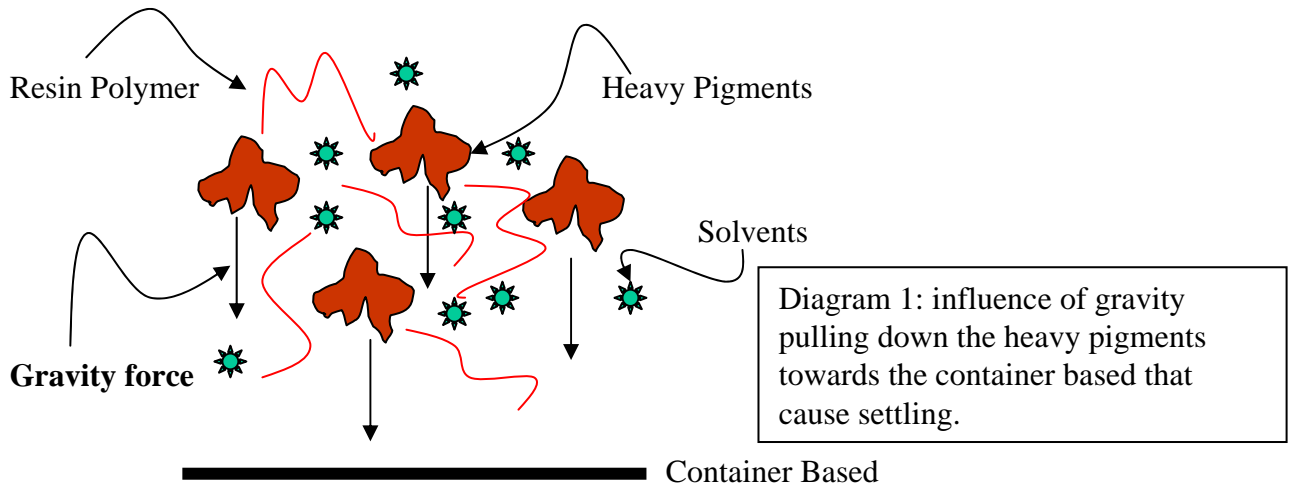


Introduction

Settling always is a major issue on coating involving heavy pigment and extender like Metal Oxide Pigment, aluminum, pearl pigment, CaCO₃ and other extenders. The major cause of the settling is because of the density of those pigments are relatively high and when subject to gravity, under certain period of time, the heavy pigments will sink down to the bottom of the container. This cause a lot of problem to coating user as this will resulting in uneven gloss, seeding and lost of hiding.

Settling

Settling as mentioned above are due to gravity force that pulling down the heavy pigments toward the bottom part of the container. Physically, settling are highly depending on viscosity of the paint. The more dilute the viscosity of the paint will resulting in a faster settling phenomena. However the higher viscosity will slow down the process but if given more time, settling can also happen.



As show in diagram 1 above, when the viscosity is higher, the polymers are pack into the condition that are more close to each other. At such condition, the pigment get more resistance to sink. Thus it need more time to sink down comparing to a more dilute system.

Beside viscosity, there are also others factors that can influence the settling process. Below listed all the factors:

- 1) Viscosity of the system
- 2) Density of the pigments
- 3) Container size
- 4) Pigmentation of the system

Different types of settling

Basically, settling can be divided to 2 types. Hard settling and soft settling. Although both are settling phenomena but hard settling is all paint formulators that trying to avoid. However soft settling will not cause real problem to the user. A very low shear force is enough to re-disperse back the settle pigment or extenders to it original condition.

Hard settling

When pigment sink to the bottom, over longer period, it pack closer and closer to each other. In additional, tackiness of the resin will also bind them together and this will make the situation even more worse and difficult to be disperse back to it original condition. Thus high speed dissolver are needed.

Hard settling are the phenomena that all paint formulators trying to avoid. When hard settling occur, all the pigments that settle to the bottom and they are pack very close to each other. Sometime it can be hard as a rock that make it impossible to be separated again.

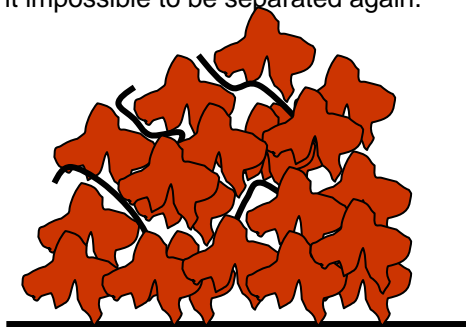


Diagram 2: Hard settling condition with resin binding together the pigments which make them hard to separate.

