Technical Information B-RI 13

TIXOGEL and RHEOCIN

Rheological Additives for Organic Phases
TIXOGEN and RHEOCIN – Rheological Additives for Organic Phases in Cosmetics and Personal Care

For oil and solvent-borne cosmetic formulations different types of rheological additives are in the market:

- Organoclays: TIXOGEN
- Hydrogenated castor oil derivatives: RHEOCIN (INCI: Trihydroxystearin)
- Synthetic polymers: Polyethylene and others
- Silica

Vegetable based TIXOGEN

TIXOGEN organophilic bentonites of Rockwood are used for rheology adjustment of solvent-borne and oil based personal care and cosmetic products.

Depending on application TIXOGEN products provide multifunctional benefits:

- Thixotropic thickening
- Anti-settling effect, pigment suspension
- Prevention of phase separation and syneresis
- Stabilization of W/O emulsions
- Temperature stability
- Reduction of running and dripping
- Uniform, color consistent film
- Soft, elegant feel of cosmetic products

Technology and grades:

For the production of TIXOGEN, the inorganic cations of natural bentonites are substituted by quaternary ammonium cations, thus converting a water-swellable mineral into an organophilic gellant for non-aqueous phases.

By selection of the organic cations used for the ion exchange, the gelling effect of each TIXOGEN grade is optimised for different polarities of the organic medium.

Traditionally the quaternary ammonium cations used for production of organophilic bentonites contain alkyl groups derived from hydrogenated tallow.

Following the demand for “animal-free” raw materials, especially in cosmetics, BYK Additives has developed new TIXOGEN grades with vegetable derived alkyl groups.

![Diagram](image1.png)

TIXOGEN VZ-V

(INCI: Stearalkonium Bentonite) is designed as gellant for polar to medium polar systems, which contain e.g. esters or vegetable oils.

TIXOGEN VP-V

(INCI: Quaternium-90 Bentonite) is optimised for use in unpolar systems, based on mineral oils, silicon oils etc.
**Incorporation:**
For maximum efficiency TIXOGEL must be subjected to both shear and polar activation. For optimum incorporation the following procedure is recommended:
1. Charge organic fluid to the dispersion vessel.
2. Slowly add TIXOGEL under agitation.
3. Mix at high speed for 10–15 minutes.
4. Add polar activator (see below).
5. Homogenize at high speed for 10–15 minutes.
6. Add additional ingredients.

Suggested polar activators are propylene carbonate/water (95:5) or ethanol/water (95:5). It is recommended to start at 30% activator based on weight of TIXOGEL and to conduct an activation ladder up to 60% in order to find out the optimum viscosity development.

**RHEOCIN**

The hydrogenated castor oil derivative RHEOCIN (INCI: Trihydroxystearin) is a very efficient thickener for low to medium polar systems. It requires temperature-controlled activation between 35 °C and 55 °C. RHEOCIN then will form white or translucent gels in the oil. Besides its rheological effects it also acts as skin conditioning agent and as water repellent.

**Mastergels**

Mastergels are ready to use gels of rheological additives in commonly used cosmetic vehicles. Compared to the use of powder form TIXOGEL and RHEOCIN, Mastergels provide a time saving in production and eliminate possible dust formation during dispersion. Furthermore polyethylene gels are available which impart water-proofing and long wear properties.

Some Mastergel examples are:
- **TIXOGEL VSP-1438**
  Organoclay Mastergel, composed of Quaternium-90 Bentonite in cyclomethicone, activated with propylene carbonate.
- **TIXOGEL IIN-1578**
  Organoclay Mastergel, composed of Quaternium-90 Bentonite in isononyl isononanoate, activated with propylene carbonate.
- **TIXOGEL CCT-6030**
  Organoclay Mastergel, composed of Stearalkonium Bentonite in caprylic/capric triglyceride, activated with propylene carbonate.

**Applications**

Due to their unique benefits, TIXOGEL and RHEOCIN rheological additives are used in cosmetic and personal care products as follows:
- Creams, lotions
- Sunscreens
- Antiperspirants
- Lipsticks
- Anhydrous and liquid make-up
- Nail lacquers
- I & I hand cleaning pastes with solvents
Products and Applications

BYK Additives

Product Range Additives:
- Additives to improve surface slip, leveling, and substrate wetting
- Adhesion promoters
- Defoamers and air release agents
- Processing additives
- Rheological additives
- UV absorbers
- Viscosity depressants
- Wax additives
- Wetting and dispersing additives for pigments and extenders

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