

Lankem dispersing agents made from BioLoop technology

In a previous article, we mentioned our novel developments around bio-based technology and the new BioLoops are based on renewable raw materials. These products are BioLoop 56L, BioLoop 68L and BioLoop 84L. After further modifications of the products, we found that they can be utilised as dispersing agents for organic and inorganic pigments. Finding use in aqueous systems, but one modification has shown potential in aqueous and solvent-based systems.

Dispersing agents help to produce a homogeneous state of dispersed pigments into a few various binders.

The dispersion process is vital. Indeed, it will influence many parameters such as appearance, colour strength, transparency, gloss, etc., but also the paint's physical properties, rheology, and stability flocculation. Understanding this process is a significant help to prevent many coatings defects.

Dispersion of pigments can be broken into three steps, wetting, dispersion and stabilisation.

1) Wetting is the first step of the dispersion process in which air and moisture are displaced from the pigment surface by the dispersing agent. The air must be fully removed, and the pigment surrounded by the liquid medium.

2) Dispersion is where the pigment agglomerates are separated by energy (milling machines) to their primary particle size. The dispersant additive helps to reduce the pigment–pigment interaction and lowers the viscosity. This action allows you to add more pigment. As the particle size reduces, the surface area increases, thus bringing about an increase in gloss and colour strength.

3) Stabilisation is the most critical stage of the process, and the dispersant needs to have good wetting and dispersing properties to be able, over a period, to keep the particles separated as the natural tendency is for these particles to re-form (flocculate). The smaller the particle size, the more likely it is for them to re-form, this can be prevented by introducing repulsive forces onto the pigment using anchor groups on the dispersing agent.

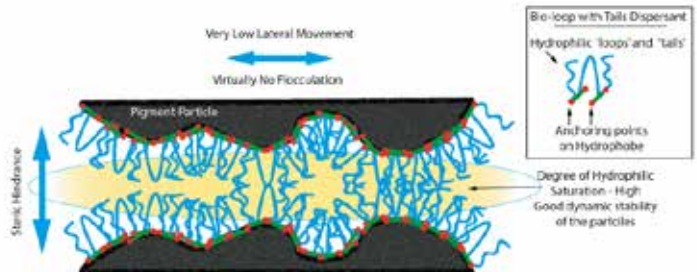
There are two main ways of stabilising the pigment particles, described below.

• **Electrostatic stabilisation** occurs when particles have the same electrical charge and hence cause repulsion between the particles. What happens is stabilisation through an electrical double layer, in which each layer has an equal charge, and when two particles come together, their respective charged double layers overlap, and repulsion occurs. However, when this type of stabilisation is the only mechanism, this is susceptible to changes in pH.

• **Steric stabilisation** in this type of stabilisation, dispersants based on polymer molecules are the preferred option. They have two key features, one is a pigment affinic (anchor) group and a second binder compatible group.

At present, the two main products which have been developed from the modification of the BioLoops are Lansperse LT87 and Lansperse BIO691.

Simplified structure of Lansperse LT87



Our products were developed using a natural backbone which contains anchoring groups. What makes them unique is the introduction of a hydrophilic loop that not only has an affinity for water and polar solvents but also, provides both steric hindrance and stability. To help boost the hydrophilic nature within the spacing between the particles, Lansperse LT87 contains both loops and tails. This helps to give further improvements in stability and flocculation reduction. Lansperse LT87 has been shown to deliver excellent stable carbon black dispersions in aqueous systems.

Key Features

- Based on the BioLoop technology
- Powerful dispersing properties
- Low flocculation
- VOC free
- Fast particle size reduction
- Good ecotoxicity
- No skin or eye irritancy

Lansperse BIO691 is part of the new range of powerful dispersing agents containing components that are from renewable sources. Unlike many bio-based surfactants, this product offers excellent wetting and dispersing properties for a wide range of inorganic and organic pigments and powders.

One main characteristic that makes both these products different from conventional dispersing agents is how they can attach to a particle substrate.

Conventional dispersing agents tend to be linear in structure and attach to one hydrophobe group. The BioLoops are different as they have two hydrophobes that attach to a particle substrate which makes it twice as effective as conventional dispersing. Lansperse BIO691 is unique because of its ability to disperse particles in aqueous and solvent-based mediums. An aqueous dispersion manufactured using Lansperse BIO691 can be incorporated in solvent and aqueous-based paints without detriment to performance. This property is suitable for universal tinters and useful for formulators that want a multi-functional dispersing agent.

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