# Product: PASTA SHAPES

## Objective: Evaluating pasta firmness

The Kramer shear cell with its multiple blades can shear samples of variable geometry. The hardness and work done results are therefore an average of the forces required to shear the sample of variable configurations.

**METHOD**

**CT3 Settings:**

| | |
|---|---|
| *Test Type:* | *Compression* |
| *Pre-Test Speed:* | *1.0 mm/s* |
| *Test Speed:* | *2.0 mm/s* |
| *Post-Test Speed:* | *2.0 mm/s* |
| *Target distance:* | *40 mm* |
| *Trigger Force:* | *30.0 g* |

**Accessory:**

5-bladed Kramer Shear Cell (TA-KSC)
50 Kg instrument
Fixture Base Table (TA-BT-KIT)
Fixture Base Plate

**Sample Preparation:**

1. Place 120 g portion of the sample into a container of 500ml boiling water.
2. Set 12 minutes cooking time on the stop watch
3. Stir the pieces of pasta whilst cooking to avoid the pasta clamping together. Partly cover the container to avoid too much water evaporation. The cooking water should be maintained to at least 90 % of its volume.
4. After the cook time, immediately drain the cooked pasta in a funnel and rinse with a stream of water for 30 seconds
5. Transfer the cooked pasta into a beaker of water prior to testing. Testing should take place immediately after cooking to avoid textural changes

**Test Procedure:**

1. Attach the blades to the instrument
2. Fix the shear cell to the fixture base table with the Perspex side facing the front and tighten into position using the side screws
3. Place the fixture base table onto the base of the machine and loosely tighten the thumbscrews to enable some degree of mobility
4. Slowly lower the arm of the instrument and align the blades with their respective sample shear cell slots by re-positioning the fixture base table so that the blades can clearly penetrate the shear cell through the slots without any friction effects caused by the blade touching the sides of the cell.
5. Once alignment is complete, tighten the thumbscrews of the fixture base table to prevent further movement.
6. Raise the blades above the cell to allow the sample to be placed into the shear cell.
7. Remove the cooked pasta from storage. Drain well and weigh out 100 g of the pasta
8. Distribute the samples evenly within the cell.

9. Move the blades down to their starting position a few millimetres from the shear cell surface
10. Commence the test
11. After each test, clean the blades and the grooves of the shear cell to remove all traces of previous sample to avoid variability in the results.

Note:
When testing several different types of pasta, 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.

For comparison purposes, weight of sample, cooking times, volume of water, and time between draining and testing should be kept constant from sample to sample.

