

When Liquids Fail The Viscosity QC Check

When QC rejects a liquid food product for viscosity reasons, whether it be a beverage, syrup, cream filling, whatever, the question is why. The viscosity value recorded by the QC technician has fallen outside the acceptable limits for the item in question. Could it be the instrument's fault? (See Figure 1) Manufacturing certainly hopes so, because they don't want to rework the product if they don't have to.



Figure 1:
Rotational Viscometer Used
To Measure Liquid Viscosity

Blaming the instrument is the easy way out. But a quick calibration check with a viscosity standard fluid shows that this is not the problem. (See Figure 2) The newer kits come complete with all plastic containers so that there is no risk of glass breakage in the Food Lab. So, if the instrument is not at fault, what else could cause the failure?



Figure 2:
Plastic VisCal Kit Used
to Verify Viscometer

Two possible explanations involve temperature control, or lack thereof, and the size/type of container in which the viscosity measurement is made. Most liquids have a viscosity-temperature profile which shows that viscosity decreases as temperature increases. (See Figure 3) It's important to know how sensitive the liquid is to temperature. For those liquids which are highly sensitive, the test

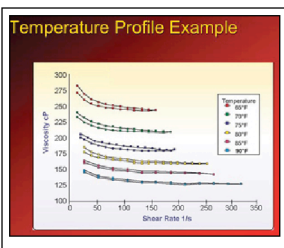


Figure 3:
Viscosity vs Temperature
Profile for Liquid Food Product

sample may require temperature conditioning prior to testing in order to eliminate significant variability in the viscosity data.

The container for the liquid under test should be of specified dimensions, such as a 600mL beaker. (See Figure 4) The technical issue is the distance between the rotating spindle and the container wall. If this distance is too small, or not consistent, the consequence may be a higher degree of shearing action by the rotating spindle. The net result is that the measured viscosity value could end up lower.

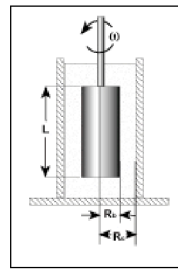


Figure 4:
Spindle in Container
Shows Key Dimension

These are two of the possible reasons that explain why a viscosity measurement can result in a failed product. Awareness of these issues can facilitate the adoption of a more detailed method, or perhaps a wider window for acceptance around a target viscosity value. Attention to detail is the bottom line. These helpful hints on viscosity measurement will ensure that liquid processing in your food processing plant continues full speed ahead.