Soft settling

Soft settling is also a kind of settling. The phenomena is not so bad and easily can be disperse back to it original condition by low shear force. This is most wanted by all paint formulators.

Soft settling are mainly related to Hydrogen Bonding. The hydrogen bonding formation are mainly form between resin, solvent, anti-settling agent that added and also to the surface of the pigments. This hydrogen bonding will form a network, like a fishing net, in the system in order to prevent the pigment come close to each other. By this, it can be very easy to re-disperse again by low shear force. Please refer to diagram 3 for more detail.

This kind of settling happen mainly to a system that have use an anti-settling agent. However is still depending on the efficiency of the anti-settling agent used. An **inefficient anti-settling agent** will change the settlement from soft to hard settling after longer period. Thus at the end, the hydrogen network that been build have to have high density that will prevent the hard settling to occur against time.

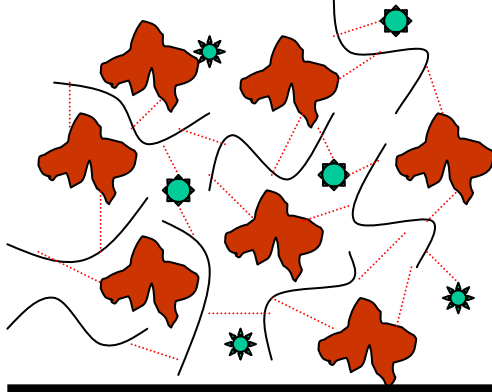


Diagram 3: Soft settling phenomena that mainly contribution from hydrogen bonding.

Anti-settling agents

Anti-settling agent are widely use in the coating industrial. They can be categorized as organic clay, conventional Polyamide, Polyethylene Vinyl Acetate, Fume Silica and Calcium Sulfonate derivatives. All this types of anti-settling agent has been available in the market for very long time. The reasons why there are so many types of anti-settling agents are used is because each of them have own limitation. Some are very effective, like the organic clay and Fume Silica, but give more disadvantages comparing to other. Some are less effective or needed higher dosage, will give less disadvantages but can not satisfied the users needed and requirement.

The most common will be the organic clay range product. The main disadvantages of those organic clay as below:

- 1) Will **reduce the gloss significantly** of a high gloss top coat.
- 2) Some need to pre-prepared and activated in paste form. The process have to be control under a very narrow range of temperature in order to get the optimal performance.
- 3) Delivery in powder form that restrict user to use it **only** in grinding phase or need to pre-prepared a paste if need to use in let down stage.
- 4) Increase viscosity of the system significantly that affect the flow and leveling of the coating.

Conventional Polyamide and Polyethylene Vinyl Acetate give less serious disadvantages.

However they still have several disadvantages as listed below:

- 1) Needed higher dosage as supplier form comparing to normal powder type of organic clay.
- 2) Polyethylene Vinyl Acetate relatively more expensive.
- 3) Delivery form in a very lumpy paste that restrict user to use it only in grinding phase or need to pre-prepare a flowable paste form which need resin to stabilized.
- 4) Increase viscosity of the system moderately that affect the flow and leveling of the coating.

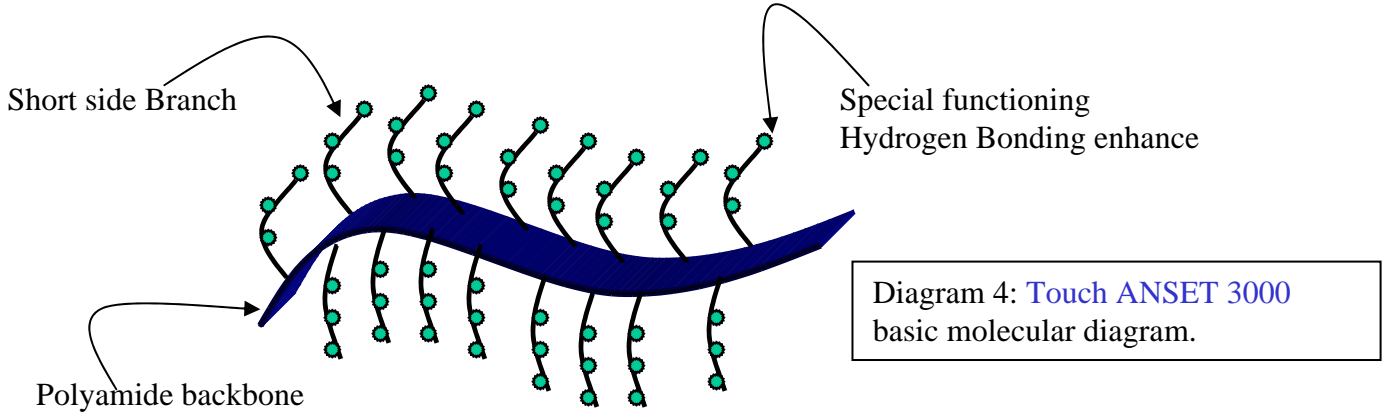
Fume Silica is also another widely used anti-settling agent. It deliver form is in white light powder. It give the following disadvantages.

