

## Bread Crumb Firmness & Springiness – Hold Until Time Compression

### TVT Texture Analyzer

The TVT Texture Analyzer (Figure 1) offers rapid and objective analysis for different 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 and springiness by hold until time compression.

### 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 distance and hold in that position during a pre-set time. 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.

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**Load cell (recommended)** 5 - 10 kg

#### Probe

Cylinder probe 36 mm diameter, rounded edges Aluminum (Figure 2).

Part number: 67.01.60



Figure 2: 67.01.60

## Profile settings

### Setting Parameter

Hold until Time Compression

Sample height [mm]	25.0
Starting distance from sample [mm]	5.0
Compression [mm]	7.00
Hold time [s]	32.0
Data acquisition time [s]	30.0
Initial speed [mm/sec]	1.0
Test speed [mm/sec]	1.7
Retract speed [mm/sec]	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.

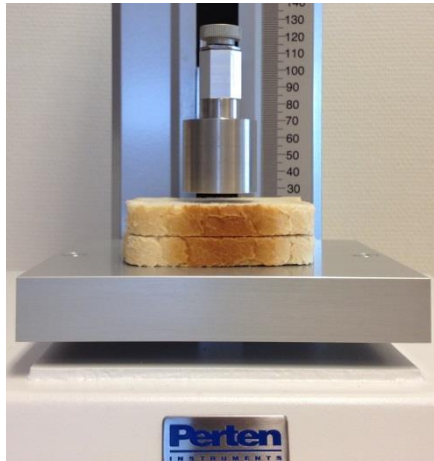


Figure 3: Sample set-up

## Curve Description

In Figure 4 a Force-Time curve is illustrated. The firmness of the crumb is taken at a distance of 6.25 mm and is here called Force C. The maximum peak<sup>+</sup> force is here called Force A while the force required after 30 s holding time is called Force B. Force B is used for calculating the springiness.

$$\frac{\text{Force B}}{\text{Force A}} \times 100 = \% \text{ Springiness}$$

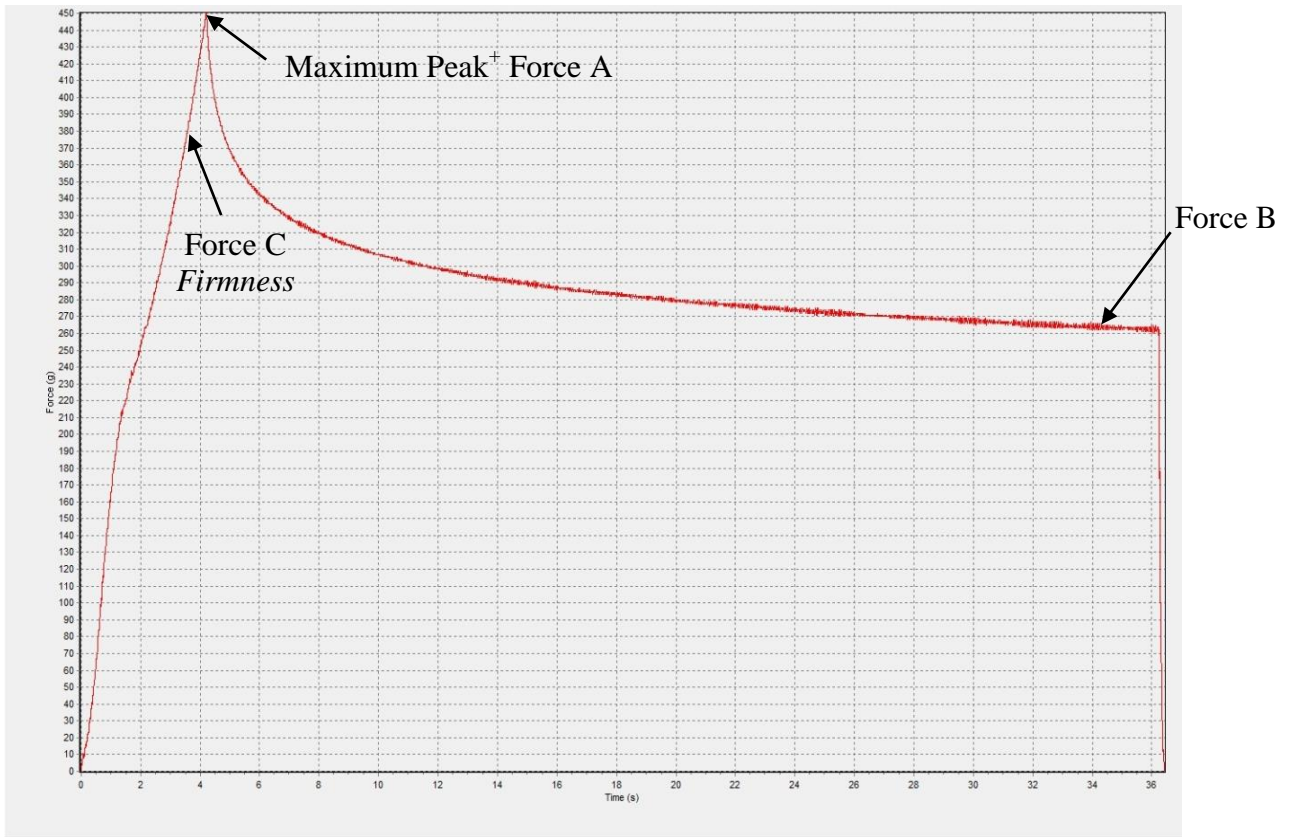


Figure 4: Hold until time test of bread crumb.

## Data Analysis

The force required to compress the sample to a certain distance is here defined as firmness and can be measured in the units [g] or [N]. Springiness is given as a percentage [%] value. Firmness, Force C is given at the distance 6.25 mm. Except raw data (force, time and distance) the program also directly provides calculated results such as *mean value* and *standard deviation*.