

As with most speciality additives it is critical that Laponite is introduced into formulations in the correct way. This will ensure that optimum performance and efficiency is achieved.

All Laponite products, 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 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.

## Recommended dispersion procedure for Laponite

### Laboratory scale mixing procedure

Add the free flowing Laponite powder to deionised or tap water at room temperature (15-25°C) with rapid agitation. For a typical lab-scale batch, it is recommended that all of the Laponite material to be used in a formulation should be added gradually into the water over a period of between 10 to 30 seconds. This will increase the rate of dispersion of all Laponite grades. Mixer speed should be sufficiently high to produce a vortex which will cause 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 200rpm or a saw tooth (Cowles) blade revolving at 500rpm. 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 mixer such as a Silverson. The viscosity of the Laponite dispersion at this time depends upon the concentration of the premix and the Laponite grade in use.

Laponite® EP will produce structure in water much more quickly than other grades of Laponite; dispersions of this grade are translucent, not clear.

Laponite EL and OG will form translucent low viscosity dispersions

in water at up to 3% concentration. Viscosity development occurs with these grades when combined with other formulation ingredients

#### For gel forming grades RD, XLG, D, DF, XL21, HW, LV

When dispersion is complete, these grades produce a clear, colourless colloidal dispersion.

Concentrations above 3% of gel forming grades can build structure very quickly in the Laponite/water premix and will form a highly viscous pregel which can make it difficult to incorporate with other raw materials in a formulation. If insufficient free water is available to allow the preparation of a premix with concentration below 3% then Laponite may be "de-gelled" by the addition of compounds such as tetrasodium pyrophosphate or low molecular weight glycols. This degelling effect is overcome on addition of the premix to a formulation.

#### For temporary sol forming grades RDS, XLS, DS, S, JS

Colourless, translucent and colloidal, low viscosity dispersions known as sols are formed. This liquid premix may be stored and used in successive batches of a formulation. High solids concentrations of sol grades should be aged for up to one hour to allow the hydration process to complete.

#### For permanent sol forming grade S482

To produce a sol at 20% solids or higher, use similar mixing equipment to that described for gel and temporary sol forming grades...a mechanical stirrer fitted with a propeller blade revolving at 200rpm or a saw tooth (Cowles) blade revolving at 500rpm

Add the free flowing Laponite powder quickly 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.

At very high solids content there will be a rapid increase in viscosity of the mixture within a few minutes, producing a thick, paste-like texture. At this time turn off the mixer and allow the dispersion to age for up to one hour to allow the peptising effect of the patented additive to develop. The viscosity will fall rapidly during this time. Turn the mixing equipment back on and continue mixing for a further 30 minutes.

Sols of Laponite prepared in this way may be stored for very long periods of time before use.

Laponite SL25 is supplied as a ready-for-use liquid dispersion.

For scale up to pilot trials or production with Laponite contact Rockwood to discuss your requirements