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# VANDERBILT

## *Technical Data*



### Stabilizing Water-Based Dispersions No. 1236

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# TECHNICAL DATA

No.1236  
Rubber and Plastics Department

## Stabilizing Water-Based Dispersions

The stabilization of an aqueous dispersion can be very challenging, particularly if it has a high solids content and the suspension must be easily poured or pumped. The use of **VAN GEL**<sup>®</sup> and **VEEGUM**<sup>®</sup> smectite clays as a suspending agent in a dispersion can significantly reduce these challenges. In addition, these products can eliminate the use of casein (a milk protein that may cause allergic reactions in some individuals) in many water-based dispersions and emulsions.

The result is:

- Excellent stability control
- Excellent viscosity control
- Superior control of flow properties

The use of smectite clays as suspending agents is also advantageous because of their synergistic interaction with thickening agents. Some common thickeners increase viscosity but are often poor suspending agents. **VAN GEL** and **VEEGUM** clays can be used with these thickeners to impart superior suspension stabilization and to allow finer adjustment of rheological properties than would be possible with the thickener alone. These clays can also be used with other suspension stabilizers, such as **VANZAN**<sup>®</sup> xanthan gum, for even greater control over stability, viscosity and flow properties.

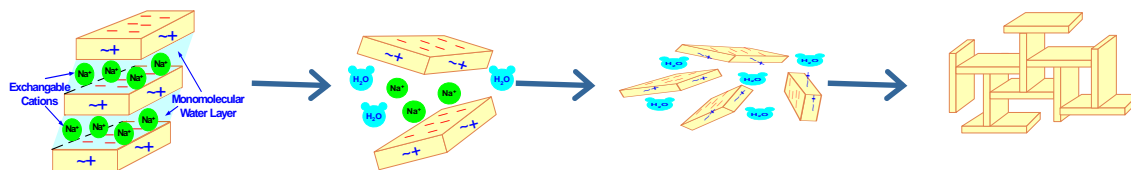
<b>64% SULFUR DISPERSION</b>	
Flour Sulfur	64.00
<b>VAN GEL B</b> , clay suspending agent	0.25
Polynaphthalene sulfonate, dispersant	2.50
Water	22.87
Propylene glycol, antifreeze	10.00
Surfynol <sup>®</sup> 104H, wetting agent	0.05
Triton <sup>®</sup> X114, surfactant	0.20
Preservative	0.20
<b>VANZAN</b> <sup>®</sup> xanthan gum	0.03
<b>Sulfur, average particle size, <math>\mu\text{m}</math><sup>A</sup></b>	<b>2.7</b>
<b>Viscosity, cps<sup>B</sup></b>	
<b>1 Day</b>	<b>880</b>
<b>1 Month</b>	<b>1010</b>
<b>3 Months</b>	<b>1080</b>
<b>Stability, 3 months</b> <b>Gelation/Syneresis/Packing</b>	<b>none</b>

<sup>A</sup>Coulter <sup>B</sup>Brookfield, 60 rpm

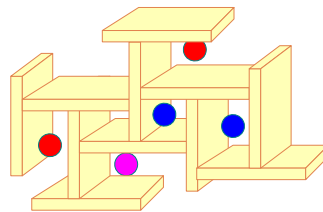
## HOW VAN GEL<sup>®</sup> AND VEEGUM<sup>®</sup> CLAYS WORK

Each clay granule is composed of millions of flake-shaped particles stacked in sandwich fashion with a layer of water between each. A single flake is one nanometer thick and up to several hundred nanometers across. The faces of these flakes carry a negative charge, while edges have a slightly positive charge.

When the clay and water are mixed, water penetrates between the flakes, forcing them apart. Diffusion and osmosis then promote delamination until the flakes are completely separated. Once the clay is hydrated (delaminated), the weakly positive flake edges are attracted to the negatively charged faces. A colloidal structure forms that accounts for the clay's thickening and stabilizing properties.



This structure effectively traps particulates, keeping them segregated and uniformly dispersed throughout the water.



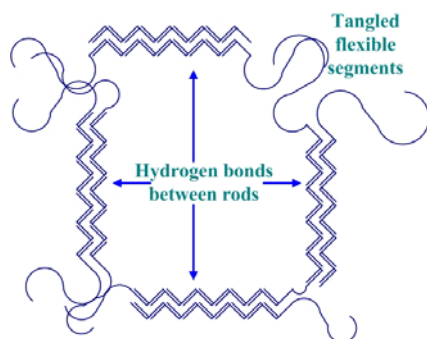
## VAN GEL AND VEEGUM CLAY GRADES

<b>VEEGUM T</b>	Offers high thickening and suspension efficiency. This product is particularly effective in highly alkaline products.
<b>VEEGUM CER</b>	A convenient blend of <b>VEEGUM T</b> and CMC; a high efficiency suspension stabilizer.
<b>VEEGUM</b>	Standard grade for a wide range of applications.
<b>VEEGUM Plus</b>	A convenient blend of clay and CMC. This product is especially easy to hydrate.
<b>VAN GEL B</b>	The standard and usually most economical grade for industrial suspensions.
<b>VAN GEL ES</b>	Offers high electrolyte tolerance.

## How VANZAN® XANTHAN GUM WORKS

The xanthan polymer's backbone is cellulose to which are attached trisaccharide side chains with the carboxylate groups that give the gum its negative charge. It is the interaction among the trisaccharide side chains that give **VANZAN** Xanthan Gum its unique solution properties. In solutions of low ionic strength or at high temperature, the xanthan gum chains adopt a random coil configuration because the anionic side chains are mutually repulsed.

A small amount of electrolyte reduces this repulsion, allowing the side chains to wrap around and hydrogen bond to the backbone, forming a helical rod. With electrolyte present, a colloidal network forms based, on hydrogen bonding among the helical rods and limited polymer entanglement. This colloidal network makes **VANZAN** Xanthan Gum an efficient thickener and stabilizer for water-based applications.



## VANZAN XANTHAN GUM GRADES

<b>VANZAN</b>	General purpose grade suitable for most applications.
<b>VANZAN D</b>	Surface-treated to facilitate dispersion without lumping. Also offers rapid dissolution at pH >9.

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