous aluminum silicate mineral having an expanding lattice.

^{**}A Report to the Bureau of Investigation of BENTONE 34 (January 26, 1946) by the Ford Research Laboratories, Inc., E. P. O. N. Y. is available upon request. The test proved conclusively that BENTONE 34 could be regarded as a highly inert material under its designed or probable effects on the material systems examined.

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Table of Properties

Composition	Organic derivative of a hydrous aluminum silicate mineral with an expanding lattice.
Color	Very light cream
Form	Finely divided powder
Specific Gravity	1.00
Softening Value	12.0 lbs./gal.
Flowrate	Less than 2% retained on No. 200 sieve***

General Application

BENTONE 31 is a very efficient gelling agent. It must be incorporated into organic liquids and creams properly, however, to secure full development of properties. The following directions are suggested for best results.

Solvents of Low Polarity -- BENTONE 31 will thicken and gel straight non-polar solvents, such as benzene, toluene, mineral spirits, and gasoline. It will also act on liquids of intermediate polarity, such as chlorinated solvents, vegetable oils, plasticizers, and resins.

Proper Incorporation Methods -- To obtain maximum effect in these systems, BENTONE 31 should be ground into the liquid on a pebble mill, roller mill, or colloid mill. However, many successful applications have been based upon the use of thorough stirring operations in which sufficient mechanical shear can be applied.

Use of Polar Additives -- The addition of a small amount of polar solvent, such as methanol, ethanol or acetone is often useful in obtaining maximum gelation with BENTONE 31 in non-polar liquids. In addition, the use of a polar additive usually reduces the amount of mechanical shear action required. Polar solvent additives should always be based upon the weight of BENTONE 31 used, and in general they are beneficial in the range of 15% to 60% of the weight of the BENTONE, depending upon the particular system involved.

Effect of Heat on Incorporation -- BENTONE 31 gels can be produced without the application of heat. In some instances, however, it has been found that heating between 150-175 F. facilitates the gelation by reducing the amount of mechanical work or polar solvent required.

***Two papers discuss BENTONE 31 relative plastic viscosity both at ultimate rate of 2510 strokes in maximum duration and approximately 0.25/0.250 strokes in maximum duration.

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