## RESULTS

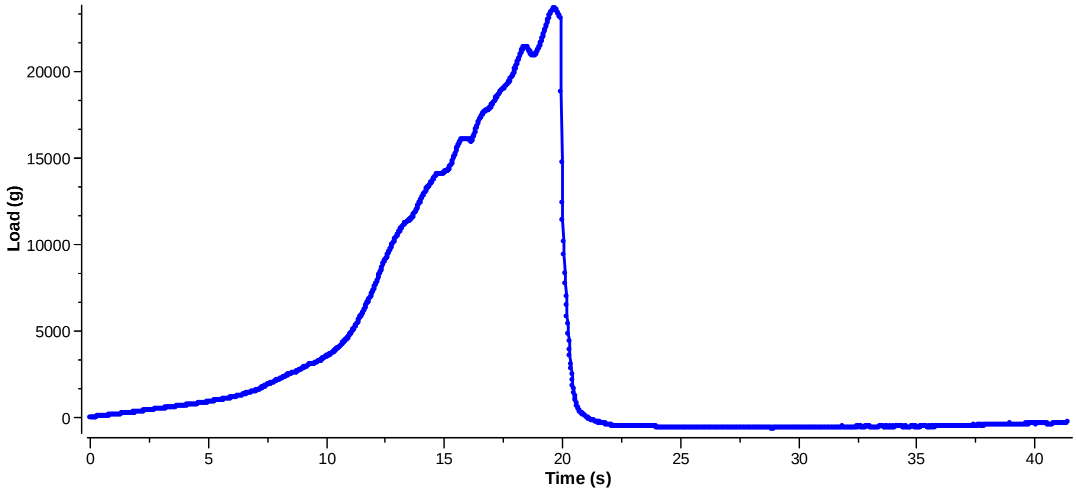


**Figure 1.** The firmness of 100 g white penne cooked (for 12 minutes) pasta tested at room temperature. The maximum force value on the graph is a measure of sample firmness. The area under the graph from the start of the test to the maximum force is a measure of work done.

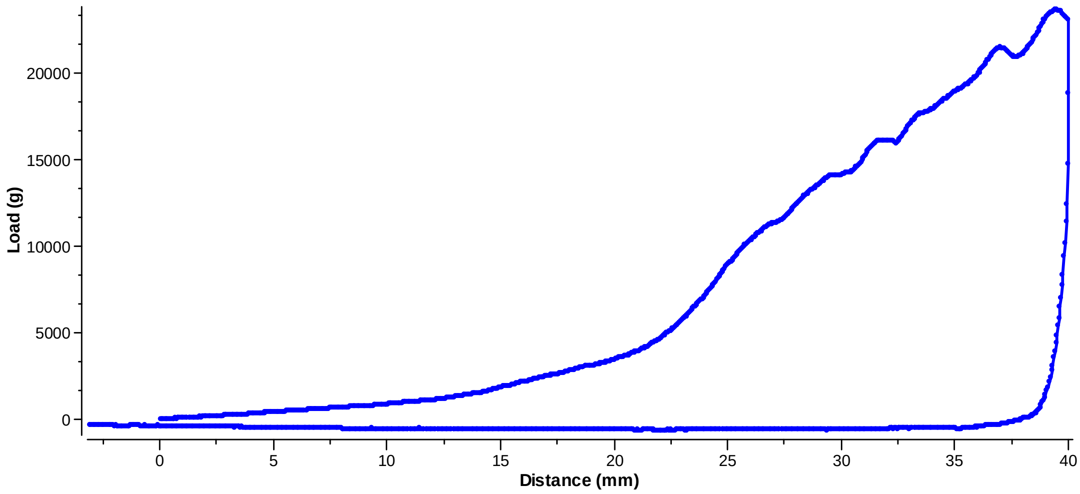


**Figure 2.** The load verses distance for the firmness of 100 g white penne pasta. This is an alternative option of displaying the results. The maximum force is a measure of sample firmness and target distant point (40 mm selected for this test). The area under the graph from the start of the test to the target distance or maximum force is a measure of work done to shear the sample. As the probe withdraws from the sample having penetrated the specified distance of 40 mm, the force is seen to markedly drop and return to zero load as it returns to its starting position.

**Observations:**
When a trigger force of 30 g has been attained at the sample surface, the blades proceed to shear the sample over a distance of 40 mm at a test speed of 2 mm/s before withdrawing from the sample and returning to the starting position. As the penetration depth increases so does the force to shear the sample over the specified distance. The maximum force over this distance is a measure of sample hardness/firmness the higher the value the firmer the sample. Hardness values can be correlated to the amount of force required to compress the sample between the molars. The work done is the area under the graph from the start of the test to the maximum force value on a load verses time graph. This value can be correlated with the amount of energy required to overcome the strength of the internal bonds within a sample.

The TexturePro CT Software can automatically calculate the sample hardness and work done to shear the sample. Results are shown below:

| Hardness (g) | Work Done (mJ) |
|---|---|
| 23670 | 2943.6 |

## 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:
c_freeman@brookfield.co.uk for enquiries in Europe and Asia
l_thibodeau@brookfieldengineering.com for enquiries in North and South America

https://laboratorium-industri.com