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VANDERBILT *Report*

VEEGUM[®], VANZAN[®] and Other Natural Ingredients

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VEEGUM[®], VANZAN[®] and Other Natural Ingredients

Today's consumers are focused on the beneficial effects of topically applied plant and mineral extracts. Formulators are no less appreciative of the benefits that natural materials can bring to the control of the rheology, stability and aesthetics of their handiwork. These natural "thickeners" are sometimes overlooked in favor of the latest versions of synthesized, polymerized, quaternized or otherwise modernized alternatives. Imaginative formulators, however, rely on natural clays and gums to sustain the appearance, application properties and skin feel that ensure consumer acceptance of the product. **VEEGUM** and **VANZAN** are natural rheology control additives that are particularly suited for use with botanical and mineral ingredients.

VEEGUM (INCI Name: Magnesium Aluminum Silicate) is natural smectite clay that has been water-washed to optimize purity and performance. It is valued for its ability to tailor the rheological properties of aqueous compositions, and it is the formulator's choice to stabilize suspensions, perfect emulsions, and to optimize flow properties and skin feel. These benefits are also present in synergistic combinations with organic gums, such as **VANZAN** xanthan gum, and polymeric thickeners.

VANZAN (INCI Name: Xanthan Gum) is a natural high molecular weight exocellular polysaccharide derived from *Xanthomonas campestris* using an aerobic fermentation process. Because of its protective function in nature, it is more resistant to shear, heat, bacterial, enzyme, and UV degradation than are most gums. **VANZAN** is soluble in hot or cold water, and gives thick, neutral pH, pseudoplastic solutions with emulsion and suspension stabilizing properties. These solutions provide viscosity stability at temperature extremes, as well as over the pH 2 to pH 12 range. Of the organic gums, xanthan gum is among the most tolerant of electrolytes, acids and bases, and it has a unique ability to thicken glycerin. **VANZAN** is compatible with most nonionic and anionic gums, and features useful synergism with **VEEGUM**.

HYDRATING VEEGUM PRODUCTS

VEEGUM products must be properly dispersed in water to achieve their best performance. No other materials, especially preservatives, should be present in the water, because they can interfere with proper hydration and colloidal structure formation. The degree of clay hydration is directly proportional to the amount of energy used to disperse the product. The degree of hydration therefore increases as mixing time, mixing intensity or water temperature increase. One grade, **VEEGUM Ultra**, is relatively unaffected by changes in these mixing factors; adequate hydration can be achieved quickly, using room temperature water and a simple, slow-speed propeller mixer.

The following table provides guidelines for the minimum amounts of time suggested for the hydration of **VEEGUM** products. Actual hydration times, in the laboratory or in production, will depend on the particular combination of batch size, mixer shear, and water temperature used. Whichever mixing conditions are used, it is very important that they be carefully controlled to achieve reproducible results in the final formulation.

Water Temp.	Mixer Type	Mixer Speed rpm	Minimum Suggested Mixing Time		
			VEEGUM & VEEGUM F	VEEGUM HS	VEEGUM <i>Ultra</i>
25°C	Homogenizer	3000 rpm	30 min.	20 min.	10 min.
25°C	Propeller	800 rpm	120 min.	30 min.	15 min.
75°C	Propeller	800 rpm	45 min.	20 min.	10 min.

DISSOLVING VANZAN

VANZAN products are soluble in both cold and warm water, with little effect on the dissolution rate. When dissolving **VANZAN**, the mixer should develop a deep vortex in the water in the mix tank, and the gum should be slowly sifted into the upper wall of the vortex. The gum should never be dumped into the water, and large amounts of **VANZAN** should not be allowed to float on the surface of the water during mixing. This can cause the formation of lumps or "fish eyes" that take much longer to dissolve. High efficiency mixers that keep the gum particles well dispersed until they dissolve are preferred. Pre-dispersion of the gum in a water-miscible liquid such as an alcohol or glycol helps to prevent the formation of lumps. A ratio of gum to water-miscible liquid between 1:2 and 1:10 is recommended. Dry-blending the gum with another dry ingredient, such as **VEEGUM**, can also be helpful in avoiding the formation of lumps. Mixing should continue until the solution is smooth and uniform, which usually takes about 30 minutes, or longer for larger batches.

