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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 ³

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

Suitable dispersion equipment

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

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

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

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 ¹
	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 ²
	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 ³
	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 ⁴
	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 LD₅₀.

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.