

doughLAB in Farinograph™ check sample service

The doughLAB is an evolution of current flour analysis equipment. It was designed to mimic the conditions under which current standard analyses are performed thereby providing relevance to historical data, experience and performance. The doughLAB can be programmed to mimic the AACC Method 54-21.02 Farinograph Method.

However, it provides enhancements to the measurement that make it easier to perform and more repeatable by removing some of the sources of error by automating as many procedures as possible. Additionally, it provides enhanced capabilities beyond standard analysis with its higher speed and higher torque capabilities.



A proper analogy is to the various instruments used for measurement of total nitrogen content following the Dumas combustion method. These instruments follow the same procedure yet each has its features and benefits for the user. The doughLAB and Farinograph™ are similar when it comes to measuring water absorption following AACC Method 54-21.02.

To demonstrate this equivalence, Perten Instruments participates in two separate check sample programs, organised by the American Association of Cereal Chemists International (AACCI) and the Bureau Inter Professionnel d'Etude Analytique (BIPEA). The samples are distributed monthly (BIPEA) and bi-monthly (AACCI), with the first sample received in September 2007. In the results summarised in this document, the first 20 samples are from BIPEA, and the remaining samples are from AACCI. Samples are tested as per instructions from AACCI and BIPEA, on a doughLAB fitted with a 300-g sigma-arm bowl, using the standard profile (30°C, 63 rpm; see AACCI Method 54-21.02; AACCI, 2011).