- 1) Will **reduce the gloss significantly** of a high gloss top coat.
- 2) The material is light and not so user friend in the production as it can easily fly.
- 3) Increase viscosity of the system moderately that affect the flow and leveling of the coating.
- 4) They are more expensive.
- 5) Sometime difficult to disperse to the desire fineness.

Calcium Sulfonate Derivatives come in a soft gel that easy to use. However they significant different with other anti-settling agents are they are also relatively expensive and needed higher dosage.

Touch ANSET 3000

Touch ANSET 3000 is a very efficient anti-settling agent in all solvent based systems. This is a high molecular weight Polyamide Polymer which incorporate with special function group that enhance hydrogen bonding formation. The molecular structure design in such a way that it is more towards the linear structure that can enhance a stronger hydrogen bonding network **without increasing too much the viscosity of the finishing paint system as other anti-settling agent did**. Please refer to diagram 4.

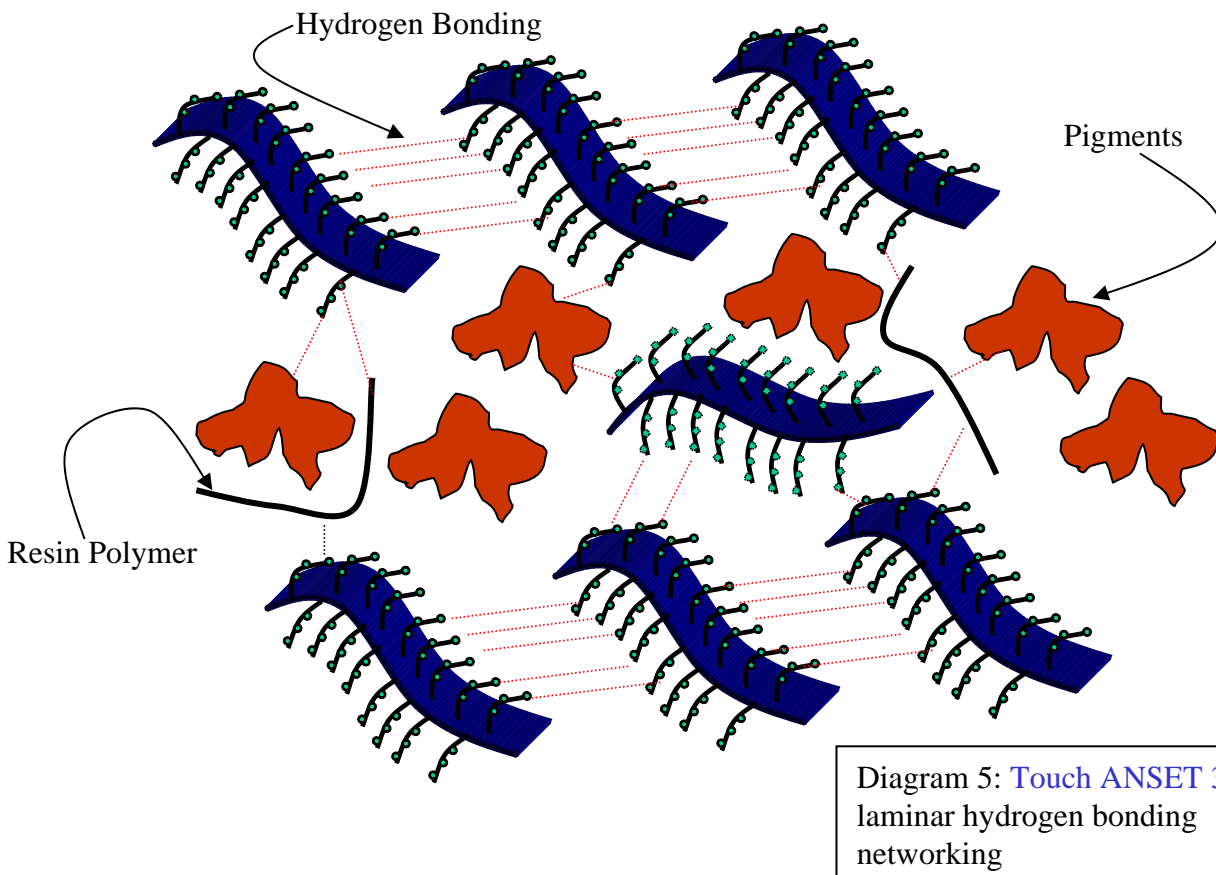


The working functions

Due to Touch ANSET 3000 molecular structure is more linear, Touch ANSET 3000 work in the sense that the hydrogen bonding networks are form in laminar manner. As high density of hydrogen bonding is form on each layer that acts as a separator net effect than all layer are joining together by less dens hydrogen bonding that do not allow the pigment to settle. However upon external shear force, the network can be break down easily. Please refer to diagram 5.

This have 2 **advantages**.

- 1) Will not increase the viscosity of the system too much as other anti-settling agent that form a 3-D Hydrogen network.
- 2) Give better anti-settling effect than other anti-settling agents by having a real multi laminar layer of high dens hydrogen bonding. Each laminar layers than link together by weaker bond.



Advantages of using Touch ANSET 3000

Due to [Touch ANSET 3000](#) using different way of mechanism on performing the anti-settling effect. It have many advantages against other anti-settling agent. It can be use in all type of solvents based coating.

[Touch ANSET 3000](#) is a very thixotropic paste. Upon subjected to higher shear force, the thixotropic effect will break down and the viscosity can be very dilute. However if there is not disturbance of external shear force, the viscosity can be very high.

The advantages of [Touch ANSET 3000](#) are as follow.

1)Need low shear force to incorporate to system

[Touch ANSET 3000](#) supply in a paste form that have fineness below 5um. It very easy to incorporate to any paint system. The shear force need for incorporation are depending on polarity of the system.