RECOMMENDED FOR TOPICAL PRODUCTS

Smectite Clays:

- VEEGUM** The original grade of water-washed smectite clay, widely used in all types of pharmaceutical, cosmeceutical and personal care products.
- VEEGUM F** A finely ground product useful for dry-mix and pressed powders.
- VEEGUM HS** The grade with the best performance in high electrolyte compositions and at pH extremes. Also sold as Purified Bentonite NF.
- VEEGUM *Ultra*** A unique white and bright, slightly acidic (pH 4.7) product, and the easiest of all the grades to hydrate.

Xanthan Gum:

- VANZAN NF** The general purpose xanthan gum, suitable for most topical applications.
- VANZAN NF-F** A finely ground product, useful for dry mix reconstitutable formulas.
- VANZAN NF-C** A clear solution grade for transparent products.

PROTOTYPE FORMULATIONS

Acid Smectite AHA Clay Mask No. 487

	<u>% by wt.</u>
VEEGUM Ultra (Magnesium Aluminum Silicate) ¹	5.0
Water	38.9
Glycerin	5.0
Butylene Glycol	3.0
Kaolin clay, Cosmetic grade	30.0
Cosmetic Talc	5.0
Sodium Lauroyl Sarcosinate, 30%	5.0
Glycolic Acid, 70%	5.0
d-Panthenol	0.5
Vitamin E Acetate	0.1
Vitamin A Palmitate	0.1
Triethanolamine	2.4
Preservative, Fragrance	qs

¹R.T. Vanderbilt Company, Inc.

Procedure: Add the **VEEGUM Ultra** to the water slowly while agitating at maximum available shear. Continue mixing until hydrated. Add the remaining ingredients in the order listed, mixing after each addition until smooth.

Instant Clay Facial No. 496

	<u>% by wt.</u>
VEEGUM F (Magnesium Aluminum Silicate) ¹	5.0
Kaolin clay, Cosmetic grade	45.0
Zinc Oxide or Calamine	20.0
Polyvinylpyrrolidone (PVP K-30) ²	5.0
Oat Flour (Ritavena [®]) ³	20.0
Sucrose	5.0

¹R.T. Vanderbilt Company, Inc.

²ISP Technologies, Inc.

³R.I.T.A Corporation

Procedure: Dry blend all ingredients thoroughly, and package in a moisture-proof container.

Directions for use: Measure one tablespoon of powder into a small clean container. Add water a few drops at a time while stirring until a smooth, creamy paste is formed. Apply to face and allow to dry. Rinse off with clear water and a soft cloth or cotton ball. Discard unused paste. Milk, juices, egg or honey can be used in place of water.

Clarifying Face Scrub No. 483

	<u>% by wt.</u>	
A	VEEGUM HS (Magnesium Aluminum Silicate) ¹	5.0
	VANZAN NF (Xanthan Gum) ¹	0.3
	Water	51.6
B	Glycerin	3.5
	Butylene Glycol	3.0
	Polysorbate 20 (Tween [®] 20) ²	1.0
	Kaolin Clay, Cosmetic grade	10.0
	Talc, cosmetic grade	2.5
	Oat Flour (Ritavena) ³	1.0
	Luffa Cylindrica (Lipo Lufa 30/100) ⁴	0.1
	Polyethylene Beads (AC-9A) ⁵	2.0
Sodium Lauroyl Sarcosinate, 30%	20.0	
Preservative, Fragrance	qs	

¹R.T. Vanderbilt Company, Inc.

²Uniqema, New Castle, DE

³R.I.T.A. Corporation, Crystal Lake, IL

⁴Lipo Chemical

⁵Aqualon Company, Wilmington, DE

Procedure: Dry blend the **VEEGUM HS** and **VANZAN NF** and add slowly to water agitated at maximum available shear. Mix until hydrated. With reduced mixing speed, add the B phase ingredients in order, mixing after each addition until uniform. Adjust as necessary to pH 6.0 ± 0.5.

