# Biscuits & Cookies Hardness & Fracturability by Cutting

## 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
- Fracturability
- Crispiness

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

Figure 1: TVT Texture Analyzer

## Scope

- Determination of hardness and fracturability of biscuits, cookies and crackers by single cycle cutting test.

## 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. *NOTE The trigger force may need to be increased if the surface of the sample is uneven or variable in order to avoid early triggering.*

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

**Probe**
P-CBK, Craft blade knife (Figure 2)
Part number: 67.13.80

Heavy Duty Stand (HDS) and PPI-insert are recommended but not obligated.
Part numbers: 67.50.80 and 67.50.11

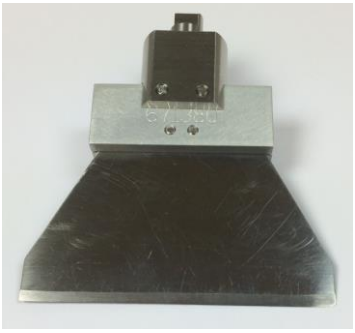

Figure 2: P-CBK

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## Profile settings

| Setting Parameter | |
|---|---|
| Single Cycle Compression | |
| Sample height [mm] | 12.0 |
| Starting distance from sample [mm] | 5.0 |
| Compression [mm] | 5.00 |
| Initial speed [mm/s] | 1.5 |
| Test speed [mm/s] | 2.0 |
| Retract speed [mm/s] | 10.0 |
| Trigger force [g] | 25 |
| Data rate [pps] | 333 |

## Sample preparation

Take the sample from the package just before testing and place it centrally under the knife blade. Samples with surface pattern should always be placed in the same direction/orientation, Figure 3. Storage and handling of the samples might influence the result and should thereby be kept constant. *NOTE It is suggested to start with the hardest samples to anticipate the force range for the testing. Sample diameter should also be as constant as possible for comparability of the samples. A larger sample diameter (thus a larger contact area) requires larger fracture forces.*


Figure 3: Sample set-up

## Curve Description

In Figure 4 a typical Force-Distance curve is illustrated. The first maximum force peak$^+$ is when the sample fractures into two pieces. Remaining peaks are smaller and a result of the blade cutting through the crack formed by the fracture. The maximum hardness is the maximum peak$^+$ force, while the total hardness is the area under the curve. The fracturability is the distance between the trigger force and the maximum peak$^+$ force. A short distance is equal to a high fracturability. Large variations might occur, due to structure variations and inclusions (fruit, nuts or chocolate).

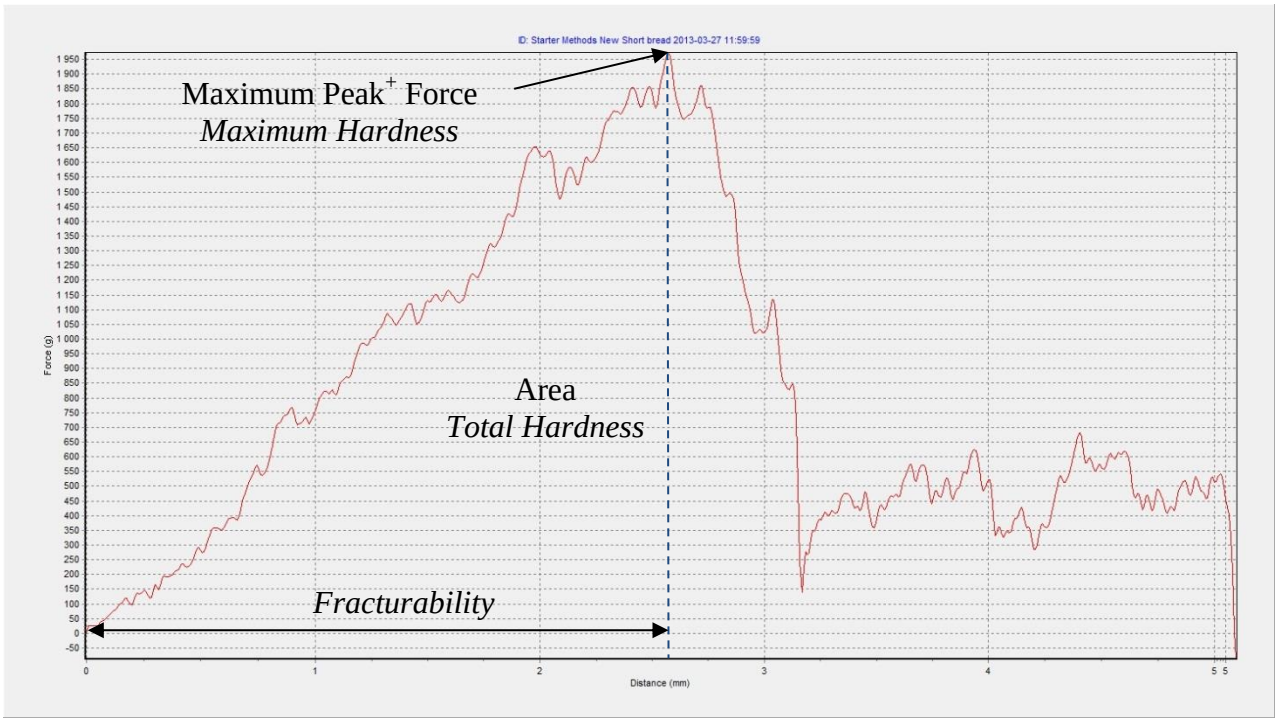


Figure 4: Cutting through a cookie

## Data Analysis

The force required to cut through the sample to a certain distance can be measured in the units **[g]** or **[N]**. The distance for the fracturability is given in **[mm]**. Except raw data (force, time and distance) the program also directly provides calculated results such as ***mean value*** and ***standard deviation***.