

Optimization of ASA Emulsion and Impact of Filler on ASA Sizing

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ABSTRACT

The sizing performance of ASA depends upon the stability of the ASA emulsion also, in addition to other factors. For fine dispersion of ASA oil, cationic starch is used to prepare the ASA emulsion at the paper machine site. The pH of cooked cationic starch is generally reduced to below 4.0 with the help of citric acid or adipic acid before emulsification to reduce the chances of hydrolysis of ASA during emulsification and to some extent on storage for few minutes. As the cationic starch and these acids are quite expensive, attempts have been made to reduce the starch consumption and substitute the expensive acids by low-cost chemicals. It has been possible to reduce the starch to ASA ratio in the emulsion from 3 to 2, resulting in cost saving. It is also possible to use PAC alone or alum alone in place of citric acid to reduce the pH of starch slurry. The optimum dosing of different chemicals has also been determined for preparation of ASA emulsion.

In India, talc is extensively used as filler in the production of writing & printing papers due to its availability at low cost. Few mills, after switching over to neutral or alkaline sizing, have started using ground calcium carbonate (GCC) also to get better optical properties. Precipitated calcium carbonate (PCC) has been reported to have even better bulk and optical properties and it is being used in several modern mills abroad. The fillers are expected to affect the sizing performance to a varying degree, depending upon their nature. These three fillers have been studied to observe their effect on performance of ASA alkaline sizing and also on optical and strength properties. Sizing performance decreases on loading the paper with GCC or PCC but it slightly improves with talc due to its non-wetting nature. Optical properties of PCC are better than those of GCC and talc, which is also reflected in the paper sheets with these fillers. Paper containing PCC exhibited superior bulk, smoothness and stiffness. Due to fine particles of PCC, the strength properties were inferior when PCC was loaded to the paper as compared to those with talc and GCC.