Aerosol Shave Cream for Sensitive Skin No. 503

	<u>% by wt.</u>	
A	Water	67.2
	VEEGUM Ultra (Magnesium Aluminum Silicate) ¹	1.5
	VANZAN NF (Xanthan Gum) ¹	0.3
B	Glycerin	3.0
	Butylene Glycol	3.0
C	Stearic Acid XXX	3.0
	Coconut Acid	3.0
	Safflower Oil	0.2
	Soybean Oil	0.2
	Cetyl Alcohol	1.0
	Dimethicone (DC-200 fluid, 350 cts) ²	1.0
	Lanolin Alcohol (Ceralan®) ³	0.1
	Isosorbide Laurate (Arlamol® ISML) ⁴	1.0
	Mineral Oil	3.0
D	Sodium Cocoyl Sarcosinate, 30%	10.0
	Panthenol	0.5
	Aloe Vera	0.5
E	Triethanolamine	1.5
	Preservative, Fragrance	qs

¹R.T. Vanderbilt Company, Inc.

²Dow-Corning Corporation, Midland, MI

³Chemron Corporation, Paso Robles, CA

⁴Uniqema, New Castle, DE

Procedure: Begin heating the water to 75°C. Dry blend **VEEGUM Ultra** and **VANZAN NF** and add slowly to the water agitated at maximum available shear. Allow about 45 minutes for the **VANZAN NF** to dissolve completely. Mix until hydrated. Add the remaining water phase ingredients from Part B, mixing after each addition until uniform. Maintain the water phase at 75°C. Blend the Part C oil phase ingredients and heat to 75-80°C. Add the oil phase to the water phase with good agitation; mix until uniform. Cool with mixing; add the Part D ingredients when the emulsion is <45°C. Add the Part E ingredients when the emulsion is <35°C. Adjust as necessary to pH 7.5 ± 0.5.

Purified Bentonite Refining Masks

	<u>% by wt.</u>	
	<u>No. 481</u>	<u>No. 482</u>
VEEGUM HS (Magnesium Aluminum Silicate) ¹	5.0	5.0
	42.5	40.0
Water		
Glycerin	4.0	4.0
Butylene Glycol	4.0	4.0
Kaolin clay, Cosmetic Grade	30.0	25.0
Cosmetic Talc	5.0	5.0
Sodium Lauroyl Sarcosinate, 30%	5.0	5.0
Oat Flour (Ritavena) ²	1.0	1.0
d-Panthenol	1.0	1.0
Aloe Vera ²	1.0	1.0
Biosaccharide Gum-1 (Fucogel 1000) ³	0.5	0.5
Sodium PCA	1.0	1.0
Lactic Acid, USP, 88%	-	5.0
Sodium Lactate	-	2.5
Preservative, Fragrance	qs	qs

¹R.T. Vanderbilt Company, Inc.

²R.I.T.A. Corporation

³Barnet Company

Procedure: Add the **VEEGUM HS** to the water slowly while agitating at maximum available shear. Continue mixing until hydrated. Add the remaining ingredients in the order listed, mixing after each addition until smooth.

Vitamin Enriched Barrier Hand Cream No. 490

	% by wt.	
A	Water	79.0
	VEEGUM Ultra (Magnesium Aluminum Silicate) ¹	0.8
	Carbomer (Carbopol [®] 934) ²	0.3
B	Glycerin	2.0
	Butylene Glycol	2.0
C	Cetyl Alcohol	0.5
	Glyceryl Monostearate (Dermalcare [®] GMS SE) ³	2.0
	Caprylic/Capric Triglyceride (Neobee [®] M-5) ⁴	2.0
	C ₁₂₋₁₅ Octanoate (Finester [®] EH-25) ⁵	2.0
	Castor Oil Polyurethane (Polyderm PPI CO) ⁶	1.0
	Phenyl Dimethicone (DC 556 fluid) ⁷	3.0
	Dimethicone (DC-200 fluid, 350 cSt) ⁷	1.0
	Bois oil ⁸	0.5
	Steareth-2 (Brij [®] 72) ⁹	0.95
	Steareth-21 (Brij 721) ⁹	0.95
D	d-Panthenol	1.0
	Vitamin E Acetate	0.5
	Vitamin A Palmitate	0.5
	Preservative, Fragrance	qs

¹R.T. Vanderbilt Company, Inc.