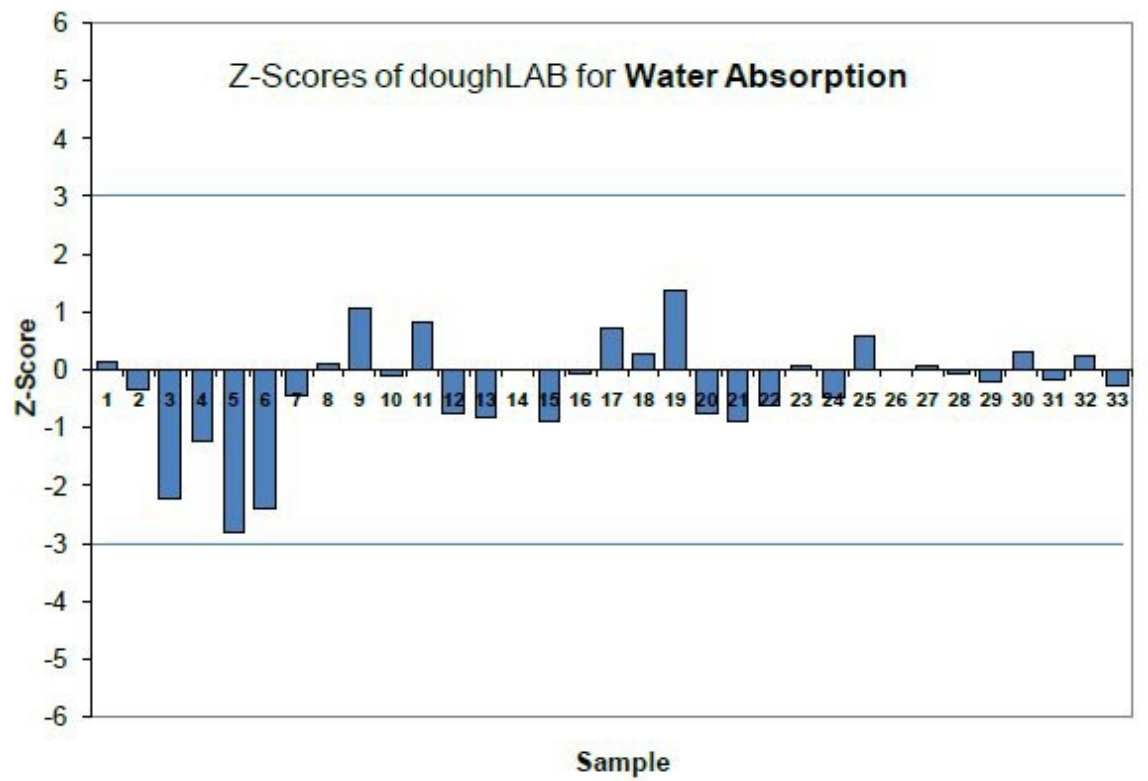
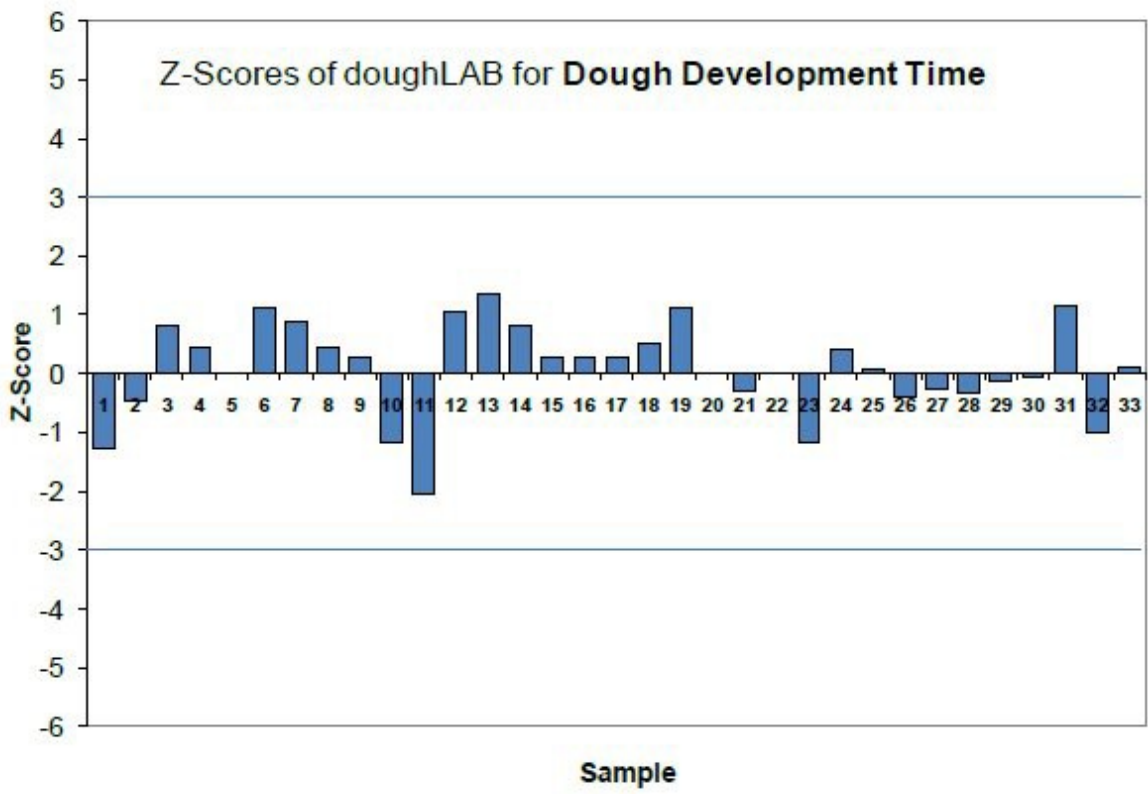
Statistical z-scores (using the median and normalised interquartile range) of doughLAB results are calculated from all data obtained from participants for both check sample services. The results of interest are water absorption (WA), dough development time (DDT), stability, mixing tolerance index at 5 min. after peak (MTI) (AACCI samples only), and softening at 12 min. after peak (BIPEA samples only). Comparison between doughLAB results and check sample statistical means

