

RHEOLOGY SOLUTIONS

COMPARISON OF ROOF COVERING MATERIALS

PROBLEM

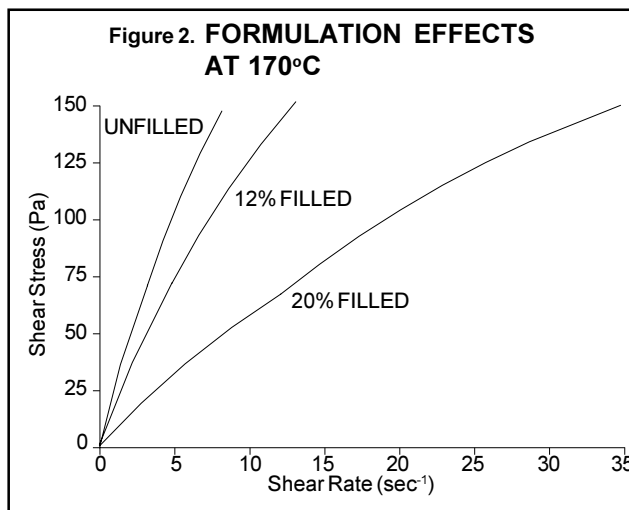
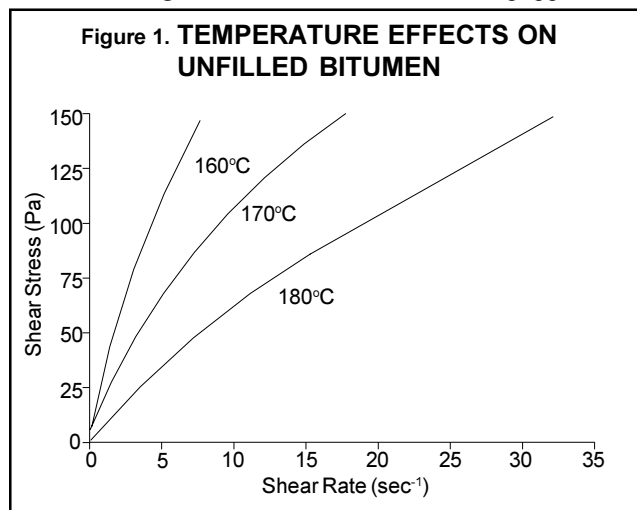
Bituminous (asphalt) roof covering materials are typically produced by dipping a fabric sheet in a vat of hot asphalt. Generation of quality products is dependent on adjusting the vat temperature so that the viscosity of the molten asphalt allows the asphalt to completely and rapidly coat the fabric, but when removed from the vat, does not allow it to run back out of the fabric before sufficient cooling occurs.

SOLUTION

Controlled stress rheology is a convenient technique for comparing the viscosity (flow) properties of materials to evaluate the effects of temperature and formulation changes. Figures 1-2 show typical results for bitumen coatings evaluated using a controlled stress rheometer equipped with

a high temperature accessory designed to reach temperatures up to 400°C at heating rates as high as 2°C/second without creating thermal gradients in the sample. Both figures show shear stress plotted versus shear rate. Hence, the slope of the individual curves represents relative viscosity.

Figure 1 shows a specific bitumen formulation evaluated at several different temperatures and illustrates that the material's viscosity does change significantly with temperature particularly above 170°C. Figure 2 shows several different formulations evaluated at one specific temperature and illustrates that changing formulation also has a significant impact on viscosity. Using curves such as these in correlation with feedback from actual production runs, it is possible to eventually establish criteria for rapidly adjusting vat temperature in future production.



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