Laponite Technical Bulletin

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Laponite technical information

How to use Laponite

Using Laponite as a rheology control agent

In common with most speciality additives it is crucial that Laponite is Introduced into formulations in the correct way.

This will ensure that optimum performance and efficiency is achieved.

All Laponite types, both gel forming and sol forming must be added to water and allowed to disperse and hydrate fully before any other components are added.

The presence of other components such as surfactants, dispersing agents etc., already in solution will interfere with the dispersion of Laponite and in some cases may halt it completely.

Laponite is a unique rheological additive which can improve the performance and appearance of many water based formulated products.

Laponite grades – two types of grade are available:

- **gel forming grades– e.g. RD, XLG, D**
- **sol forming grades– e.g. RDS, XLS, DS**

Some definitions as they apply to Laponite:

Colloid - a very small particle, with dimensions <500 nm
Gel - a high viscosity colloidal dispersion
Sol - a low viscosity colloidal dispersion

Gel forming grades disperse readily in water, under agitation, to form clear, colourless dispersions. The viscosity of such dispersions depends upon the Laponite solids and the electrolyte content of the water used. At 2% in tap water highly thixotropic gels are formed; at the same concentration in deionised water, low viscosity sols will be produced. Both forms of dispersion are suitable to use in, or add to formulations at this time. Laponite develops viscosity by interaction with the soluble components in a formulation.

Sol forming grades follow the same dispersion characteristics, but contain an inorganic polyphosphate dispersing agent which delays the formation of a thixotropic gel structure. At concentrations of up to 10%, low viscosity sols are formed. When the sol premix is added to a water based system containing other solids or electrolytes, the effect of the dispersing agent is overcome and viscosity begins to rise. The rate at which the desired level of structure is achieved will depend on the exact composition of the system, but in many formulated products this can often be within minutes of adding the Laponite sol premix.

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Recommended laboratory dispersion procedure for Laponite

1. Add Laponite powder with rapid mixing. Initially, the dispersion is quite cloudy.

2. Continue mixing. As the Laponite disperses, the mixture will become clearer.

3. When the mixture becomes clear or translucent, the dispersion process is approaching completion.

Notes

Add the free flowing Laponite powder to deionised or tap water with rapid agitation at room temperature. Mixer speed should be sufficiently high to produce a vortex which will cause all the powder to fully wet out without the formation of clumps.

Suitable laboratory mixing equipment could be a mechanical stirrer fitted with a propeller blade revolving at 200—500 rpm or a saw tooth (Cowles type) blade revolving at 500—1000 rpm. Mixing should be continued for at least 20 minutes.

If required, dispersion time may be reduced by increasing the temperature of the mixture up to 40-50°C after the Laponite powder is fully wetted out or by use of a high shear or emulsifier mixer such as a Silverson.

When dispersion is complete all Laponite grades produce a clear or translucent, colourless colloidal dispersion. The viscosity of the dispersion at this time depends upon the concentration of the premix and the Laponite grade in use. Laponite premixes are often flowable liquids, not rigid gels. In such cases, thixotropic viscosity and structure will develop as other formulation ingredients are added.

For scale up to production with Laponite, you are invited to contact **Rockwood** for advice and technical support. For more information, consult The Laponite Technical Directory.

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