



# HEMINGS

## NANJING HEMINGS NEW MATERIAL

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## Lithium Magnesium Sodium Silicate

(Hatorite® S482)

The Clear Leader

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### Description

Hatorite S482 is a modified synthetic magnesium aluminum silicate with pronounced platelet structure. When dispersed in water, Hatorite S482 forms a transparent, pourable liquid up to a concentration of 25% solids. In resin formulations, however, significant thixotropy and a high yield value can be incorporated.

### Typical Properties

Physical Form: White, free-flowing powder

Brightness: (Elrepho R 457) ~85%

Specific Gravity: 20.83 lbs/gal (2.50 g/cm<sup>3</sup>)

Bulking Value: 0.048 gal./lb.

Particle Size: (Dry) 95% < 325 mesh (45 μm)

Moisture Content: 15% maximum

Temperature Stability: Up to 400°C

## **Application**

- Emulsion paints
- Putties
- Adhesives
- Ceramic frits / glazes / slips
- Grinding pastes and abrasives
- Silicon resin based external paints
- Artist paints / finger paints
- Water reducible systems

## **General Information**

Due to its good dispersability, HATORTITE S482 can be used as a powder additive in high gloss and transparent waterborne products. The preparation of pumpable 20-25% pregels of Hatorite® S482 is also possible. It must be observed, however, that during the production of a (for example) 20% pregel, the viscosity can be high at first and therefore the material should be added slowly to the water. A 20% gel, however, shows good flow properties after 1 hour.

By using HATORTITE S482, stable systems can be produced. Due to the Thixotropic characteristics of this product, the application properties are significantly improved. HATORTITE S482 prevents settling of heavy pigments or fillers. As a Thixotropic agent, HATORTITE S482 reduces sagging and allows the application of thick coatings. HATORTITE S482 can be used to thicken and stabilize emulsion paints. Depending on the requirements, between 0.5% and 4% of HATORTITE S482 should be used (based on total formulation). As a Thixotropic anti-settling agent, HATORTITE S482 can also be used in: adhesives, emulsion paints, sealants, ceramics, grinding pastes, and water reducible systems.

## **Hints for Practical Use:**

In deionized, or very soft water, low viscosity suspensions of up to 25% Hatorite S482 can be prepared using low shear. These suspensions can be handled at low viscosity for several hours. If only hard water is available, it should be demineralized applying the usual methods (ion exchange,

polyphosphates, Zeolite, etc.). Accelerated swelling can be accomplished by heat (35-60°C), high shear mixing, addition of electrolytes or a combination of these variables.

**Suitable salts are:**

Na<sub>3</sub>PO<sub>4</sub> NaOH Na<sub>2</sub>CO<sub>3</sub> NaNO<sub>3</sub> NH<sub>3</sub> MgSO<sub>4</sub> Mg(NO<sub>3</sub>)<sub>2</sub>

The benefits of Hatorite S482 are maximized when a few guidelines are followed. The electrolyte concentration in the system (especially divalent cations) can have a dramatic effect on the properties of Hatorite S482. For this reason, it is recommended that Hatorite S482 be incorporated into deionized water. This will allow for better utilization of the Hatorite S482. After mixing in deionized water for a few minutes, activation of the Hatorite S482 can be accomplished with heat or by the addition of a small quantity of electrolyte. If neither heat nor electrolyte is used, Hatorite S482 will with low shear incorporation slowly hydrate and gel overnight. However, the thickening efficiency and the clarity will not be at their maximums. The use of heat during mixing to activate Hatorite S482 is the best approach. Heat will produce the clearest gel having the greatest efficiency. Any amount of applied heat will provide advantages over allowing it to hydrate under ambient conditions. However, the more heat that can be applied, the quicker the Hatorite S482 will hydrate. For example, it can be expected that if the solution is heated to 35°C and then removed from the heat, a gel will form after about ~6 to 8 hours. If the solution is heated to 60°C, the gel will form in ~1 to 2 hours.

As mentioned earlier, electrolytes can be used at extremely low levels to accelerate the hydration of Hatorite S482. For example, an addition of 1.5% sodium carbonate (based on the weight of Hatorite S482) will result in immediate gelation. The addition of 0.5% sodium carbonate will result in a gel in ~1 to 2 hours, but will have greater clarity than the 1.5% addition. Care must be taken if electrolytes are to be used to activate Hatorite S482 solutions, since too much electrolyte can flocculate Hatorite S482. In the case of sodium carbonate, an addition of 6-7% (based on the weight of Hatorite S482) will flocculate the Hatorite S482. The use of more than 5% of a monovalent cation or more than 1% of a divalent cation is not recommended due to impaired thickening and clarity. Please note that the quality of the deionized water will affect the electrolyte level that gives the best results.

If tap water is to be used, gelation may occur rapidly depending on the hardness of the water. This is even true under ambient conditions due to the electrolytes present. Clarity of the gel will typically be poor. Even if the gel is heated, the clarity will not improve to a level comparable to the level possible in deionized water.

### **Incorporation as a Pregel**

In deionized water 25% gels of Hatorite S482 can be prepared with low initial viscosity. The viscosity increases rather slowly unless heat or shear is applied. Additional components therefore can be incorporated while maintaining the low viscosity level. If the 25% pregel is stored for several days, a completely dispersed gel is obtained which can be added into all formulations.

### **Compatibility with Polar Solvents:**

Hatorite S482 is also an effective thixotropic agent in the presence of organic solvents. The amount of solvent, however, is limited and should not exceed the following concentrations:

Methanol: 50%

Ethanol: 30%

Isopropanol: 30%

Ethylene Glycol: 50%

Compared to pure water, the viscosity of a water/solvent gel is higher. At higher concentrations of organic solvents, the gel loses transparency and stability.

### **pH Stability of Hatorite S482 Pregel:**

Pregels in water are stable from neutral and across the alkaline pH range. The optimum efficiency is obtained between pH 9 and 12. An adjustment of the pH quite often is not necessary, because Hatorite S482 as supplied is sufficiently alkaline. In the acidic area Hatorite S482 is not stable.

### **Storage**

Hatorite S482 is hygroscopic and should be stored under dry condition.