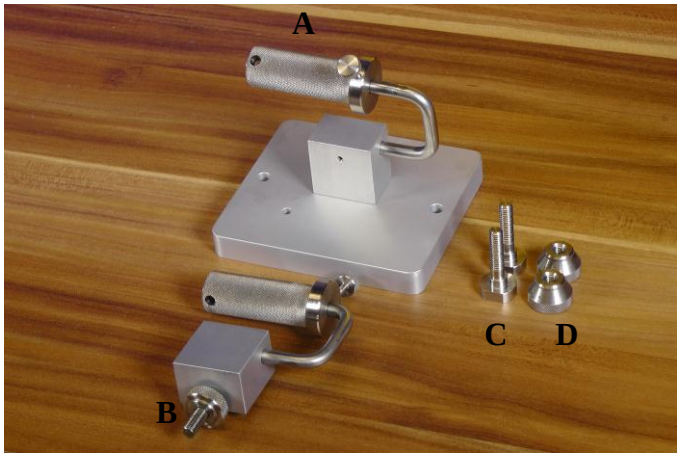
Product: NOODLES

Objective: Evaluating the elasticity of noodles using a noodle tensile fixture

The noodle tensile fixture consists of lower and upper friction rollers with a slot (orifice) on each roller through which the sample can be passed through. The sample is then wound round two to three times so as to anchor the sample ends. The rollers of the tensile fixture are knurled to ensure a firm grip; this also means that samples can also be wound directly onto the friction rollers. The rollers also ensure that the sample is extended and does not split during the test. A successful test should have the sample breaking along the extended part of the sample.



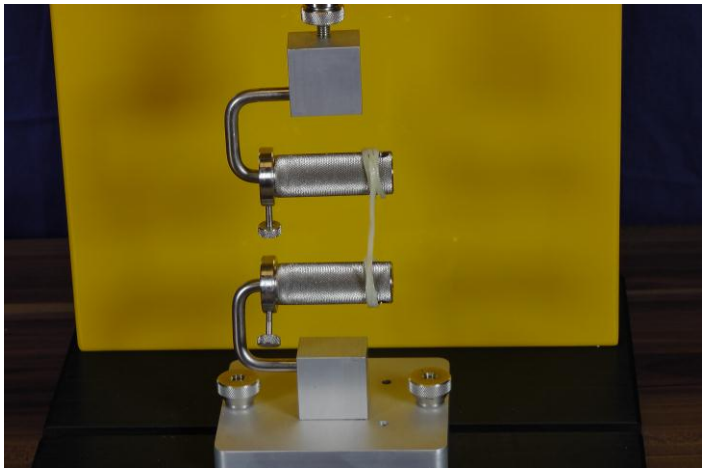
A Lower Friction Roller

B Upper Friction Roller

C T-bolts

D Screws

The noodle tensile fixture is suited to perform break strengths and elasticity measurements on spaghetti and noodle samples. Individual strands of the sample are tested, and for comparison purposes, samples should be of equal length. For successful sample attachments, long noodles lengths are preferable. It is also important that samples are correctly wound round the friction rollers to prevent the sample slipping when under tension.



Test set up for noodle tensile strength

Equipment:

4.5 kg Instrument
Noodle Test Fixture (TA-NTF)

CT3 Settings:

Test Type:	*Tension*
Pre-Test Speed:	*1.0 mm/s*
Test Speed:	*3.0 mm/s*
Post-Test Speed:	*Return at test speed*
Trigger Force:	*5 g*
Distance	*40 mm*

Note:
Thicker samples may require a higher trigger force and a longer tension distance

METHOD

Sample Preparation:

When preparing the sample, the noodles should be cooked under controlled conditions. The weight of dry noodles, volume of water used, cooking time, drainage time, and time period between cooking and testing must be kept constant for comparison purposes. For instance, for this application, 100g of noodles were placed into a microwavable dish containing 300 ml of boiling water. The noodles were cooked for 5 minutes in a 900W microwave. Samples were left to cool for 1 minute prior to testing.
In general, cooking times and the volume of water used will vary depending on sample size and weight.

Test Procedure:

1. Place the lower friction rollers on the base of the instrument and loosely tighten the T-bolts to enable some degree of mobility.
2. Attach the upper rollers to the probe shaft of the instrument
3. Lower the instrument arm until the upper friction roller is a few millimetres from the lower friction roller
4. Align the lower friction roller to the upper friction roller by re-positioning the lower roller.
5. Once alignment is complete, lock the T-bolts on the lower roller to prevent any further movement.
6. Raise the arm of the instrument to provide enough space to wind the sample
7. Pass the sample through the orifice on the upper and lower friction rollers and then wind the sample onto the rollers. Samples can also be wound onto the rollers without passing through the orifice.
8. Once the sample is extended, tighten the screws on the upper and lower friction rollers to prevent further movement.

Note:
Always ensure that there are no apparent weaknesses along the length of the sample before performing a test as this may lower the tension forces and distance to break point values.

When testing different brands of noodles, 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 samples being tested.

