

## **Product: DRY SPAGETTI**

**Objective: Evaluating the hardness (breaking strength) of dry spaghetti using a spaghetti flexure fixture.**

### **Investigation purpose:**

The gluten strength or quality of the semolina making up the spaghetti strands may determine the dry strength of the spaghetti. Measuring the breaking strength is therefore a useful method for determining the strength of dry pasta in order to predict how well the product will tolerate shipping and hold together when cooking.

### **METHOD**

#### **CT3 Settings:**

<i>Test Type:</i>	<i>Compression</i>
<i>Pre-Test Speed:</i>	<i>1.5 mm/s</i>
<i>Test Speed:</i>	<i>2.5 mm/s</i>
<i>Post-Test Speed:</i>	<i>2.5 mm/s</i>
<i>Target Value:</i>	<i>10 mm</i>
<i>Trigger Force:</i>	<i>15 g</i>

#### **Accessory:**

Spaghetti Flexure Fixture (TA-SFF)  
4.5 Kg instrument  
Fixture Base Table (TA-BT-KIT)

#### **Sample Preparation:**

Prior to testing, remove the sample from its packaging to avoid moisture build up in the pack. Cut the strands to an even length.

#### **Note:**

When selecting strands for the test ensure that there are no weaknesses along the length of the sample which would otherwise result in lower break forces and distance to breaking point.

#### **Test Procedure:**

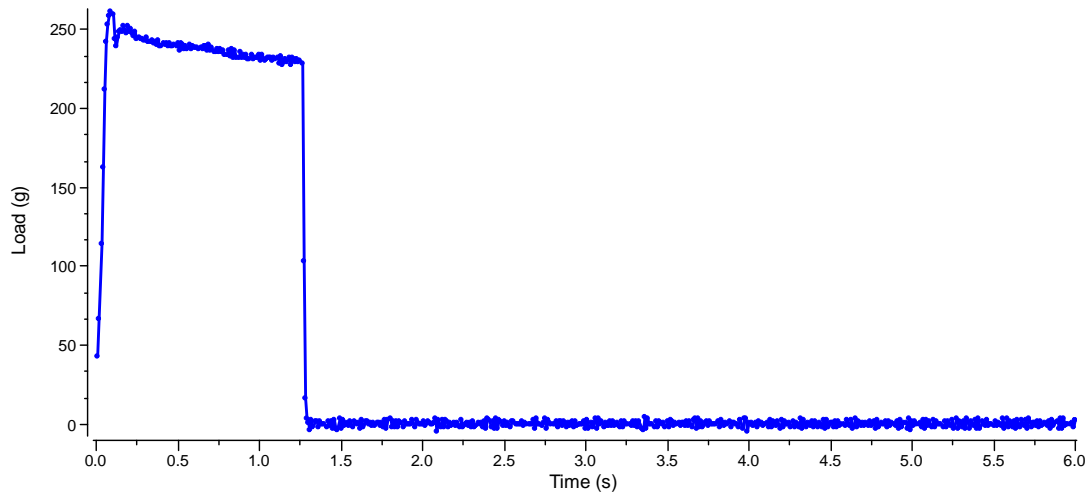
1. Attach the upper fixture to the instrument
2. Place the fixture base table onto the base of the instrument and loosely tighten with the thumb screws to enable some degree of mobility.
3. Place the lower support indent on the base table and align it directly below the upper fixture indent to ensure correct vertical support of the samples.
4. Place and position a strand into the indents.
5. Commence the test

#### **Note:**

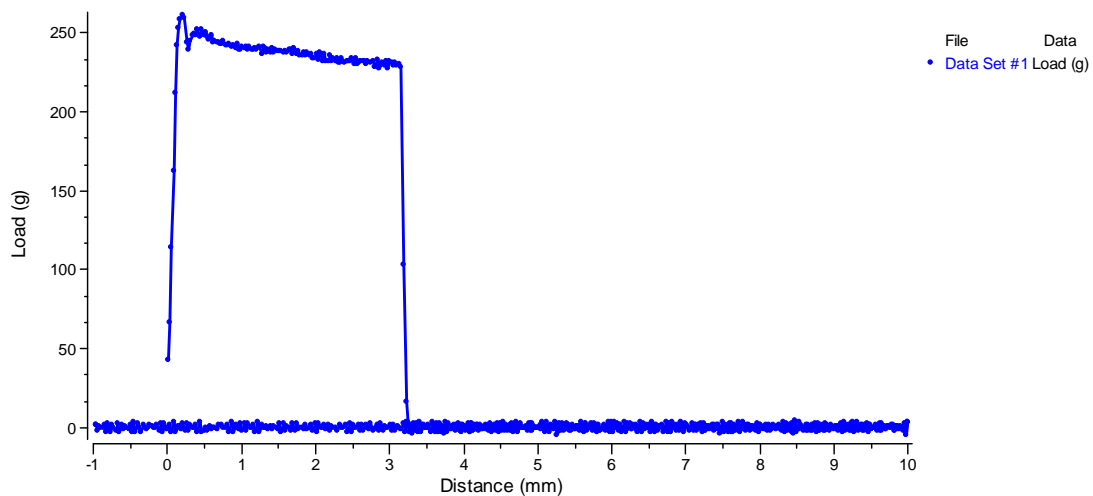
The hardest sample is best tested first in order to anticipate the maximum testing range required. This will ensure that the force capacity covers the range for other future samples.

## RESULTS

Graph to show the breaking strength of dry spaghetti



**Figure 1.** The breaking strength of durum wheat spaghetti of 110 mm long tested at room temperature. The maximum force value on the graph is a measure of sample hardness/firmness.



**Figure 2.** The load verses distance for the breaking strength of 110 mm dry spaghetti tested at room temperature. The maximum force value is a measure of sample firmness. When the spaghetti strand has reached it maximum flexing capacity seen by the plateau on the graph, any further compression force breaks the sample seen by the sudden drop in force. As the target distance for the instrument has been set for 10 mm, the upper fixture continues to travel over this distance as shown on the graph before returning to its starting position indicated by the horizontal line. The hardness work done is the area under the graph from the start of the test to the breaking point (point when the force suddenly drops).

**Observations:**

When a trigger force of 15 g has been attained at the sample surface, the probe proceeds to compress the sample to a distance of 50 mm at a test speed of 2.5 mm/s. During this time, the spaghetti is flexed until it breaks. The maximum force value on the graph is a measure of sample hardness/firmness. The higher the value, the firmer the sample, (see Figure 1). The distance covered prior to breaking is an indication of sample flexibility (see Figure 2). The greater the compression distances for a sample, the more flexible the sample.

**Note:**

Before the sample reaches breaking point, any fluctuations in force observed may indicate that there is a degree of weakness within the sample e.g., cracks.

The table below summarises the results as automatically obtained from the CT3 TexturePro Software:

Hardness (g)	Work Done (mJ) (mJ)	Fracturability (g)
238.7 ± 20.9	7.72 ± 0.61	217.3 ± 43.9

**Technical Assistance:**

At Brookfield we pride ourselves on the availability and quality of our technical support. Our Texture departments are staffed with experienced Texture Specialists with extensive practical and theoretical expertise in sample preparation, presentation and analysis. If you have any questions or experience any difficulties regarding Texture Analysis methodology or software in general, please do not hesitate to contact us.

Brookfield customers are a major source of information regarding the use of our products. We encourage you to contact us if you have any suggestions on product performance or new applications or technologies.

For technical assistance and more information, please contact:

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