

Application Data


MPSI

 Mineral and Pigment
Solutions, Inc.

Surfactants - Phosphate Ester



Authorized Distributor

Phosphorous has the unusual property of forming a short polymeric structure. In reality, the phosphate ester surfactant will consist of 2-4 or more phosphorous atoms, with resulting complexity of the mono- and diester, and especially, of the coester structure.

By recognizing the possibilities inherent in this complex polymeric form, Dexter has been able to develop a group of products with unique combinations of properties which include wetting, dispersing and emulsification.

Wetting is defined as the action of a liquid penetrating into, or spreading along, a solid surface.

Emulsification is generally considered to be the formation of a stable distribution of one liquid within another immiscible liquid.

Dispersion usually refers to breaking up solid particles in liquid, and keeping them suspended within the liquid.

Proper selection of types and quantities of reactive components, coupled with precise control of reaction conditions, has led to products with carefully tailored properties. The STRODEX products offer optimum combinations of properties for a wide variety of end uses.

STRODEX products are sold not only in the neutralized form shown, but are also available as acids. This enables the user to neutralize with other alkalies or amines to obtain specific properties. STRODEX products in the acid form are less hydrophilic and therefore suitable for certain non-aqueous formulations.

Ionic Effects of STRODEX Surfactants

Both wetting and dispersing properties are necessary to form a proper pigment dispersion in an aqueous medium. Any type of wetting agent will reduce the surface tension of the liquid, and cause it to spread more readily over the surface of the solid pigment; ionic surfactants contribute additional dispersion stability by counteracting ionic flocculation.

The STRODEX surfactants have powerful surface tension depressing characteristics, and in addition, contain multiple anionic charges. Because of their structure, they are

uniquely suited for use as pigment dispersants. They will reduce dispersion time and energy requirements, plus improve paint consistency and flow properties of the mill grinds.

The phosphate groups in STRODEX surfactants also aid in passivation of metallic substrates, particularly in the presence of ammonium ions. The STRODEX phosphate surfactants also complex with atphoter reactive sites on pigments such as acicular zinc oxide.

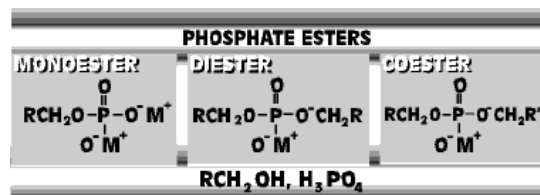
STRODEX Pigment Dispersion Rheology

An important characteristic of the STRODEX surfactants is that they exhibit relatively flat pigment dispersion demand curves. In in-house tests, the STRODEX surfactant reached a minimum viscosity, and held to this viscosity level, as the surfactant level is further increased. Conversely, polymeric carboxylic acid salt showed a sharp increase in viscosity after the minimum had been reached. Because of this flat dispersant demand curve, it is possible to use higher levels of STRODEX surfactant without any danger of reflocculation of the pigments.

While several inorganic phosphate dispersants will perform this same function, it must be realized that these organic materials will readily hydrolyze and lose this desirable property. However, the STRODEX surfactants are extremely stable and help to ensure that the viscosity and other characteristics of the pigment dispersion will not change in time.

It has been found that the addition of small amounts of STRODEX into blends of other types of dispersants will level off the critical portions of the dispersant demand curves, thus reducing their reflocculation danger.

The chemical structures of the STRODEXES shown below are conventional simplifications, but do not illustrate their true nature.



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