

PACKAGING MATERIALS AND VISCOSITY

What does packaging have to do with viscosity? Quality Managers worry about their food products and measure viscosity to ensure proper flow behavior, such as with sauces and dressings (see Figure 1). But why concern yourself with the containers these products go into or the shipping boxes? Very simply, the adhesives, inks and coatings used for these packaging materials also require viscosity measurement and control to provide durable attractive products that will serve the food manufacturer well.

Figure 2: Standard Benchtop Rotational Viscometer for Packaging Materials



The viscosity issue is the same for all. Be it an ink or an adhesive, the consistency of the material is ensured by measuring its viscosity. A rotational benchtop viscometer is the tool of choice (see Figure 2) and provides a quick pass/fail indicator once the measurement is made. Normally a specification already exists defining the spindle, rotational speed, time of rotation, operating temperature and sample volume. If there is no spec, then one is created, based either on supplier information or from a characterization test run on the ink/adhesive.

Figure 1: Viscosity Flow Curve for Sauces

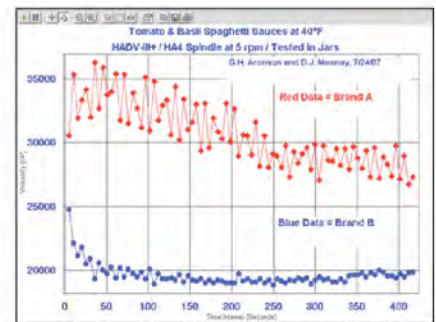


Figure 3: Standard Disc Spindle in 600 mL Beaker

Spindle selection is one of the decisions that must be stated in the spec. Whereas the food item can oftentimes be measured with a standard disc spindle in a 600 mL beaker (see Figure 3), the adhesive or ink necessitates working with a smaller sample volume. Consequently, the Small Sample Adapter or Cone/Plate are appropriate for making the viscosity measurement since they require less than 16mL and 2mL respectively. (see Figure 4)



Figure 4: Cone/plate Spindle Geometry for Measuring Viscosity of Small Sample Volumes



For some adhesive materials, such as hot melts, the viscosity measurement is made at elevated temperature. The Thermosel System provides the rapid heating capability to test small sample sizes quickly and efficiently for viscosity. (see Figure 5)

Figure 5: Thermosel System for High Temperature Viscosity Measurement of Hot Melt Adhesives



One additional issue to bring up is the tear strength of the packaging material itself. There's nothing worse than a packaged food product which either opens too easily (suggesting the seal was not complete) or requires the strength of Hercules to pull apart. The solution is to evaluate the seal strength

Figure 6: Texture Analyzer with Dual Grip Assembly Measuring Force Required to Pull Apart Packaging Seal



of your packaging material with a Texture Analyzer. (see Figure 6)

Pack Expo is an event where food companies and suppliers of packaging materials have the opportunity to investigate these very issues. Instrumentation companies like Brookfield are in attendance and can explain testing methodology using each of the devices mentioned in this article. For best results in the quality of your packaging materials, viscosity measurement is an issue that deserves your attention.