TA Instruments

Thermal Analysis & Rheology

RHEOLOGY SOLUTIONS

COMPARISON OF ANTI-SLING AGENTS IN FIBER FINISHES

PROBLEM

Manufacturers of fiber finishes add "anti-sling" agents to the finish to prevent the finish from being slung (thrown off) the fiber during processing. These anti-sling agents are usually mixed with the finish to achieve a specific formulation viscosity. However, viscosity is not always the ideal parameter for controlling performance of the finish. Figure 1, for example, shows the viscosity profiles for two batches of anti-sling agent known to perform very differently in actual use.

SOLUTION

Controlled stress rheology measures the deformation and flow of materials under a variety of modes including steady shear (flow), creep, and oscillation. The latter two modes are particularly useful when the properties of interest are related to the material's viscoelasticity. Since anti-sling agents work by increasing the adhesion of the finish to the fiber and since adhesion is directly related to the amount of elastic behavior present, these two modes should provide better product differentiation than simple viscosity. Figures 2 and 3 verify that hypothesis. Both modes clearly show that the behavior of the two batches is different and that, as expected, the good batch of anti-sling agent has much more elastic behavior than the bad.

Figure 1 - Fiber Coating Anti-Sling Agents (Viscosity Profiles)

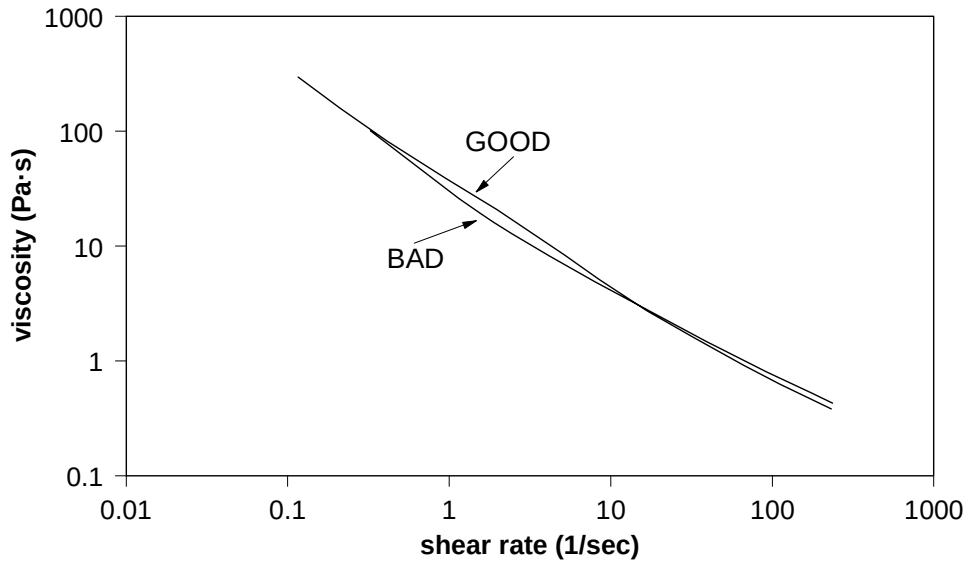


Figure 2 - Fiber Coating Anti-Sling Agents (Creep)

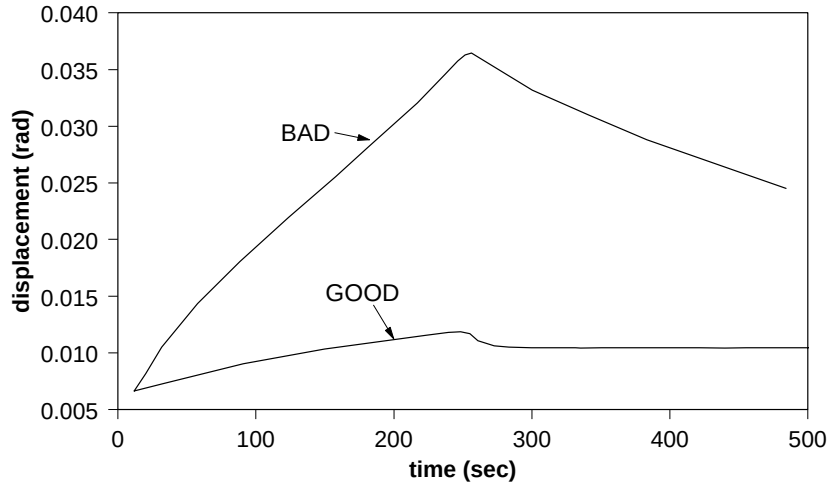
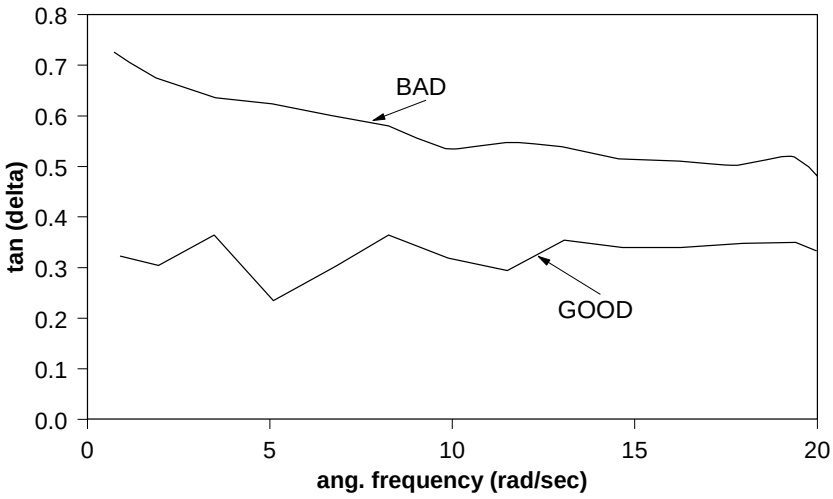


Figure 3 - Fiber Coating Anti-Sling Agents (Oscillation)



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