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"Dutch Boy"
BENTONE® 38

*New Gelling Agent for
Organic Liquids*



DUTCH BOY CHEMICALS

A Product Development of
NATIONAL LEAD COMPANY

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NLI 11595

"Dutch Boy"[®] BENTONE[®] 38

"DUTCH BOY" BENTONE 38 is a new grilling agent for organic liquids. It has two outstanding features:

1. High grilling efficiency in a wide range of organic liquids of low and intermediate polarity.
2. Very light color both in the dry and in the grilled states.

BENTONE 38 is an organic compound of a special montmorillonite^{*} and is supplied as a fine, creamy-white powder. Like its companion grilling agent, BENTONE 34 and BENTONE 154C—the organic portion is linked to the montmorillonite through a stable chemical bond.

BENTONE 38 gels are of the short, chinosropic type. It produces predictable bulging or viscosity increases which are remarkably stable and unaffected by changes in temperature. The gel structure of BENTONE 38 promotes particle suspension and penetration control. In addition, BENTONE 38 exerts a strong reinforcing action in non-volatile organic compositions.

Fields of Application

The high grilling efficiency and light color of BENTONE 38 suggest its use in many types of organic systems, such as the following products:

Paints	Waxes
Enamels	Adhesives
Varnishes	Mastic Compounds
Vinyl Dispersions	Composites
Epoxy and Polyester Resins	Non-Synthetic Pharmaceutical Preparations

Table of Properties

Composition	Organic derivative of a special magnesium montmorillonite
Color	Creamy-white
Form	Finely divided powder
Specific Gravity	1.00
Bulking Value	11.0 lbs./gal.
Flammability	Less than 5% retained on No. 200 mesh ^{**}

General Application

BENTONE 38, in general, has fields of application and incorporation techniques similar to BENTONE 34. BENTONE 38 will thicken and gel straight non-polar solvents, such as hexanes, heptanes, mineral spirits and gasoline. It will also gel liquids of intermediate polarity, such as chlorinated solvents, vegetable oils, plasticizers and resins. However, BENTONE 38 has two distinct and important advantages.

^{*} Montmorillonite is a hydrous silicate mineral having an expanding lattice.
^{**} When properly dispersed BENTONE 38 exhibits bubble structure with an ultimate particle size of 0.1-0.5 micron in various solvents, and approximately 0.001-0.005 micron in chlorinated solvents.

1. **Grilling Efficiency**—Polar evaluation plots of BENTONE 34, approximately 30% in given point consistency. This greater efficiency is where the mild grilling action of BENTONE 34 BENTONE 38, by achieving a given viscosity at concentrations in glass finishes without undercuts.

2. **Lighter Color**—BENTONE 38 gels of BENTONE gels. In addition, the reduced amount of grilling increases or particle suspension color of the grilled BENTONE 38 is added to the advantages in such compounds as white or light emulsion, or vinyl dispersion systems in white or light.

Proper Incorporation

Equipment Required—BENTONE 38 can be used with high shear dispersion equipment, in order to achieve a fine, creamy-white powder. In point practice, BENTONE 38 is usually incorporated during the regular grinding operation.

Use of Polar Additive—Small amounts of polar additives, are especially useful in addition to direct BENTONE 38. Their suitability depends on the organic system to be grilled. If, for example, a non-polar additive is recommended, it must be added in small amounts, and (especially) shorten the grilling time for effective incorporation equipment.

The amount of polar additive to be used is to be pending on the particular system involved, polar 30% to 50% of the BENTONE weight. The polar additive BENTONE 38 prior to incorporation into the system to add the polar solvent to the organic liquid.

Effect of Heat on Incorporation—BENTONE 38, with the application of heat, in some cases 150-175°F., facilitates the grilling by reducing the solvent required.

Incorporation with High Shear Stirring—In high viscosity systems, and BENTONE 38 grilling equipment, with the addition of polar solvents, in the non-polar liquid, and the polar additive to the system. In some of this type, the grilling should be done using high shear grilling methods. It has been grilling at or near peak efficiency by the use of high shear grilling methods.

General Recommendation

The amount of BENTONE 38 required depends on the degree of thickening or other properties desired. Usually 1% BENTONE 38 (based on the main mass) 2 to 3 pounds of BENTONE 38 per 100 gallons, mixed, while a stipple point, for example, may be 10 pounds of point.