Medium to high polar system - Need only very low shear force for incorporation. **For example in lab scale, hand stirring is enough to disperse it well.** The Systems are Polyurethane, NC, Thermoplastic Acrylic, Alkyd-Urea Acid Curing system, Epoxy, CAB system, Etching Primer and Unsaturated Polyester.

Low to medium low polar - Need higher shear force for incorporation. Sometime is not possible to stir in by hand in lab scale. However stir it under a normal dissolver is enough to disperse it well. A spiracle velocity of 6 m/s is enough. The systems are all baking system and air drying alkyd.

Thus this is one of the main advantages of [Touch ANSET 3000](#) as it can be use as post added additives as well as incorporated during the grinding stage. In actual case, in grinding formulation are recommended not to incorporate any additives beside wetting and dispersing agent. This is to avoid any other added additives **compete with Dispersing on pigment surface or influence the efficiency of the dispersing agent.** However after the wetting and stabilization process of pigments is completed, any additives added later will have less influence. Thus [Touch ANSET 3000](#) is recommended to add at the later stage of the production.

2) No gloss reduction on high gloss top coat

[Touch ANSET 3000](#) will not reducing the gloss of the coating. The total solid of [Touch ANSET 3000](#) polymer that incorporated is very low and normally is not more than 0.30%. Further more it has relatively better compatibility with system.

3) Better efficiency



Hard settling condition after 1 week in 25°C NC primer that added 5% of 10% solid content of organic clay that was activated with alcohol during the process of pre-gelling.



Soft settling condition after 1 week in 25°C of NC primer that added 0.5% of [Touch ANSET 3000](#) as delivery form.



Hard settling condition after 1 week in 25°C AC Wood Sealer that added 5% of 10% solid content of organic clay that was activated with alcohol during the process of pre-gelling.



Soft settling condition after 1 week in 25°C of AC Wood Sealer that added 0.5% of [Touch ANSET 3000](#) as delivery form.

4) Minimum influence on viscosity of the finishing Coating

The laminar layer effect of [Touch ANSET 3000](#) as explain in pages 4 are responsible for this phenomena. Thus the main benefit of it will be minimum influence on the leveling property of the coating. This is very important as most anti-settling agent does increase the tendency of having orange peel appearance on the finishing paint film.

5) No seed out in the system upon storage

[Touch ANSET 3000](#) have very stable performance in storage. It will not give seeding out problem as some anti-settling do. The compatibility is relatively better than other anti-settling agent. Thus the seed out defect will not exist.