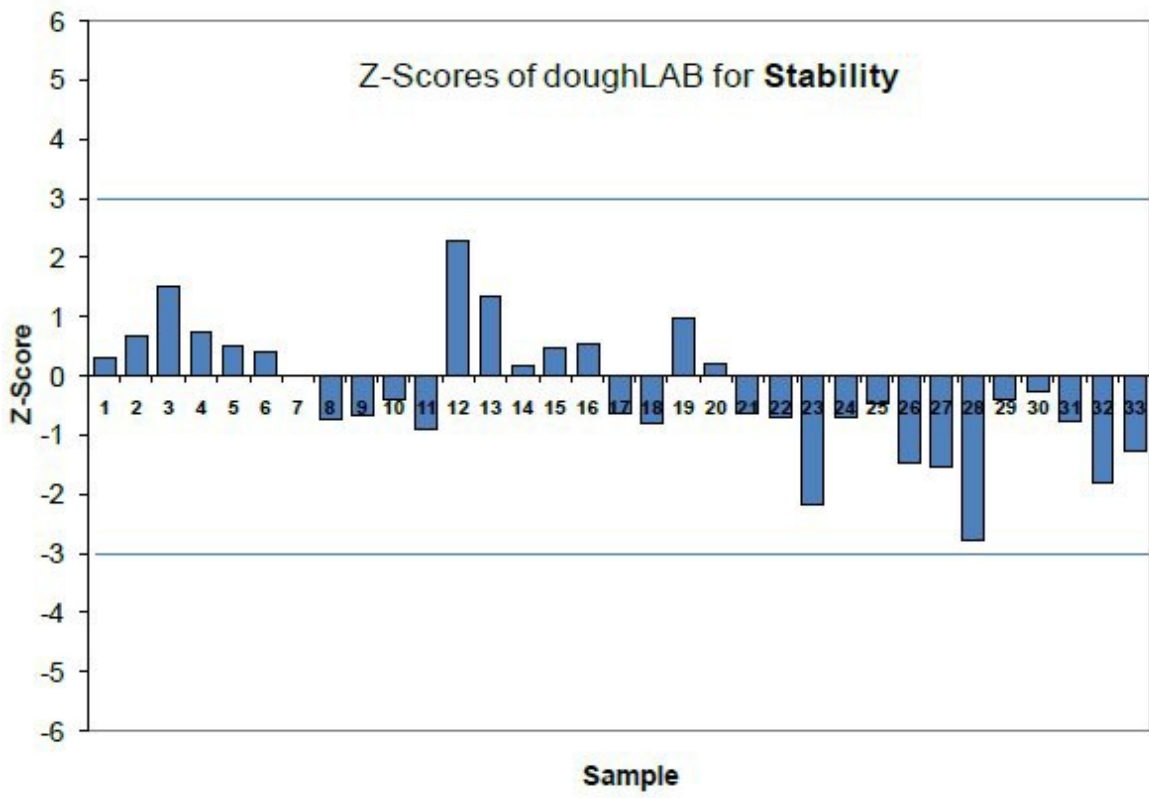
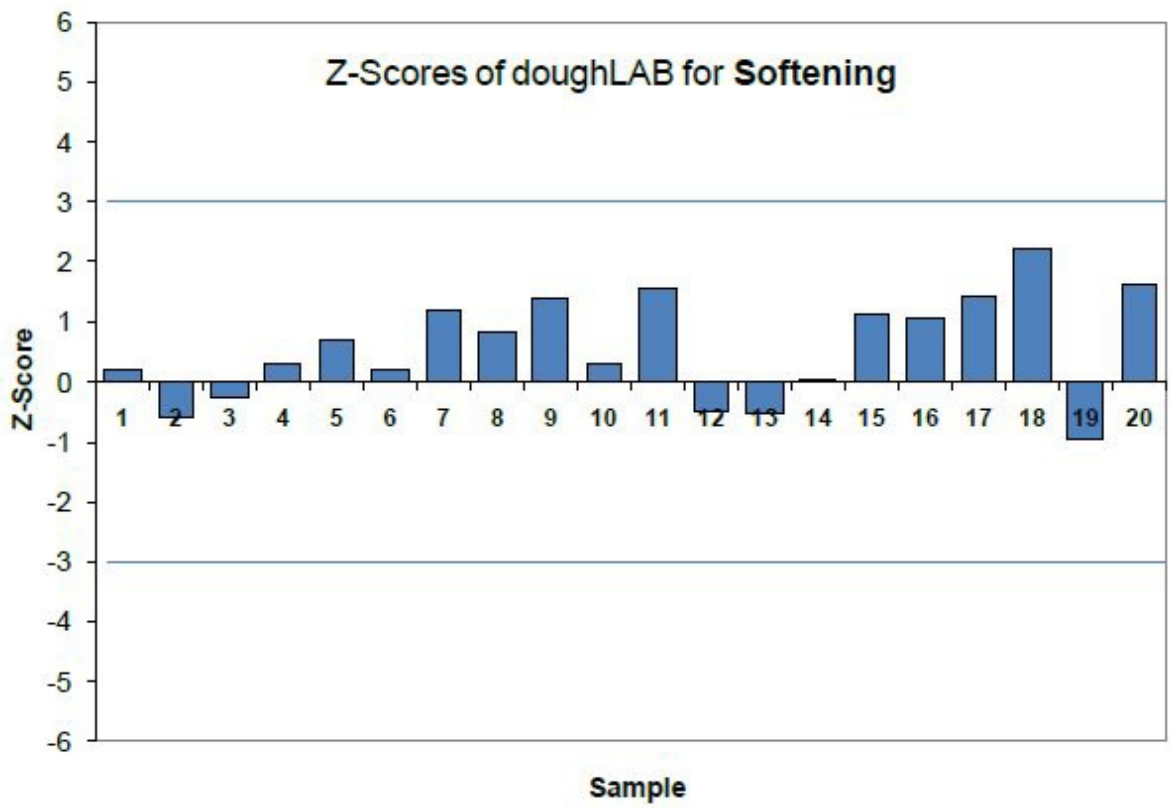
The BIPEA check sample service includes approximately 100 subscribers, with the majority of participants using a Farinograph™ 300-g mixing bowl. Mixing parameters collected for the BIPEA check sample service include WA, DDT, stability, and softening at 12 min. after peak. The AACCI has approximately 50 subscribers, with the majority of participants using a Farinograph™ 300-g bowl. Mixing parameters collected for the AACCI check sample service include WA, DDT, stability, and MTI at 5 min. after peak.

