

Bread Crumb Firmness, by Compression

AACCI 74-09.01 Standard Method

TVT Texture Analyzer

The TVT Texture Analyzer (Figure 1) offers rapid and objective analysis for all kinds of products. The following parameters can be characterized for your product category:

- Firmness
- Springiness

Both international standard methods as well as customer tailor-made profiles are available.



Figure 1: TVT Texture Analyzer

Scope

- Determination of bread crumb firmness by single cycle compression, AACCI (74-09.01) Standard Method.

Method Description

The recording of the measurement data commences once the probe reaches the pre-set trigger force. The probe will then compress the sample to a pre-defined percentage of the sample height. After compression, the probe returns to its starting position.

Calibration

Make sure the instrument is correct calibrated before the measurements. How to perform the calibration can be found in the User's Manual.

Load cell (recommended) 5 - 10 kg

Probe

Large loaves: >1 pound (450g): Cylinder probe 36 mm diameter, rounded edges Aluminum

Part number: 67.01.60 (Figure 2)

Small loaves: Cylinder probe 21 mm diameter, rounded edges Aluminum

Part number: 67.01.59



Figure 2: 67.01.60

Profile settings

Setting Parameter

Single Cycle Compression

Sample height [mm]	25.0
Starting distance from sample [mm]	5.0
Compression [%]	40.00
Initial speed [mm/s]	1.0
Test speed [mm/s]	1.7
Retract speed [mm/s]	10.0
Trigger force [g]	5
Data rate [pps]	250

Sample preparation

Slice the bread loaves in slices of 25 mm thick, or two bread slices of 12.5 mm each which then should be compressed together. Avoid taking the 3 slices nearest the end of the loaf, since they are normally harder than the rest. Place the sample on the measuring table and center it below the probe, Figure 3. Make sure no larger irregularities are in the measuring area. Work quickly, since contact with air dries out the bread and increases the firmness. If a sample is irregular avoid using it in the test. This test could be done with or without the bread crust. Avoid getting the probe too close to the edges since it will have an effect on the measuring results. One 25 mm slice or two 12.5 mm slices are used for each measurement.



Figure 3: Sample set-up

Curve Description

In Figure 4, a typical Force-Time curve is illustrated. With this test differences in storage time or flour types/qualities are easily detected. The firmness is here defined by the Compression Force Value (CFV), which is the force required to compress the sample 25% (distance 6.25 mm).

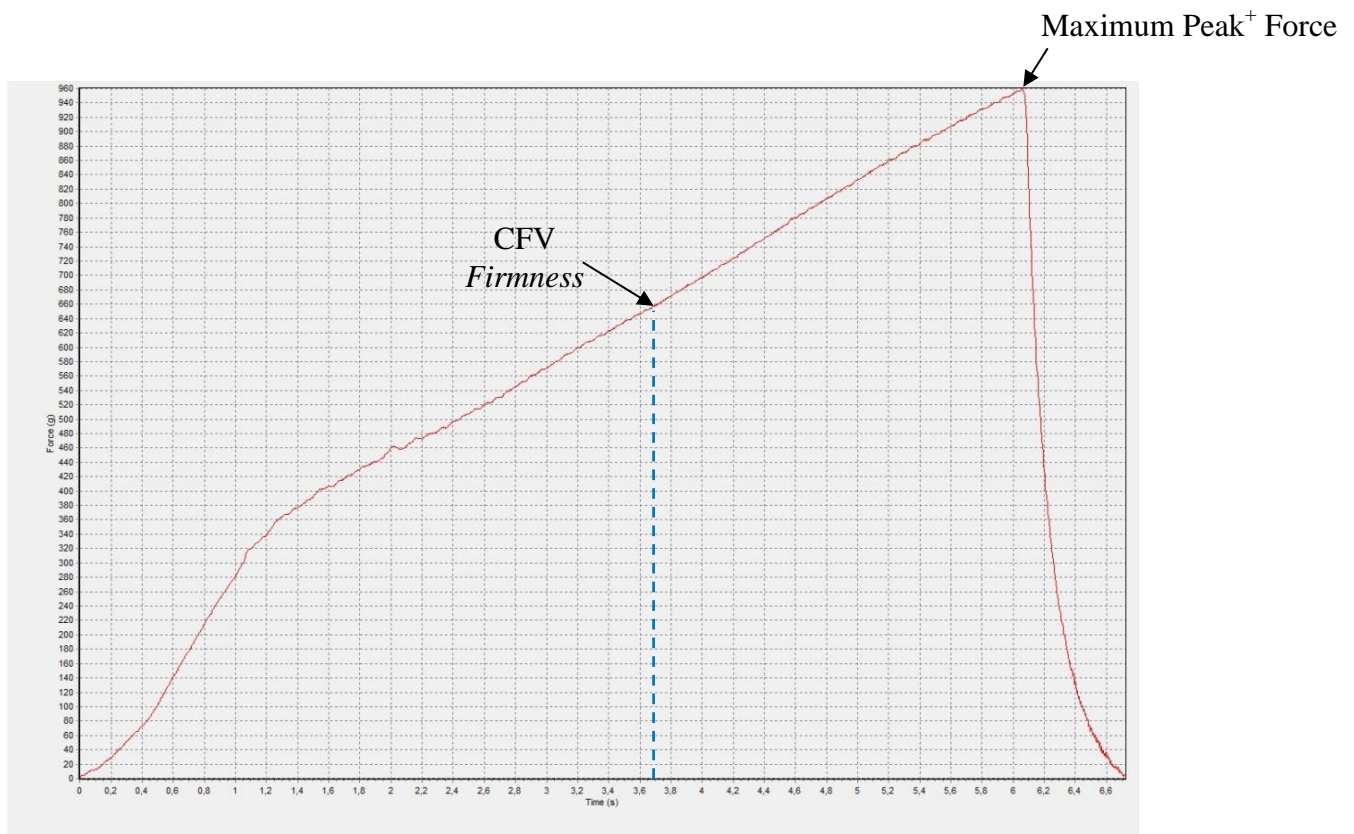


Figure 4: Bread crumb firmness using AACCI (74-09.01) compression method

Data Analysis

The force required to compress the sample to a certain strain or distance is here defined as firmness and can be measured in the units [g] or [N]. The force at the compression strain of 25% (distance 6.25 mm) is here used as the compression force value (CFV) (AACC International, 1995).

Except raw data (force, time and distance) the program also directly provides calculated results such as *mean value* and *standard deviation*.

Reference

AACC International. Approved Methods of Analysis, 9th Ed. Method 74-09.01. Bread Firmness by Universal Testing Machine. Approved November 8, 1995, Reapproved November 3, 1999. AACC International, St. Paul, MN, U.S.A. doi: 10.1094/AACCIntMethod-74-09.01