

## Sponge Cake Firmness by Penetration

### 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
- Cutting force

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



Figure 1: TVT Texture Analyzer

### Scope

- Determination of firmness of sponge cake by single cycle penetration test.

### Method Description

The recording of the measurement data commences once the probe reaches the pre-set trigger force. The probe will then penetrate the sample to a pre-defined distance. The probe will return to its starting position once the pre-set distance is reached.

### 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

P-CY05S, Cylinder probe 5 mm diameter, stainless steel  
(Figure 2)  
Part number: 67.30.05



Figure 2: P-CY05S

## Profile settings

### Setting Parameter

Single cycle compression

Sample height [mm]	30.0
Starting distance from sample [mm]	5.0
Compression [mm]	15.00
Initial speed [mm/s]	1.5
Test speed [mm/s]	1.5
Retract speed [mm/s]	10.0
Trigger force [g]	5
Data rate [pps]	200

## Sample preparation

Slice the sponge cake in 30 mm thick slices. Place a sample on the measuring table centrally under the probe, Figure 3. Avoid larger sample irregularities in the measuring area. Work quickly, since contact with air dries out the sponge cake and makes it firmer. *NOTE* The sample size should be kept constant to be able to compare different samples and the sample is assumed to be larger than the diameter of the probe. Depending on the size of the sponge cake slice, several measurements might be performed on the same slice.

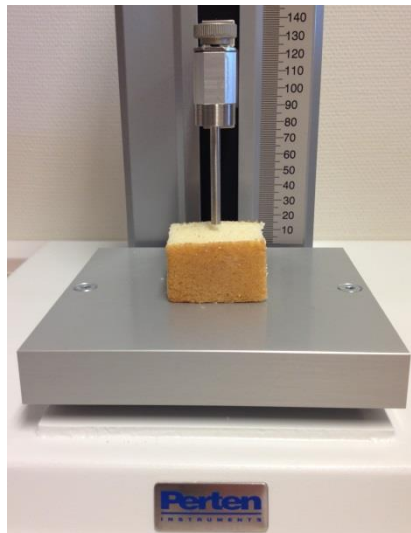


Figure 3: Sample set-up

## Curve Description

In Figure 4, a typical Force-Distance curve is illustrated. The maximum peak force indicates the firmness of the sponge cake. In this example, a peak is displayed at a distance of 5.7 mm which here is due to that the sample surface had been exposed to air for some time resulting in a slightly dehydrated sample slice. The surface peak and the initially larger slope indicate that the first 5.7 mm of the slice is drier than the rest. The homogeneity of the sample can be seen by the regularity of the penetration curve line.

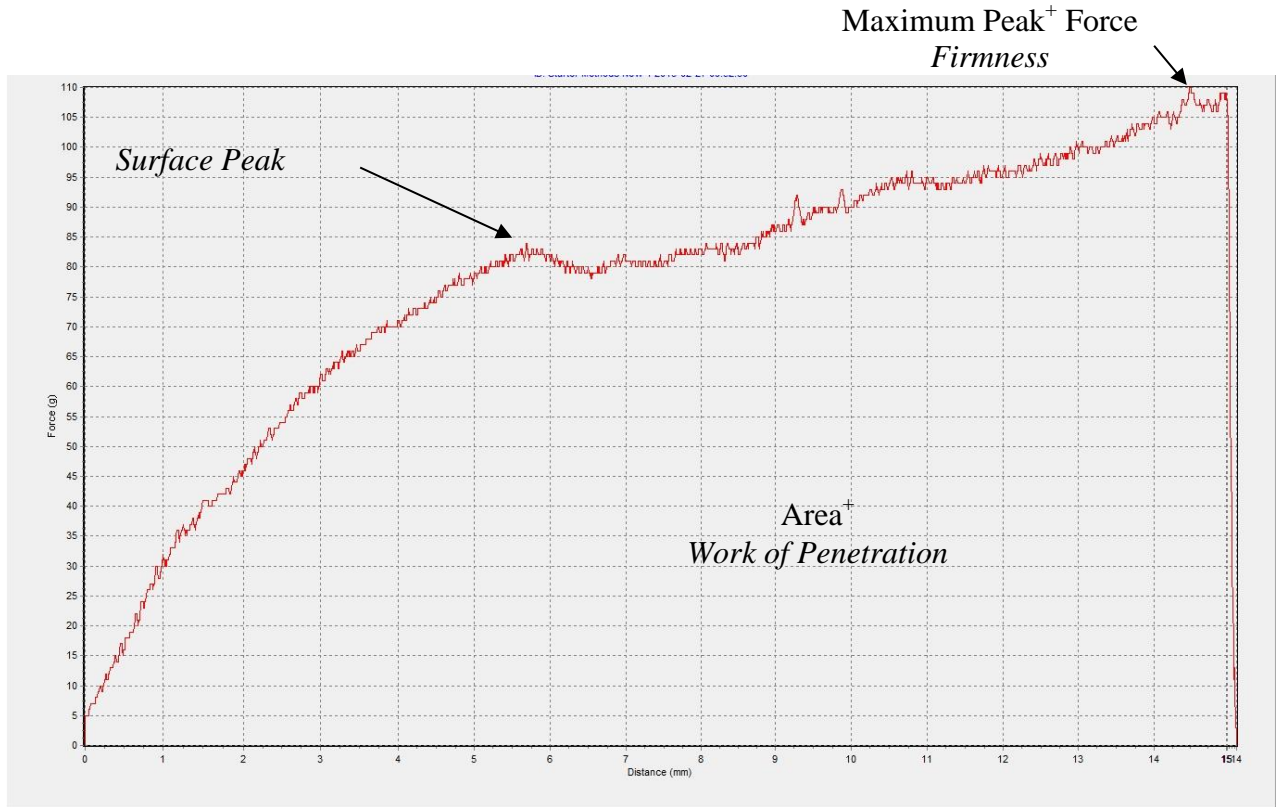


Figure 4: Penetration of sponge cake

## Data Analysis

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