

**Production:** PANETONE & SPONGE CAKE

**Objective:** Determination of softness (firmness) of Panetone and Sponge Cake using the AACC (74-09) Standard method (originally developed for bread firmness)

**Type of action:** Penetration test

**Test setting:**

Speed	Test mode	Trigger	Target	Hold
1.7 mm/s	Strain (c)	5 gf	40%	0 sec

**Accessory:**

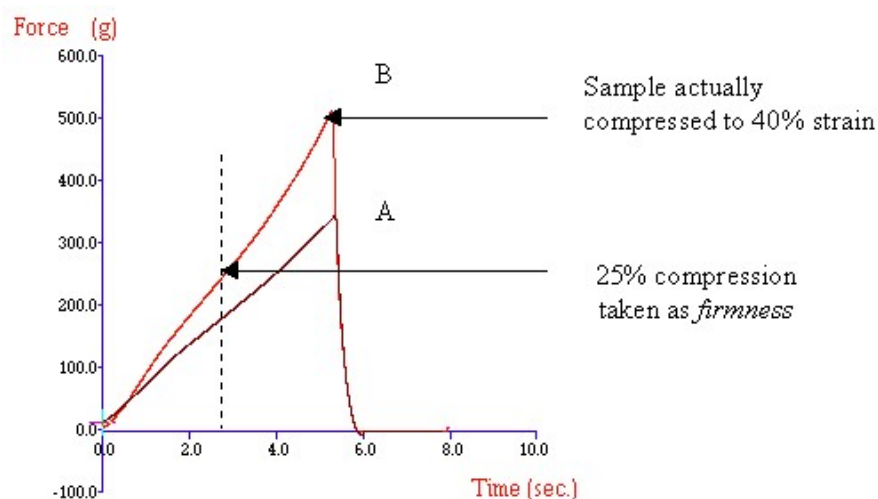
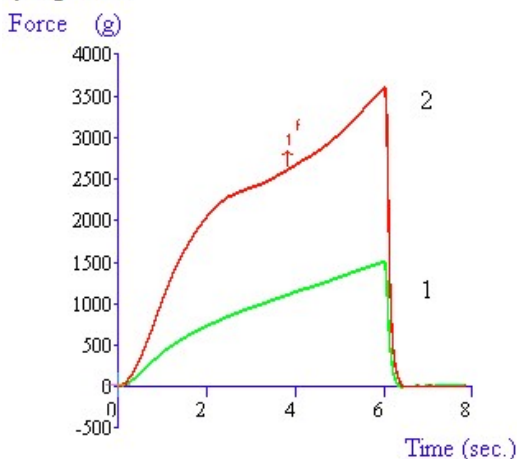
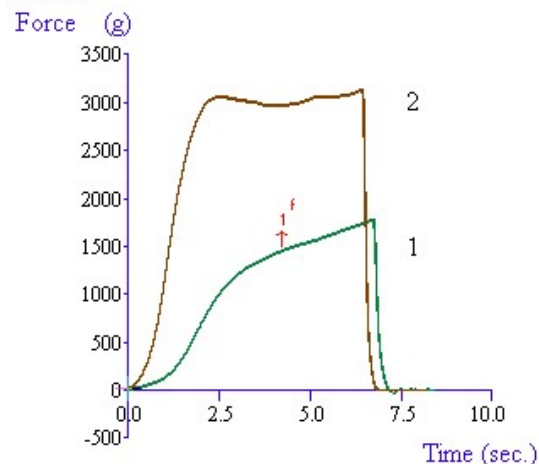
φ 36 mm cylinder probe, Platform

**Sample Preparation:**

The samples were sliced by hand into equal slice thicknesses e.g. 25mm, ensuring a flat base and testing surface. One slice from each test sample was taken and the end crust slices of the loaves were discarded.

**Test Set-Up:**

The sample should be placed centrally under the cylinder probe, avoiding any irregular or non-representative areas of crumb and testing away from the crust regions. The compression test was commenced.

**Typical plots:****Sponge Cake****Panetone**

**Observations:**

The above plot illustrates a Force-Time (or Distance) curve which shows the characteristics of a cake firmness test. Once the trigger force is attained, the probe proceeds to compress the sample until it has compressed it by 40% of the product height. It then withdraws from the sample and returns to its starting position.

Firmness is defined in this method as the force (in grams, kilograms or Newtons) required to compress the product by a pre-set distance (i.e. force taken at 25% compression of 25mm) (AACC, 1983). A 25% compression of 25mm thick sample = 6.25mm compression distance at which point the compression force value (CFV) is taken. Units displayed can be converted automatically according to requirements and are not restricted to the units used during the test. Examples of the use of this type of test is in the determination of firmness of bread samples according to storage time or the effect of change in flour type. Clearly sample B is firmer than sample A.

**Data Analysis:**

☒ Point selection by user (25%)

**Results**

Sample	Mean Compression Force 'Firmness' (S.D.) (g)
Sponge Cake 1	1140.4 +/- 165.5
Sponge Cake 2	2611.3 +/- 168.8
Panetone 1	1445.4 +/- 124.4
Panetone 2	2967.6 +/- 257.3

**Notes:**

- This method is applicable directly to research and quality control evaluation of white pan breads. The principle (or method) may also be used to study other loaf types and similar products, such as cakes (as tested here), although sample preparation may need to be adjusted appropriately. The sample provided contains large fruit pieces and air pockets. When choosing suitable test samples it is advisable to choose the most representative testing areas, i.e. uniform structure and, if possible, a test surface which has no fruit pieces which would potentially be in contact with the cylinder probe perimeter, for repeatability purposes. The results shown above are based on a limited number of samples provided and therefore choice of optimum test samples was not available.
- Storage, packaging, and handling of sample before testing with the texture analyser are considered parts of variable conditions under which sample is tested, not parts of standard testing procedures. However, it is important to identify these conditions when reporting results of firmness tests. Within any given laboratory, they must be kept constant for comparison purposes.
- Cutting crust off the sample immediately before the compression test is also considered a variable testing procedure. The crust should not interfere with compression by a 36mm diameter probe. However, if a larger probe or a different type of cake is used so that the crust does resist compression, the crust may be removed from the sample before testing.
- Stress can be measured as a alternative to plotting force by ensuring that the surface area of the probe is inserted into the correct box in the run a test window.
- When attempting to optimise test settings it is suggested that the first tests are performed on the hardest samples to anticipate the maximum testing range required and ensure that the force capacity allows testing of all future samples.