

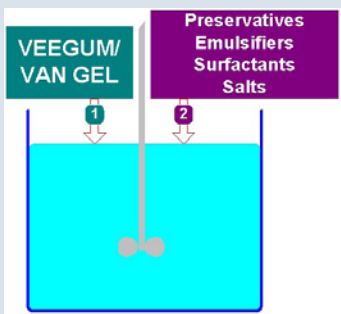
PREPARATION of DISPERSIONS

VANATURAL® Bentonite Clay, **VEEGUM**® Magnesium Aluminum Silicate and **VAN GEL**® Magnesium Aluminum Silicate products must be properly dispersed in water and hydrated to provide the desired performance properties.

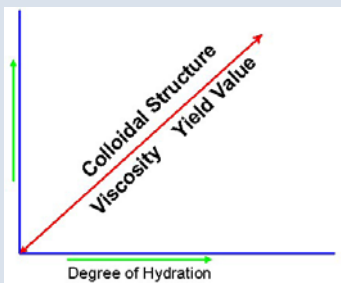
The two guides to successful hydration are:

- ✓ **THE BEST DISPERSIONS ARE PREPARED IN WATER FREE OF ADDITIVES.**
- ✓ **MORE ENERGY INPUT GIVES QUICKER HYDRATION.**

Any materials present in the water when the clay is added, including preservatives, chelating agents or other minor additives, will interfere with hydration and inhibit the formation of the desired colloidal structure.

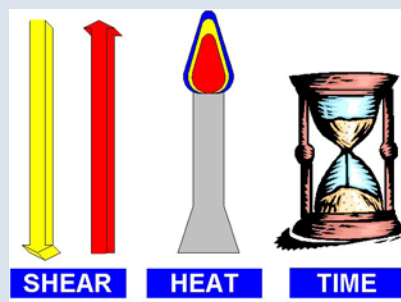


Dry clay particles are actually multiple layers of individual platelets separated by a layer of water. The extent to which these particles are delaminated into individual clay platelets is referred to as the degree of hydration. The greater the degree of hydration, the stronger the colloidal structure, and the greater the viscosity and yield value of the dispersion.

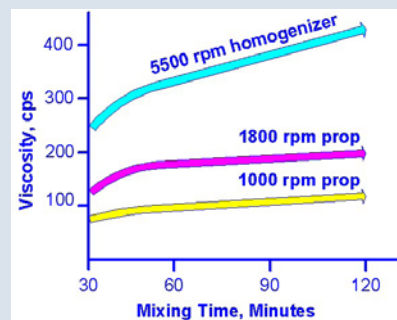


The degree of hydration is directly proportional to the amount of energy used to disperse the product, and therefore increases in proportion to the following factors:

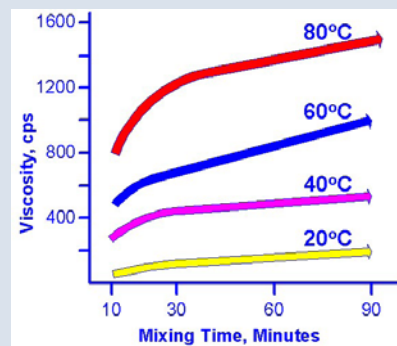
- **Shear, or mixing intensity**
- **Heat input, or water temperature**
- **Mixing time**



Using greater shear, or mixing for a longer time, will provide better hydration, which is measured as higher viscosity.



Heat input in the form of heated water has an even more pronounced beneficial effect on hydration than does the mechanical energy contribution of shear.



Any change in mixer intensity (e.g., speed, propeller to vessel ratio) or water temperature will affect the degree of hydration and the hydration time.

Whichever mixing conditions are used, it is very important that they be consistently controlled to achieve reproducible results in the laboratory, during scale-up and in production.

Because of its unique nature, **VEEGUM Ultra** clay is an exception. It is relatively unaffected by changes in hydration parameters. Adequate hydration of this product will be achieved in most cases in no more than 15 minutes. Increasing mixing intensity, mixing time or water temperature will not significantly affect its degree of hydration.

The table on the back provides guidelines for the minimum amounts of time suggested for the hydration of **VANATURAL**, **VEEGUM** and **VAN GEL** clays. They are based on laboratory scale preparations under practical formulating conditions. Actual hydration times in the laboratory or in production will depend on the particular combination of batch size, mixer shear and water temperature used.

In the laboratory or during production, the key to consistent performance of **VANATURAL**, **VEEGUM** and **VAN GEL** products is consistent conditions of hydration. Changes in hydration time, mixer shear, vessel size or water temperature will change results.

For detailed information on the properties and uses of these clay products, please request a copy of: "VANATURAL Bentonite, The Essential Mineral for Personal Care" and the "VEEGUM/VAN GEL" brochure at:

www.vanderbiltminerals.com



Vanderbilt Minerals, LLC
33 Winfield Street, P.O. Box 5150
Norwalk, CT 06856-5150
(800) 562-2476 Fax: (203) 855-1220
E-Mail: specialt@vanderbiltminerals.com

Please contact Vanderbilt for additional information on the products listed in this brochure.

Samples and technical information are available on request.

For a complete listing of Vanderbilt products, please visit:

www.vanderbiltminerals.com

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Minimum Suggested Hydration Times	Normal Hydrating Grades	Quick Hydrating Grades	Ultra Hydrating Grade
Propeller Mixer: 800 rpm, 25° C water 800 rpm, 75° C water	VEEGUM® VEEGUM F VEEGUM K VEEGUM HV VEEGUM Pure VEEGUM PRO VEEGUM T VAN GEL® B	VANATURAL® VEEGUM HS VEEGUM D VEEGUM Plus VAN GEL O VAN GEL ES	VEEGUM Ultra
Homogenizer: 3000 rpm, 25° C water 3000 rpm, 75° C water	120 Minutes 45 Minutes	30 Minutes 20 Minutes	15 Minutes 10 Minutes

