Marzipan Hardness, 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
- Consistency
- Stickiness

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

**Scope**
- Determination of hardness of marzipan by single cycle cutting test.

**Method Description**
The recording of the measurement data commences once the probe reaches the pre-set trigger force. The probe will then cut the sample to a pre-defined distance. After cutting, 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 - 10kg

**Probe**
- Wire cutter, 90 mm frame, 0.4 mm wire (Figure 2)
- Part number: 67.13.95

---

Figure 1: TVT Texture Analyzer

Figure 2: 67.13.95 (P-CW9004)
**Profile settings**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Cycle Compression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample height [mm]</td>
<td>40.0</td>
<td></td>
</tr>
<tr>
<td>Starting distance from sample [mm]</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Compression [mm]</td>
<td>18.00</td>
<td></td>
</tr>
<tr>
<td>Initial speed [mm/s]</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Test speed [mm/s]</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Retract speed [mm/s]</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>Trigger force [g]</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Data rate [pps]</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Adhesiveness</td>
<td>Marked ✔</td>
<td></td>
</tr>
</tbody>
</table>

**Sample preparation**
Take the samples from their packaging just before testing and place under the probe, Figure 3. Work quickly, since contact with air dries out the product and increases the surface firmness. Storage and handling of the samples might influence the result and should thereby be kept constant.

![Sample set-up](image)

**Figure 3: Sample set-up**

**Curve Description**
In Figure 4 and 5 typical Force-Distance curves are illustrated. The maximum peak* shown in Figure 4, at a distance of 8.8 mm, is a result of a dryer surface- and outer layer region as compared to the rest of the product. Maximum peak* force is here defined as the surface hardness of the sample, while the plateau force is defined as the hardness of the interior mass. The area* is the total work of cutting. It is here clearly shown that not only the plateau hardness can be of interest but also surface peaks, peak distances, slopes, areas and the peak.
Data Analysis
The force required to cut the sample to a certain distance is here defined as hardness 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.