



Laponite® LV in automotive metallic basecoat

Description

Laponite® LV has been specially developed for use in high performance water based surface coatings to produce shear sensitive and thixotropic structure. It is particularly useful in surface coating formulations that contain high levels of emulsion resins and have relatively low levels of free water available in which to disperse a rheological additive.

These include:

- automotive basecoats, metallic, pearlescent and solid colours
- industrial and protective coatings
- wood coatings

When hydrated in deionised water at up to 3% concentration, **Laponite® LV** will produce a clear and colourless colloidal dispersion of very low viscosity level, typically <50 mPa.s. The low viscosity of this dispersion makes it easy to produce a homogenous mixture when it is combined into a resin system. **Laponite® LV** will produce an instantaneous build in viscosity of the system when added to a wide range of types of emulsion resins

Benefits and advantages of Laponite LV

- Easier to incorporate
- Improved viscosity stability with time
- Excellent appearance
- Improved flip-flop
- Improved moisture resistance

How to incorporate Laponite® LV

As a general recommendation, Laponite® products should not be prepared as a viscous pre-gel in water. If a strongly gelled Laponite® pre-mix is added into a liquid formulation, it may be difficult to get the Laponite® gel component dispersed homogeneously into the rest of the formulation. This will often lead to formation of gel seeds or grits in the system.

Add the free flowing Laponite® LV powder to deionized at room temperature (15-25°C) with rapid agitation. It is recommended that the Laponite® material used in a pre-mix should be added gradually into the water over a period of ~ 10 seconds. This will increase the rate of dispersion, and prevent formation of gel seeds. Mixer speed should be high to produce a vortex this will allow the powder to wet out fully without formation of clumps. Mixing should be continued for at least 20 minutes.

A dispersion of Laponite® LV at 3% solids content will remain at low viscosity for up to 2 hours and ideally should be used within that time frame. If it is necessary to store the Laponite® pre-mix for longer periods it is recommended that a low molecular mass glycol (e.g. PEG, PPG or BDG) is used to act as a de-gelling agent. This will stabilize the dispersion at low viscosity for several weeks and allow it to be easily incorporated into a coating formulation.

Using glycol to "de-gel" Laponite® LV

Add 4 parts low molecular mass glycol, e.g. PEG 900 to 92 parts deionized water. Set mixing rapidly and add 4 parts of Laponite® LV powder; continue mixing until dispersed.

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Guide formulation: automotive metallic basecoat

Procedure

- A) Add ingredients in order shown and mix for 30 minutes to disperse the aluminium pigment
 B) Add resin and mix for a further 20 minutes
 C) Add dispersion of thickener and mix for 10 minutes; a part of the DI water from Phase F may be added at this point if required
 D) Add wax emulsion and mix for 5 minutes
 E) Add alcohol and mix for 10 minutes, remove from mixer and store in a sealed container
 F) After approximately 12 hours adjust viscosity to 300 to 400 cP ($25s^{-1}$; 23°C) with DI water

Phase	Mass (g)	Ingredient	Dry mass (g)	% by mass	Description/ function
A	66.77	Stapa® IL Hydrolan 2154	40.06	10.74	Non-leafing aluminium pigment
	4.29	ADDITOL® XL 250	4.29	0.69	Dispersing/ wetting agent for pigment
	49.25	Butylglycol		7.92	solvent
Sub-total	120.31		44.35	19.35	
B	277.78	DAOTAN® VTW 6463/36WA	100.00	44.70	Water based polyurethane dispersion resin
C	37.93	Laponite® LV (3% dispersion in DI water)	1.14	6.10	Rheology control/ flip control agent
	44.58	Deionised water		7.17	to adjust viscosity if required
D	54.07	Ultralube® E 500 V	18.92	8.70	Wax emulsion, gloss, slip, anti-mar agent
E	13.85	Isobutanol		2.23	solvent
Sub-total	548.52		164.42	88.25	
F	73.00	Deionised water		11.75	Let-down
Total	621.52		164.42	100.00	
Formulation developed by CYTEC Surface Specialties Austria GmbH					

Typical results:

Phase E Viscosity = 1319cP ($25s^{-1}$; 23°C)

Phase F Viscosity = 378cP ($25s^{-1}$; 23°C)

pH = 8.6

Storage & safety

Laponite® LV is supplied in 25kg polyethylene lined cardboard cartons. When stored under dry conditions in original packaging, shelf life is 4 years from date of manufacture shown on the certificate of analysis.

Laponite® products are in compliance with EU chemical regulations REACH and CLP.