

Cookie Hardness by Breakage, *AIB Standard Procedure*

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:

- Hardness
- Flexibility
- Crispness

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



Figure 1: TVT Texture Analyzer

Scope

- Determination of hardness and flexibility/softness in cookies by single cycle compression test, AIB Standard Procedure (AIB).

Method Description

The recording of the measurement data commences once the probe reaches the pre-set trigger force. The force will then increase until the sample fractures. The probe will return to its starting position once the pre-set distance is reached. This breaking test is comparable to the first bite force of a product.

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

Breaking Rig Set

Part number set: 67.50.45

Consisting of:

P-BP70A, Break probe 70 mm, aluminum (Figure 2a), Part Number: 67.11.70

R-TPBR, Three point bend rig (Figure 2b)
Part Number: 67.50.40

Figure 2a: P-BP70A



Figure 2b: R-TPBR



Profile settings

Setting Parameter

Single Cycle Compression

Sample height [mm]	10.0
Starting distance from sample [mm]	5.0
Compression [mm]	15.00
Initial speed [mm/s]	2.5
Test speed [mm/s]	2.0
Retract speed [mm/s]	10.0
Trigger force [g]	20
Data rate [pps]	200

Sample preparation

Choose the gap carefully between the support plates so that they support the sample. The gap between the support plates is set to 60 mm for a 105 mm diameter cookie. Both sample diameter and support rig distance should be kept as constant as possible for comparability of the samples. Take the sample from the package just before testing and place it on the support plates. Samples with surface pattern should always be placed in the same direction/orientation, Figure 3. Break 6 – 15 replicates each testing day. ***NOTE** This procedure was designed for sugar snap cookies that are rolled to 3/8 inch and cut with a 3-inch cutter. The gap distance of the base can be adjusted to accommodate cookies of various sizes. Adjusting the gap to be half the diameter of the cookie is a common procedure.*

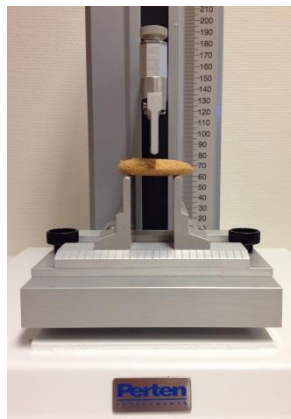


Figure 3: Sample set-up

Curve Description

In Figure 4 a typical Force-Distance curve is illustrated. The hardness of the sample is given by the maximum peak⁺ force while the flexibility is the distance between the trigger force and the maximum peak⁺ force. A short distance is equal to a low flexibility. The probe movement is set to 15 mm. Since the break point for the measured sample here is located at between 1-2 mm, the original graph is here zoomed.

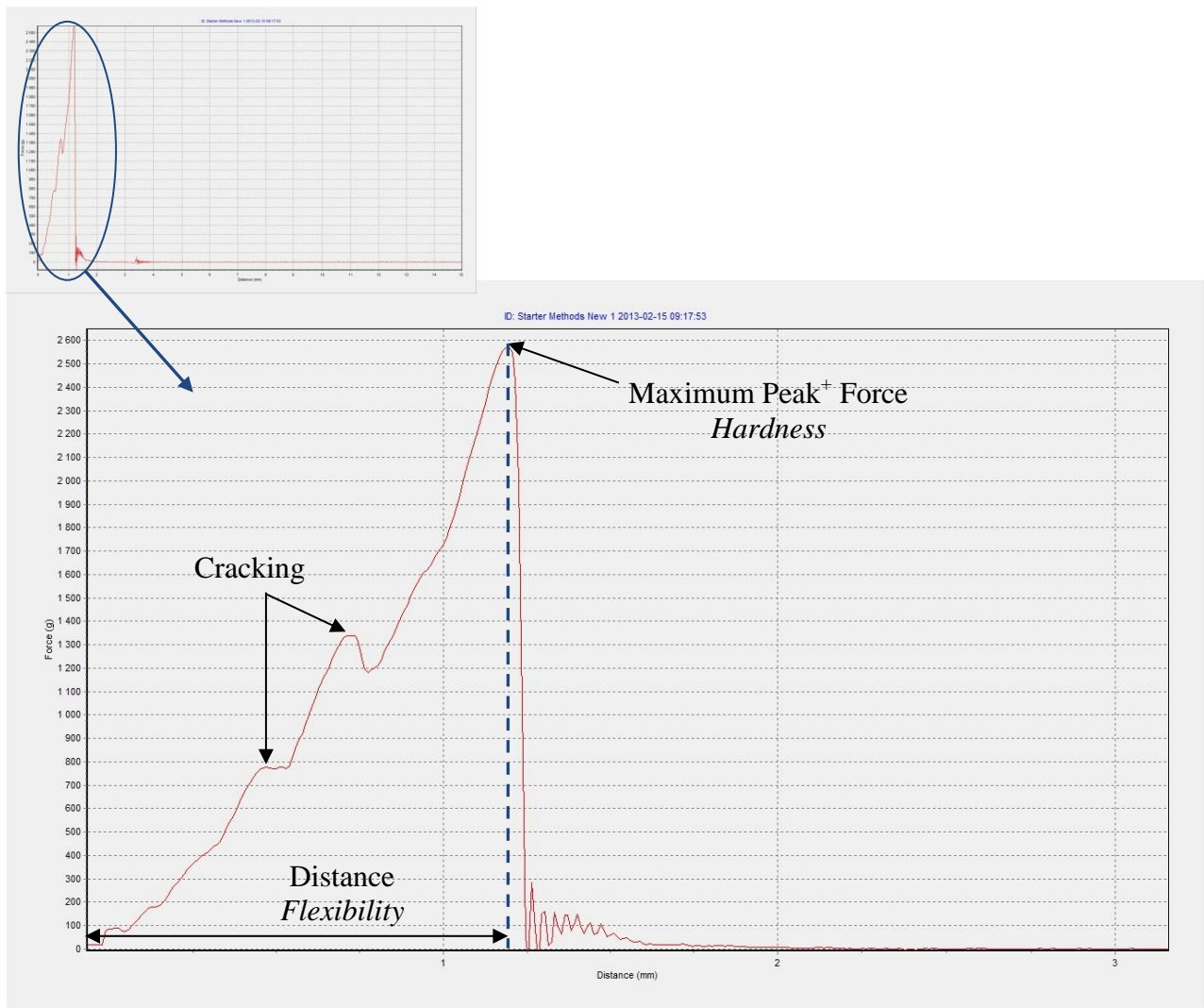


Figure 4: Cookie hardness measurement of Swedish “Bondkaka” (sugar snap cookie).

Data Analysis

The force required to break the sample is here defined as firmness and can be measured in the units [g] or [N]. The flexibility is measured in [mm]. Except raw data (force, time and distance) the program also directly provides calculated results such as *mean value* and *standard deviation*.

Reference

AIB Cookie Hardness. AIB - American Institute of Baking. Lab in Manhattan, Kansas.

<https://www.aibonline.org/aibOnline/Documents/EN/DevelopYourProductSolutions/AIBTextureAnalysisProcedures.pdf> (2017-03-01)