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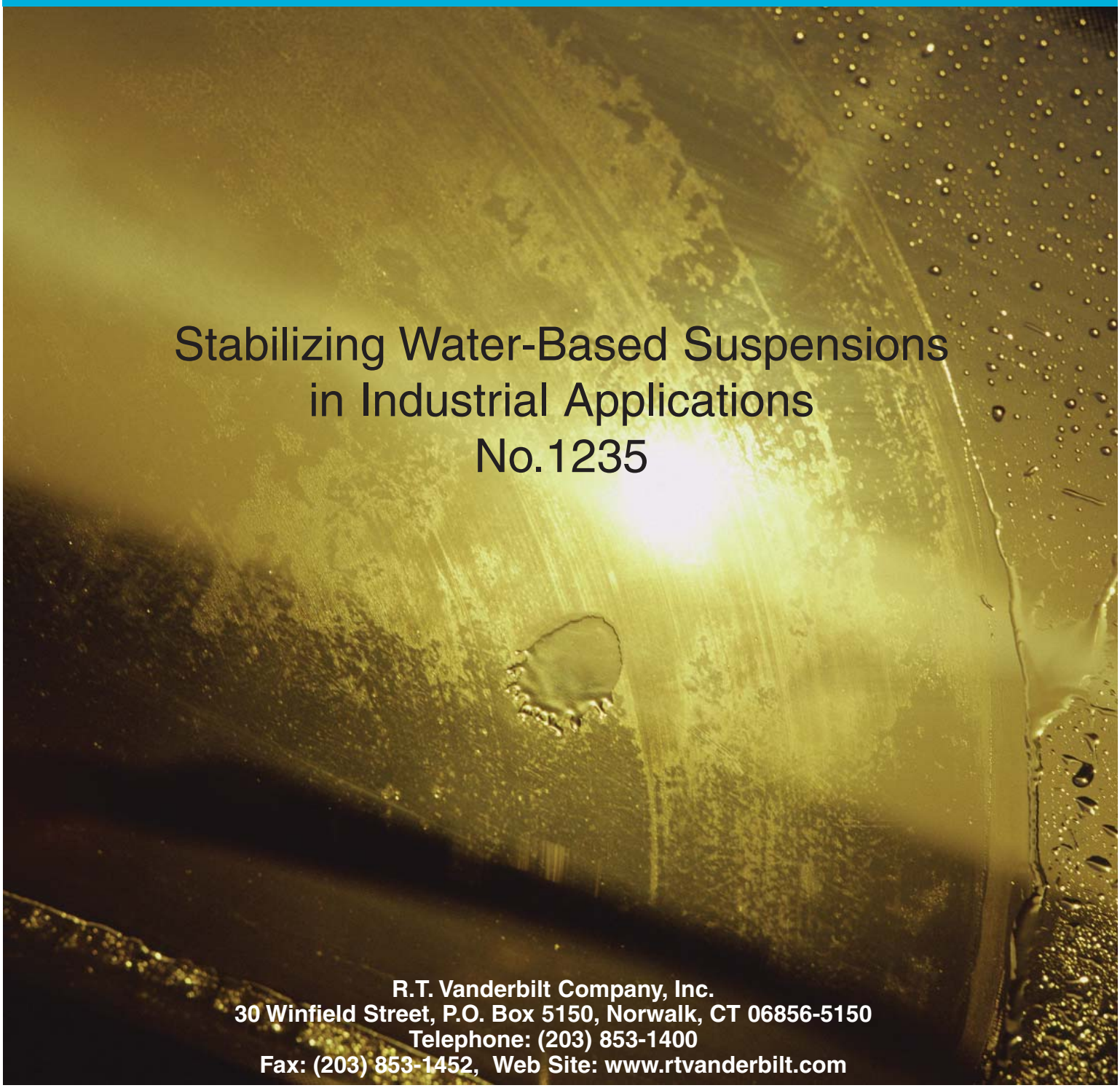
VANDERBILT Technical Data



Stabilizing Water-Based Suspensions in Industrial Applications No.1235

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TECHNICAL DATA

No. 1235
Rubber and Plastics Department

Stabilizing Water-Based Suspensions in Industrial Applications

The stabilization of an aqueous dispersion can be very challenging, particularly if it has a high solids content and must be easily poured or pumped. The use of **VAN GEL®** and **VEEGUM®** Magnesium Aluminum Silicate (smectite clay) as a suspending agent can significantly reduce these challenges.

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®** xanthan gum, for even greater control over stability, viscosity and flow properties.

These products work in a variety of applications including:

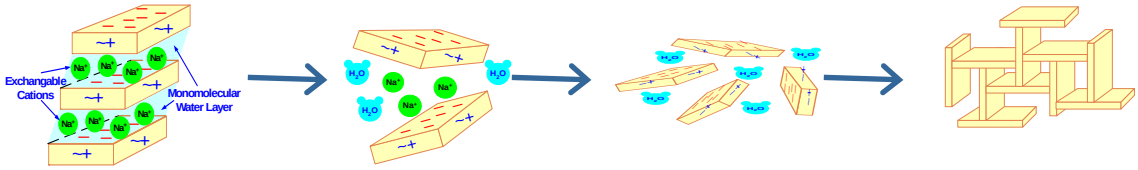
- Water-based Lubricants
- Aqueous Carbon Dispersions
- Tire Puncture Sealant
- Radiator and Coolant Stop Leak Sealant
- Many more. . .

60% CARBON BLACK DISPERSION	
Carbon Black	60.00
DARVAN® 1 Spray Dried Dispersant	2.40
VAN GEL® B Smectite Clay	0.25
Water	37.35
TOTAL	100.00

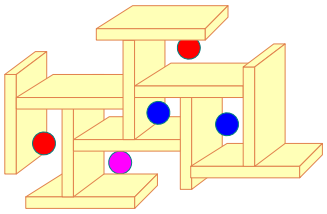
HOW VAN GEL® AND VEEGUM® CLAYS WORK

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.



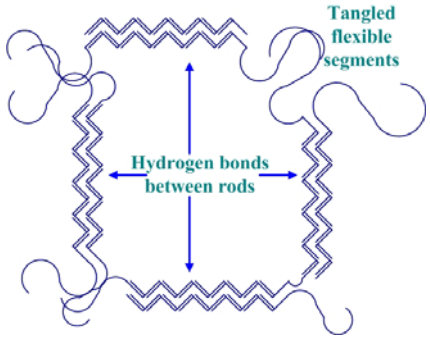
VAN GEL AND VEEGUM CLAY GRADES

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

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

08/08

For additional information regarding our high quality minerals and chemicals, please visit our website:

www.rtvanderbilt.com

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