RESULTS

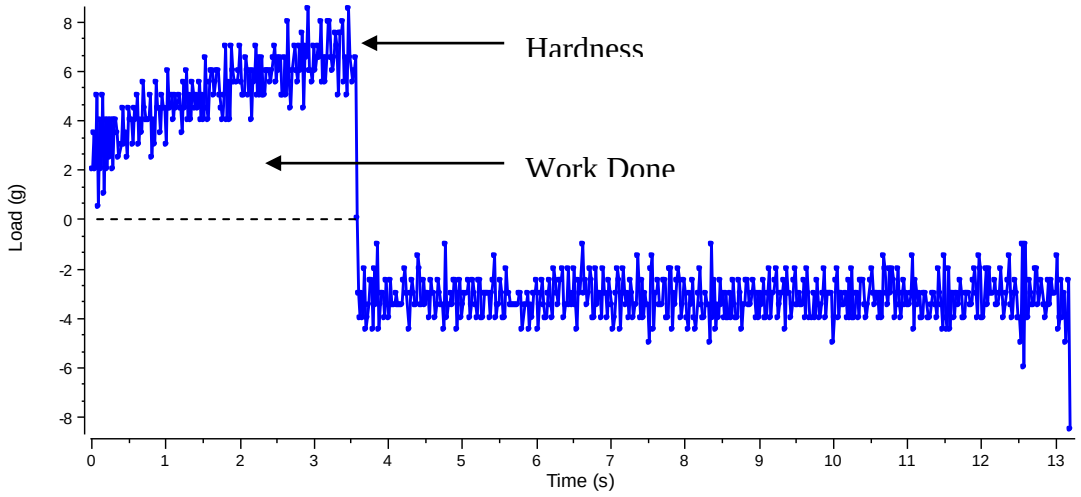


Figure 1. A graph to show the extensibility of noodles using a noodle test fixture. The maximum peak force is a measure of sample hardness. This is the force required to break the sample. The area under the graph from the start of the test to the maximum force value is a measure of work done.

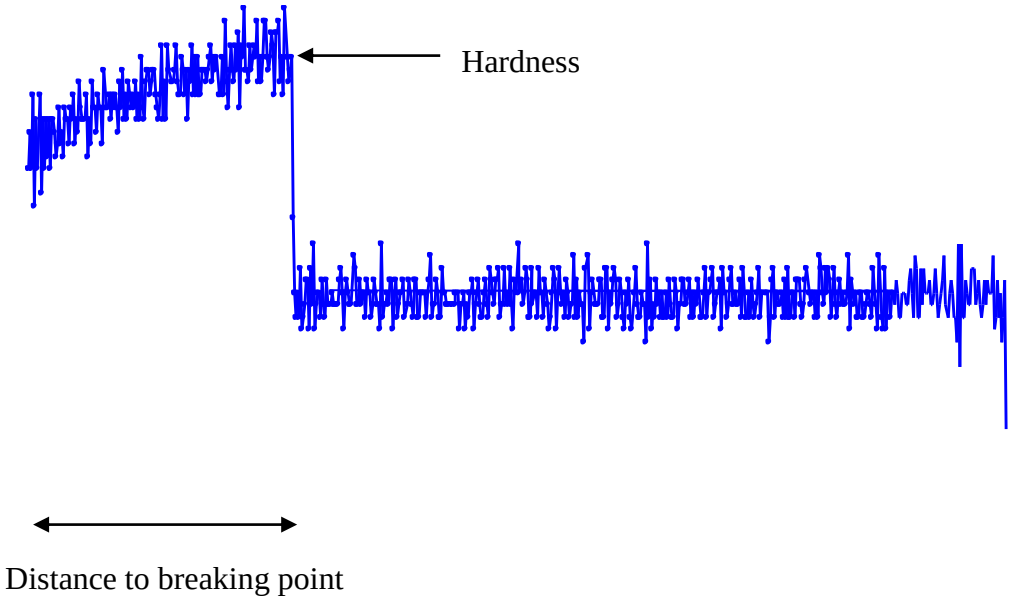


Figure 2. A load verses distance graph for the extensibility of noodles using a noodle test fixture. This is an alternative option for displaying the results. The graph shows similar features to the load/time graph but with one additional measurement. The load/distance graph can measure the distance to breaking point. This value can also be automatically calculated using the Texture Pro CT software. The value can be used to compare the elasticity of samples. The longer the distance to breaking point, the more the elastic component of the sample.

Note: A 4.5 Kg instrument has been used for this test. However because of the low load values (see graphs), a 1000 g or even 100 g instrument would be recommended for this type of test.

Observations:
When a trigger of 5 g has been attained the upper tensile grip proceeds to stretch the noodle over a distance of 40 mm at a test speed of 3 mm/s. When the elastic limit of the noodle has been exceeded, the noodle snaps and this is observed as the maximum tension force on the graph (see fig. 1 and 2). The higher the force values of the sample, the greater the tensile strength of the sample. The elastic component of the sample can also be tested. From the load verses distance graph, the measured distance to break point is an indicator of sample elasticity. The greater the extension distance the more elastic the sample.

The table below summarises the results from two samples as automatically obtained from the TexturePro CT Software:

Sample	Peak Load (g)	Deformation at Peak Load (mm)
Noodles	8 ± 0.7	9.84 ± 0.97

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.

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