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**ELEMENTIS**  
SPECIALTIES

# BENTONE® 34

rheological additive

for low to intermediate polarity organic systems

BENTONE 34 is an organic derivative of a special smectite. This rheological additive is designed for low to intermediate polarity organic systems.

## Applications

Adhesives  
Anti-corrosive paints  
Automotive finishes  
Bituminous compositions  
Buffing compounds  
Coil coating systems  
Dip coatings  
Finishes for household appliances  
Greases  
High-build systems  
Industrial finishes  
Interior and exterior house paints including do-it-yourself paints  
Knifing fillers  
Mould release agents  
Paint stripper pastes  
Plastisols  
Primers, undercoats, fillers  
Printing inks  
Putty and caulking compounds  
Refinishes for household appliances  
Road marking paints  
Underbody sealants and sound-absorbing compounds  
Wood preservatives and finishing systems  
Waxes  
Wood preservatives and finishing systems

## Key Properties

**Advantages of BENTONE 34 in various systems:**

### Alkyd

no hard pigment settling, no sag, no syneresis in thixotropic paints, no flooding, prevents excessive penetration

### Bitumen

good thixotropy, no melt, no flow at elevated temperatures, no embrittlement in cold water

### Chlorinated Rubber

### Cyclized Rubber

no pigment or filler settling, no stringing of the paint, good chemical stability of the coating due to homogeneous surface and higher thickness

### Epoxy Ester

no pigment settling or sag of the paint

### Polyacrylic

no film cracking, higher film thickness are possible

## Chemical and Physical Data

|             |  |
|-------------|--|
| Composition | organic derivative of a special smectite |
| Colour      | light cream                              |
| Form        | finely divided powder                    |
| Moisture    | max. 3%                                  |
| Density     | 1.7 g/cm <sup>3</sup>                    |

## Incorporation

### General

Incorporation of BENTONE® 34 in organic systems, e. g. paints, requires high shear dispersion equipment and the addition of a chemical (polar) activator.

BENTONE 34 is activated in two steps:

1. Dispersion (mechanical breakdown of agglomerates)
2. Gelation (development of the gel structure)

There are three basic ways to incorporate BENTONE 34:

1. as a dry powder for in-situ gelation
  2. as a pregel of commonly used concentration (5-10% by weight)
  3. as a pregel of higher concentration (10-15% by weight) adjusted to lower viscosity by addition of a wetting agent
- 1) Addition of BENTON E 34 as a dry powder for insitu gelation:

No masterbatching process step is required with this method.

The BENTONE 34 powder is added directly to the resin (diluted if need be) and is dispersed in it for 5min. After this) the pigments are added and dispersed. Then the chemical activator is added. If plastic flow of the mill base is desired, the activator can be added before the pigment.

If a wetting agent is to be used, it should be added after the chemical activator

- 2) Addition of BENTONE 34 as a pregel:

The solvent is charged to the mixing tank. BENTONE34 powder is added and dispersed at high shear force. Then a chemical activator (most suitably methanol or propylene carbonate, see below) is introduced for gelation.

For incorporation (e. g. into a paint), begin with the binder solution and stir the pregel into it. Add the pigments and disperse.

- 3) Addition as a pregel containing surfactant:

This method is recommended when a pregel of high concentration is required or for post-correction of the flow properties of a paint.

This pregel is prepared in the same way as described under 2. It is advisable to add the surfactant to the solvent prior to introducing and dispersing BENTONE 34.

For more details see Elementis Specialties Rheology Handbook

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Suitable dispersion equipment

High speed disc impellers (Cowlers Dissolver), Ultra-Turrax, pearl-, sand-, ball- and three-roll mills.

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Chemical (polar) activators are recommended to ensure full activation, i. e. optimum efficiency of BENTONE 34.