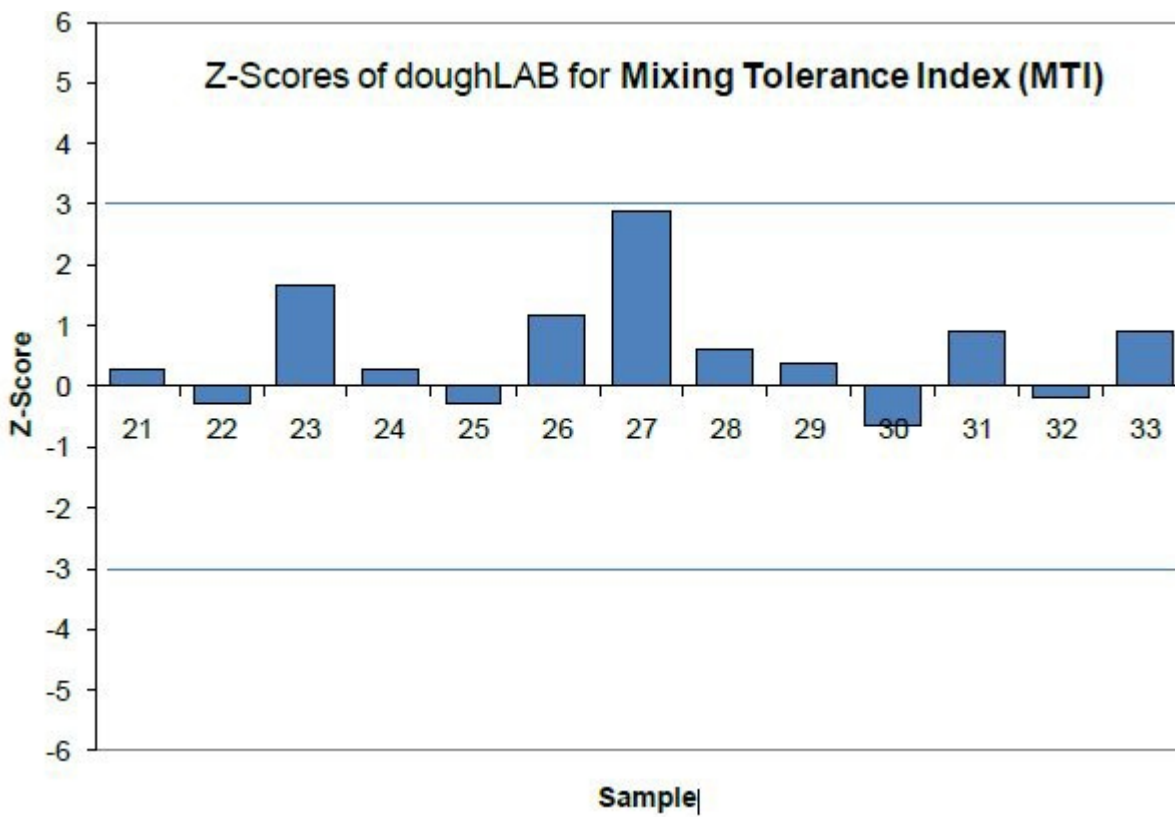
Statistical z-scores of the doughLAB results for the various mixing parameters are calculated from all data obtained from participants for both check sample services. The z-score compares results between participating laboratories. Each z-score is calculated using the median and normalised interquartile range (NIQR). An outlier is defined as any result with an absolute z-score greater than 3. This outlier criteria has a confidence level of about 99%, that is, there is a less than 1 % chance of the result being a true member of the population. Similarly, a z-score cut-off of two has a confidence level of approximately 95%.

