

Manuscript of the Presentation:

Ladies and Gentlemen:

I am pleased that there is a chance for me to introduce “**The New development of JLS Ammonium Polyphosphate Surface Treatment without Formaldehyde**” (1 page)

JLS is a major player of ammonium polyphosphate (II phase), we try our best to develop our APP to meet different application. Today, in the conference I emphasis on the new grade JLS-APP104 series suitable for textile, my presentation divided these sections (2 page)

Why JLS develop new grade APP104 series? (3 page)

Most textile coating must pass water-proof testing generally. In some application, it must pass hot water-proof and steam testing. If used in domestics or automobile, it restricts to release formaldehyde in the using strictly. (4 page) From our past experience, we find that APP and other grade treated by ordinary method is very difficult to pass water-proof if you don't have suitable formulation, moreover it is very difficult no to pass hot water-proof and steam testing. In the application, they use APP treated by MF resin. But for domestics or automobile, there are strict limit to formaldehyde, the standard is too low to use these APP. Even if you use APP treated by MF resin in your coating formulation, you may be defeated. It is up against hot water and steam , you need an accurate coating formulation.

Because of the factor, JLS develop a new grade APP104 series for different textile coating. (5 page)

JLS-APP 104 is suitable ***for*** Common water-proof, formaldehyde free

JLS-APP 104 S and JLS-APP 104 W are suitable ***for*** more high water-proof, ***maybe can pass hot water-proof and steam testing***, formaldehyde free

JLS-104MF is suitable ***for*** hot water-proof and steam testing, MF resin treated, have formaldehyde.

I elaborate on the characteristic of JLS-APP104 series (6 page)

We can see that there are difference of P content , N content, viscosity , using region.

APP104, 104s and 104w are all formaldehyde free . APP104s is suitable solvent base coating,

APP104w is mostly used in water base coating, APP104MF is the best water-proof, but the grade have formaldehyde .

JLS have two points of view, one is Good water-proof ≠Good fire resistance effect (7 page)

If APP had been treated, it will cover with an treated agent surface to prevent APP meet carbon donor and blowing agent. At the meantime, there are different TGA curve according to different treatment, we will discuss it next page.

This is the chemical reaction of flame retardant in fire. (8 page)

I elaborate on difference between JLS-APP104 series (9page)

At first **I'll give you more introduction on difference surface treating APP104, and the affect to APP TGA.** In this table, you can find the difference. The temperature of 20% weigh loss recede when we treated APP.

(10page) Next let we see next page, in the figure, we can find the difference more **distinctly.**

We contrast with the TGA curve of APP, the APP TGA changes a lot when you use MF resin.

APP104, APP104S and APP104W are similar. For flame retardants, TGA is important index, it must suitable your formulation, or else you can not get satisfying result.

This is the TGA curve of APP (11page)

This is the TGA curve of APP104 (12page)

This is the TGA curve of APP104MF (13page)

This is the TGA curve of APP104S (14page)

This is the TGA curve of APP104W (15page)

(16page) Why do we treat APP? We want to low the water solubility of APP, the different treatment can get different water solubility.

APP104MF is the best, APP104S and APP104W is the second.

(17page) In practice, we need know the stability of flame retardant in the water for a long time. at this page, we find that it is good for the stability of APP used JLS treatment methods, the result is pleased. For 7 days, the water solubility of modified APP change a little, but APP changes a lot.

(18page) Why do we develop the MF resin treatment method? Of course the method has the formaldehyde releasing, but it have excellent water-proof, especially in hot water. If used other treatment method , they all dissolve entirely become transparent liquid at 70°C water.

(19page) Of curse we develop the MF resin, to reduce the dissociative content of free formaldehyde and modified the hot water-proof. If used common MF resin, they all dissolve entirely become transparent liquid at 70°C water for a day. JLS-APP104MF is OK.

This is the difference of PH (20page)

This is the difference of viscosity (21page)

This is the difference of the flowability, we use the angle of repose to appraise the flowability. **The lower** the angle of repose is, the better the flowability is. (22page)

Underside, JLS we introduce the difference of the testing formaldehyde method. You can see that they differ a lot. The cured MF resin still release formaldehyde in the course of using. The chemical reaction as follows: (23page)

The content of free formaldehyde is a little based on extraction method, the content can attain the most standard (24page)

The content of releasing formaldehyde is a lot based on JLS decompose test method. However the content of APP104MF can not attain the some standard (25page)

At the end, *how do JLS-APP104 series used* (26page)

There is so much standard corresponding to different application.

(27page) The key is that, using which grade of APP104, you must think about the difference capability of APP104, if the APP could match with other material in the formulation. Of course it needs us to do test and to adjust the formulation. Then all material can show their best 表现.

If you have require, we are pleased a chance to help you.

Thank you very much! (28page)