⁶Alzo, Inc., Sayerville, NJ

²Noveon Corp., Cleveland, OH

⁷Dow-Corning Corporation, Midland, MI

³Rhodia, Cranbury, NJ

⁸Barnet Company, Englewood Cliffs, NJ

⁴Stepan Chemical Company

⁹Uniqema, New Castle, DE

⁵Finetex, Inc. Elmwood Park, NJ

Procedure: Begin heating the water to 75-80°C. Slowly add the **VEEGUM Ultra** and Carbopol 934 sequentially or as a dry blend to the water agitated at maximum available shear. Mix until hydrated. Add the remaining water phase ingredients from Part B, mixing until uniform. Maintain the water phase at 75-80°C. Blend the Part C oil phase ingredients and heat to 75-80°C. Add the oil phase to the water phase with good agitation; mix until uniform. Cool with mixing; add the Part D ingredients when the emulsion is <35°C. Adjust as necessary to pH 5.8 ± 0.3.

Botanical Skin Lightening Lotion No. 492

	% by wt.	
A	Water	69.8
	VEEGUM Ultra (Magnesium Aluminum Silicate) ¹	2.0
	Carbomer (Carbopol 934) ²	0.2
B	Polysorbate 20 (Tween 20) ³	0.6
	Glycerin	3.0
	Butylene Glycol	3.0
C	Cetyl Alcohol	0.5
	Isosorbide Laurate (Arlamol [®] ISML) ³	1.0
	Laureth-23 (Brij [®] 35) ³	0.7
	Steareth-2 (Brij 72) ³	1.1
	Steareth-21 (Brij 721) ³	1.1
	Caprylic/Capric Triglyceride (Neobee M5) ⁴	5.0
	Glyceryl Monostearate (Dermalcare GMS SE) ⁵	3.0
D	C ₁₂₋₁₅ Octanoate (Finester EH-25) ⁶	3.0
	Dimethicone (DC-200 fluid, 350 cSt) ⁷	1.0
	Triethanolamine (pH to 6.0 ± 0.5)	3.0
	Saxifraga Sarmentosa Extract, Grape Extract, Butylene Glycol, Water, Mulberry Root Extract, Scutellaria Baicalensis Extract, Na ₂ EDTA (Biowhite) ⁸	2.0
	Preservative, Fragrance, Color, Chelating agent	qs

¹R.T. Vanderbilt Company, Inc.

⁵Rhodia, Cranbury, NJ

²Noveon Corp, Cleveland, OH

⁶Finetex, Inc., Elmwood Park, NJ

³Uniqema, New Castle DE

⁷Dow Corning Corporation, Midland, MI

⁴Stepan Chemical Company, Northfield, IL

⁸Coletica, NYC, NY

Procedure: Begin heating the water to 75-80°C. Slowly add the **VEEGUM Ultra** and Carbopol 934 sequentially or as a dry blend to the water agitated at maximum available shear. Mix until hydrated. Add the remaining water phase ingredients from Part B, mixing until uniform. Maintain the water phase at 75-80°C. Blend the Part C oil phase ingredients and heat to 75-80°C. Add the oil phase to the water phase with good agitation; mix until uniform. Cool with mixing; when the emulsion is <45°C add the Part D ingredients in the order listed, mixing after each addition until smooth and uniform.

OTHER R.T. VANDERBILT COMPANY PRODUCTS FOR PERSONAL CARE FORMULAS

Smectite Clay: **VEEGUM**, Magnesium Aluminum Silicate
Natural Clay stabilizers and thickeners for water-based formulas

VEEGUM
VEEGUM *Ultra*
VEEGUM HV
VEEGUM K
VEEGUM HS
VEEGUM F
VEEGUM PRO
VEEGUM PLUS

Xanthan Gum: **VANZAN**, Xanthan Gum
Natural gum stabilizers and thickeners for water-based formulas

VANZAN NF
VANZAN NF-C
VANZAN NF-F
VANZAN NF-ST

VANDERBILT REPORTS AVAILABLE IN THE PERSONAL CARE FORMULARY SERIES

No. 907 (Rev.) **VEEGUM**[®] in Color Cosmetics
No. 915 **VEEGUM**[®] in Facial Masks
No. 917 **VEEGUM**[®], **VANZAN**[®] and Other Natural Ingredients
No. 918 **VEEGUM**[®] In Bath and Hair Products
No. 919 **VEEGUM**[®] and **VANZAN**[®] in Skin Care Products

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Neobee is a registered trademark of Stepan Company

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