

Medicinal Sprays:

How Do You Test For “Stickiness”?

Medicinal and pharmaceutical products that are applied by spraying have gained in popularity because they easily coat the targeted surface without need for further spreading action by the consumer. Oral and nasal sprays may actually work with greater rapidity, migrating quickly to the target area and producing a very desirable benefit for the patient in terms of faster relief. How do manufacturers know whether the spray will actually stick to the targeted surface once it arrives? Relying on feedback from user groups is one way to get the necessary information, but would seem to have a highly variable range of responses since it is based on human judgment.



Figure 1: Brookfield CT3 Texture Analyzer Measures “Stickiness”

Instruments known as Texture Analyzers or Texture Testers provide a convenient and objective means for making this measurement. See Figure 1. These devices can run a test within a matter of seconds to determine the “stickiness of sprays. They are simple to operate and give “tighter” objective results compared to human sensory panels. Compared to many other types of instruments found in pharmaceutical labs, Texture Analyzers are easily affordable and do not require complicated procedures for calibration or maintenance. In fact, test technicians are making measurements within a matter of minutes when first using the instrument.

Choices involved in selecting the correct piece of equipment boil down to load cell range and type of measurement probe. With a load cell that has capacity up to 1000 grams and a cylindrical probe of 1-inch diameter, the Texture Analyzer, when used in a QC lab, has the ability to make measurements in standalone mode that will satisfy most spray applications. During initial evaluation in R&D, use of software to run the Texture Analyzer may be desirable so that different spray formulations can be easily compared against one another.



Figure 2: Sample Is Placed Onto Base Table

Test method involves placing sample material on a table like the one shown in Figure 2. Having attached the cylindrical probe to the Texture Analyzer, the technician brings the probe close to the sample within a few millimeters to create what is called the “start” position for all future tests. Once the set up is completed, the technician conducts a “target load” test by entering the following values into the parameter table:

Test Type: Compression
Target Value: 500 grams
Test Speed: 1 mm/sec
Trigger Load: 1 gram (or slightly higher if desired)



When ready, the start button is pushed and the test executes automatically. The probe moves downward, makes contact with the sample, starts making measurements as soon as 1 gram of force is detected, and presses the material up to a compressive force equaling 500 grams. The curve in Figure 3 shows two different formulations of an oral spray that were evaluated for “stickiness”. The peak force in each case is shown to be 500 grams, which is the control value that was entered before the test. The measured values of interest are the Negative Peak Loads, because they indicate how much resistance the probe encountered as it tried to pull away from the sample on the table. This is essentially the adhesive force of the sample trying to keep the probe from lifting off. The area under the “negative” part of the curve is a measurement of the “adhesiveness”, or work that is required to pull the probe away.

Software used with Texture Analyzers can record data from multiple tests and compute average “adhesiveness” values over multiple batches along with the calculation for standard deviation. This provides a window for acceptability on future production batches of material.

Use of Texture Analyzers to make these types of simple measurements is growing because the results give an objective approach for pass/fail determination. Education to train technicians in use of the equipment is relatively quick. Maintenance on the instrument requires nothing more than using a set of weights to verify that the load cell is measuring correctly. Best of all, the purchase price is affordable compared to most instruments found in the lab. Perhaps it’s time for you to investigate Texture Analyzers for your manufacturing operation.

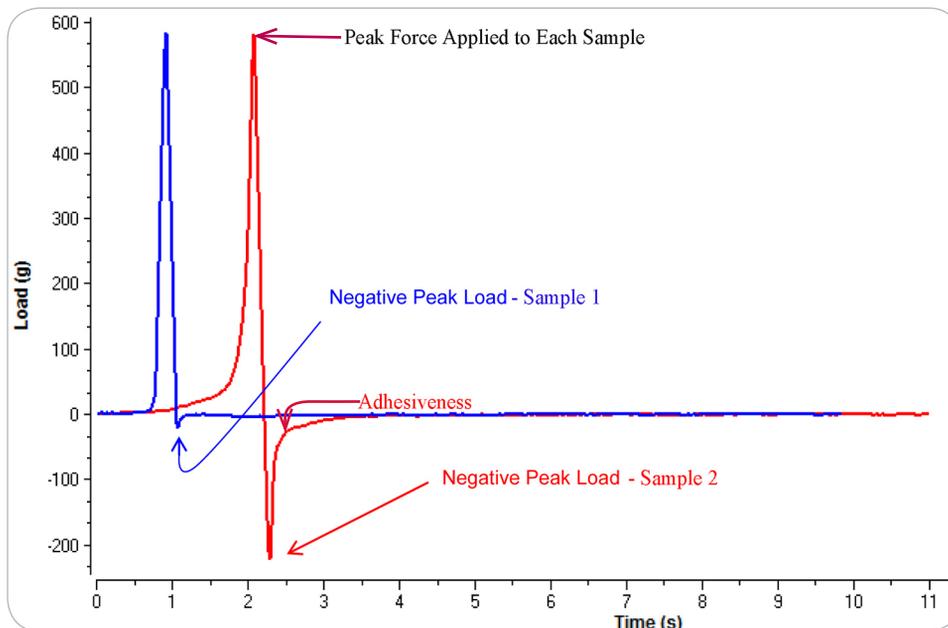


Figure 3: Test Data for Two Samples

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