# Farinograph Equivalent Method

## Scope

- Method to emulate actual Farinograph test conditions to obtain comparable doughLAB results.

## doughLAB

The doughLAB is a flexible dough rheometer with conventional z-arm mixing action. It includes automated systems to control bowl temperature and dispense water into the sample, and variable temperature and speed controls. The instrument uses standard or custom test configurations to determine water absorption, dough mixing profile, development time, stability and softening of wheat, rye, durum and composite flours for milling, baking, and foods laboratories.

## Description

One of the differences between the Farinograph and doughLAB is the temperature control system. The Farinograph is usually supplied with a heating-only water bath that is connected to the instrument via plastic tubing. During the course of a standard test, the work generated by the mixing action adds heat to the bowl temperature control system. Unless a cooling water bath is connected, the system is unable to bring the temperature down to the initial test temperature, and will increase by at least 1°C, and more on extended tests. The constant increase in temperature throughout the test has a measurable effect on temperature-dependent parameters of the dough, including stability, softening, and mixing tolerance index (MTI). The increased temperature throughout the test may also affect peak torque results (and therefore WA) for strong flours.

The doughLAB has integrated temperature control, ensuring that the bowl is kept to the set temperature throughout the entire test. The integrated temperature control gives the doughLAB more flexibility for method development and manipulation for research purposes, making it possible to run extended tests (for strong or difficult to develop samples) and variable temperature tests (for research and development).

This method is designed to allow laboratories to compare their doughLAB results with historical Farinograph data. The method mimics the temperature control system of most Farinographs, by ramping the test temperature by 0.05°C/min until the end of the test.

**Table 1.** Effect of profile heating rate on doughLAB stability and softening results of a hard flour tested at 63 rpm. Total test time was 20 min.

| Parameter | Profile heating rate (°C/min) | | |
|---|---|---|---|
| | 0°C/min | 0.05°C/min | 0.1°C/min |
| Stability (min.) | 12.8 | 11.9 | 11.6 |
| Softening (FU) | 36 | 38 | 40 |

The results in Table 1 indicate that stability would decrease by ~5%, and softening would increase by ~5%, for every 1°C increase in bowl temperature.

## Method

Modified twenty minute mixing profile (based on AACCi Method 54-21, RACI Official Method 06-02, ICC Standard No. 115/1), with heating ramp.

## Sample Preparation

300.0 g (or 50.0 g) sample at 14% moisture. The first water absorption (WA) estimation is entered by the user. The doughLAB will automatically dispense the correct amount of water for the sample size used. At the end of the test, the doughLAB will calculate the correct WA to reach a peak of 500 FU (4902 mNm for the 300-g bowl, 980 mNm for the 50-g bowl).

## Profile

| Time | Type | Value |
|---|---|---|
| 00:00:00 | Temp | 30°C |
| 00:00:00 | Speed | 63 rpm |
| 00:20:00 | Temp | 31°C |
| 00:20:00 | End | |
| Premixing time: 60 sec.<br>Premixing speed: 63rpm | | |

## Measure

PT: Peak torque (FU)
WA: Water absorption (%)
DDT: Dough development time (min)
Stab: Stability (min)
ST: Softening (FU)
MTI: Mixing tolerance index (FU)

The method can be used to compare doughLAB results with historical Farinograph data.

Target torque may vary by country, e.g. the target torque is commonly 600 FU (5882 mNm for the 300-g bowl, 1176 mNm for the 50-g bowl) in the UK.