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| Suitable chemical activators                    | % based on weight of dry BENTONE 34 |
|---|-------------------------------------|
| Methanol/H <sub>2</sub> O (95/5)                | 33 %                                |
| Propylene carbonate                             | 33 %                                |
| Propylene carbonate/<br>H <sub>2</sub> O (95/5) | 33 %                                |
| Ethanol/ H <sub>2</sub> O (95/5)                | 50 %                                |
| Acetone/ H <sub>2</sub> O (95/5)                | 60 %                                |

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## Recommended use level of BENTONE® 34

The level depends on the system in which BENTONE 34 is to be used. For house paints and industrial paints typical levels are between 0.2 and 0.5 % (dry) BENTONE 34 based on total system weight. For primers slightly higher quantities are required (0.5 —1 % dry BENTONE 34). In aqueous systems between 0.2 and 0.3 % BENTONE 34 (dry) are used.

For water-reducible paints we recommend the following combination of BENTONE 34 and surfactant:

|    |     |                 |                              |
|----|-----|-----------------|------------------------------|
| 1. | 10  | parts by weight | BENTONE 34                   |
|    | 1-5 | parts by weight | Disperbyk <sup>1</sup>       |
|    | 5-1 | parts by weight | Isopropanol                  |
|    | 84  | parts by weight | White spirit or xylene       |
| 2. | 10  | parts by weight | BENTONE 34                   |
|    | 8   | parts by weight | Borchigen PB 60 <sup>2</sup> |
|    | 2   | parts by weight | Ethanol                      |
|    | 80  | parts by weight | White spirit or xylene       |
| 3. | 10  | parts by weight | BENTONE 34                   |
|    | 5   | parts by weight | Colorol E <sup>3</sup>       |
|    | 3   | parts by weight | Methanol                     |
|    | 82  | parts by weight | White spirit or xylene       |
| 4. | 10  | parts by weight | BENTONE 34                   |
|    | 5   | parts by weight | Texaphor 277 <sup>4</sup>    |
|    | 3   | parts by weight | Methanol                     |
|    | 82  | parts by weight | White spirit or xylene       |

Producer:

1. Byk-Chemie GmbH, 4230 Wesel
2. Gebr. Borchers AG, 4000 Düsseldorf
3. Lucas Meyer, 2000 Hamburg
4. Henkel & Cie. GmbH, 4000 Düsseldorf

## FDA Approval for Indirect Food Application

|                 |  |
|-----------------|--|
| 21 CFR 175.300  | Components of Resinous and Polymeric Coatings                              |
| 21 CFR 176.170  | Components of Paper and Paperboard in Contact with Aqueous and Fatty Foods |
| 21 CFR 176.180  | Components of Paper and Paperboard in Contact with Dry Food                |
| 21 CFR 177.1210 | Closures with Sealing Gaskets for Food Containers                          |
| 21 CFR 178.3570 | Lubricants with Incidental Food Contact                                    |

## Summary of Toxicity Data

This summary is provided as an overview of more detailed toxicity test results on BENTONE 34. Comprehensive reports detailing the procedure and results of these tests are available upon request.

### Acute Oral Toxicity in Rats

BENTONE 34 was too innocuous to permit the intragastric administration of a dose large enough to establish an LD<sub>50</sub>.

### Primary Skin Irritation in Rabbits

Using the procedure of Draize (J. Pharm. and Exptl. Therap., 82, 377 [1944]), BENTONE 34 was inert when applied to the intact or abraded skin of rabbits.

### Primary Eye Irritation in Rabbits

Using the procedure of Draize (J. Pharm. and Exptl. Therap., 82, 377 [1944]), BENTONE 34 caused at most only a temporary mild irritation as might be expected from any foreign body.

### Allergenicity (conducted with Guinea Pigs)

BENTONE 34 additive is non-allergic to guinea pigs.

### Subacute Oral Toxicity with Rats

A 12-week feeding study at the dietary levels as high as 25 % gave no indication of a toxic reaction.

### Chronic Skin Toxicity Study with Rabbits

Experiments were conducted involving chronic exposure of the skin of rabbits to BENTONE 34 during periods of at least 6 hours or more daily for 65 consecutive weekdays. No evidence of a toxic reaction was found.

*The information in this publication is intended to serve as a guide but is not necessarily complete and is given without warranty. We recommend all users to determine the suitability of our products for their intended uses and caution them to comply with statutory obligations and to avoid infringing rights of third parties. We encourage users to contact us to discuss problems involving our products in order to facilitate their use.*