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"Dutch Boy"

BENTONE® 38

BENTONE 38 is a new grilling agent for organic liquids. It has two efficiency in a wide range of organic liquids of low and intermediate or both in the dry and in the grilled state.

an organic compound of a special montmorillonite* and is supplied as powder. Like its companion grilling agent—BENTONE 34 and organic portion is linked to the montmorillonite through a stable

is one of the most, thisotropic type. It produces predictable bodying which are remarkably stable and unaffected by changes in temperature of BENTONE 38 promotes particle suspension and protection BENTONE 38 exerts a strong reinforcing action in non-soluble organic

Fields of Application

efficiency and light color of BENTONE 38 suggest its use in many such as the following products:

- Excess
- Adhesives
- Resin Compounds
- Composites
- or Resins
- Non-Synthetic Pharmaceutical Preparations

Table of Properties

Organic derivative of a special magnesium montmorillonite
Coarse-ribbed
Finely divided powder
100
15.0 lbs./gal.
Less than 5% retained on No. 200 sieve**

General Application

over, has fields of application and incorporation techniques BENTONE 38 will thicken and gel straight non-polar solvents, mineral spirits and gasoline. It will also gel liquids of non-halogenated solvents, vegetable oils, plasticizers and resins. These distinct and important advantages.

efficiency and light color of BENTONE 38 suggest its use in many such as the following products:

1. **Grilling Efficiency**—Paint evaluations show that when BENTONE 38 is used in place of BENTONE 34, approximately 30% less BENTONE 38 is required to achieve a given paint consistency. This greater efficiency is especially useful in canisters and cans, where the mild flaking action of BENTONE 34 sometimes limits its use in glass finishes. BENTONE 38, by achieving a given viscosity at lower levels, may be used in most practical concentrations in glass finishes without undesirable flaking action.

2. **Lighter Color**—BENTONE 38 gels are the lightest in color of any of the BENTONE gels. In addition, the reduced amount of BENTONE 38 required to produce a specific bodying increase or particle suspending action means that less of the grilling color of the grilled BENTONE 38 is added to the organic system. This property proves most advantageous in such compounds as white or light colored paints, clear varnishes, waxes, composites, or vinyl dispersion systems in white or pastel shades.

Proper Incorporation Methods

Equipment Required—BENTONE 38 must be incorporated into organic liquids using high shear dispersion equipment, in order to obtain maximum efficiency of gelation. Roller mill, pebble mill or colloid mill grinds will produce excellent BENTONE 38 gels. In paint practice, BENTONE 38 is usually incorporated into the vehicle with the pigments during the regular grinding operation.

Use of Polar Additives—Small amounts of polar solvent, such as methanol, ethanol or acetone, are especially useful as additives in developing the maximum grilling efficiency of BENTONE 38. Their suitability depends on the amount of polarity which exists in the organic system to be grilled. If, for example, a major constituent is aromatic mineral spirits (low polarity), a polar additive is recommended. If the compound is high in aromatic content, polar additives may not be required. Polar additives act as an aid to attaining maximum gel efficiency, and frequently shorten the grinding cycle required. They are not a substitute for effective incorporation equipment.

The amount of polar additive to be used is based on the weight of BENTONE 38. Depending on the particular system involved, polar additives are beneficial in the range of 20% to 50% of the BENTONE weight. The polar solvent is generally used to pre-disperse the BENTONE 38 prior to incorporation into the organic liquid. Another common method is to add the polar solvent to the organic liquid prior to the grinding step.

Effect of Heat on Incorporation—BENTONE 38 gels can generally be produced without the application of heat. In some instances, it has been found that heating to 150-175°F. facilitates the gelation by reducing the amount of mechanical work or polar solvent required.

Incorporation with High Shear Stirring—In some cases, particularly in solvents with high aromatic content, good BENTONE 38 gels may be produced with high speed stirring equipment, with the addition of polar solvents. Usually the BENTONE 38 is first dispersed in the non-polar liquid, and the polar additive introduced afterward, with constant agitation. In cases of this type, the gels formed should be compared with gels made in the same system using high shear grinding methods. This will insure that the BENTONE 38 has been gelled at or near peak efficiency by the high speed stirring procedure.

General Recommendations

The amount of BENTONE 38 required depends upon the type of organic system and the degree of thickening or other properties desired. With maximum gelation, approximately 1% BENTONE 38 (based on the resin content) may suffice in a vinyl plastic. From 2 to 3 pounds of BENTONE 38 per 100 gallons could be recommended for a glass enamel, while a stippie paint, for example, may need between 6 and 8 pounds per 100 gallons of paint.

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