From results to date, absolute z-scores for mixing results obtained from the doughLAB are all less than 3. Mixing results from the doughLAB therefore fall within the normal range for all parameters compared to those from other similar instruments in the check sample services. To re-state, it is impossible to distinguish the doughLAB results from the population of Farinograph™ results.

The graphs below plot the z-scores of the doughLAB results for each sample since September of 2007. As can be seen, there are no outliers.







Further information

[Read more about the doughLAB](#). Copies of statistical data can be provided on request.

References

AACC International Approved Methods of Analysis, 11th Ed. (2011). Method 54-21.02. Rheological Behavior of Flour by Farinograph: Constant Flour Weight Procedure. AACC Int., St. Paul MN.

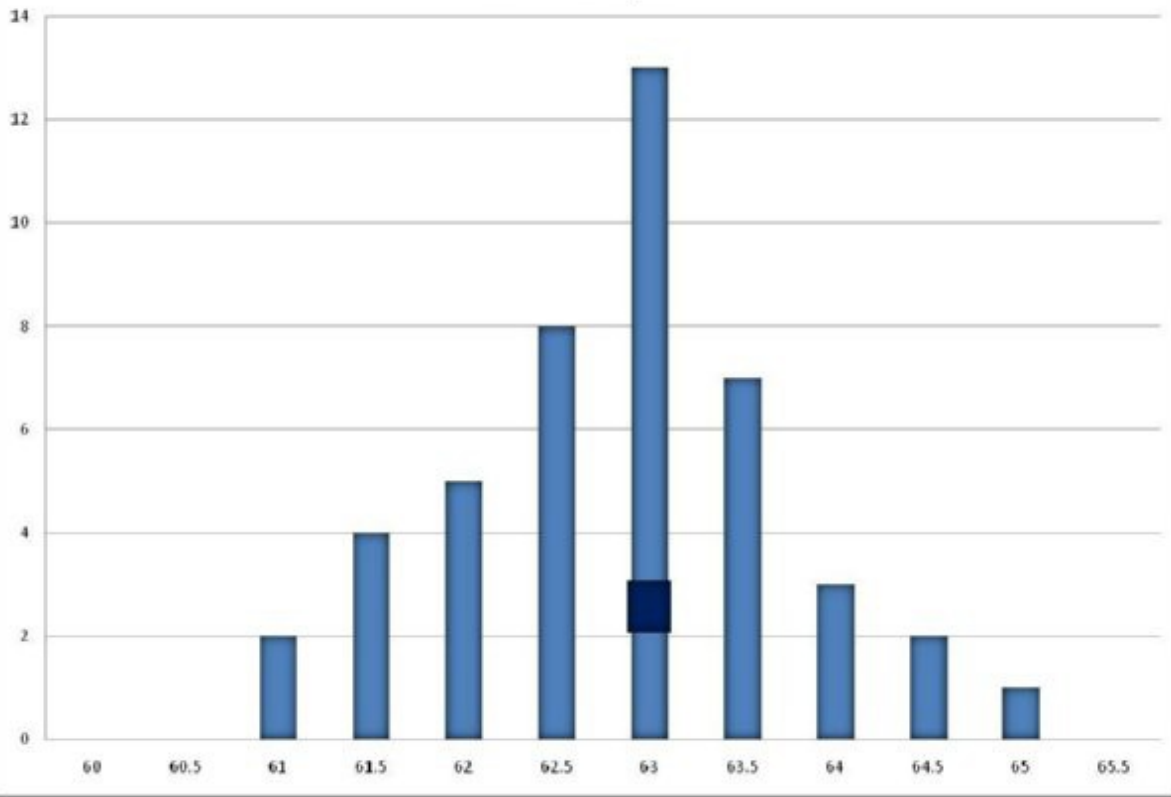
National Association of Testing Authorities, Australia (1997). Guide to NATA proficiency Testing, NATA, Rhodes, Australia, 27p.

doughLAB – Participation in Farinograph™ Check Sample Service

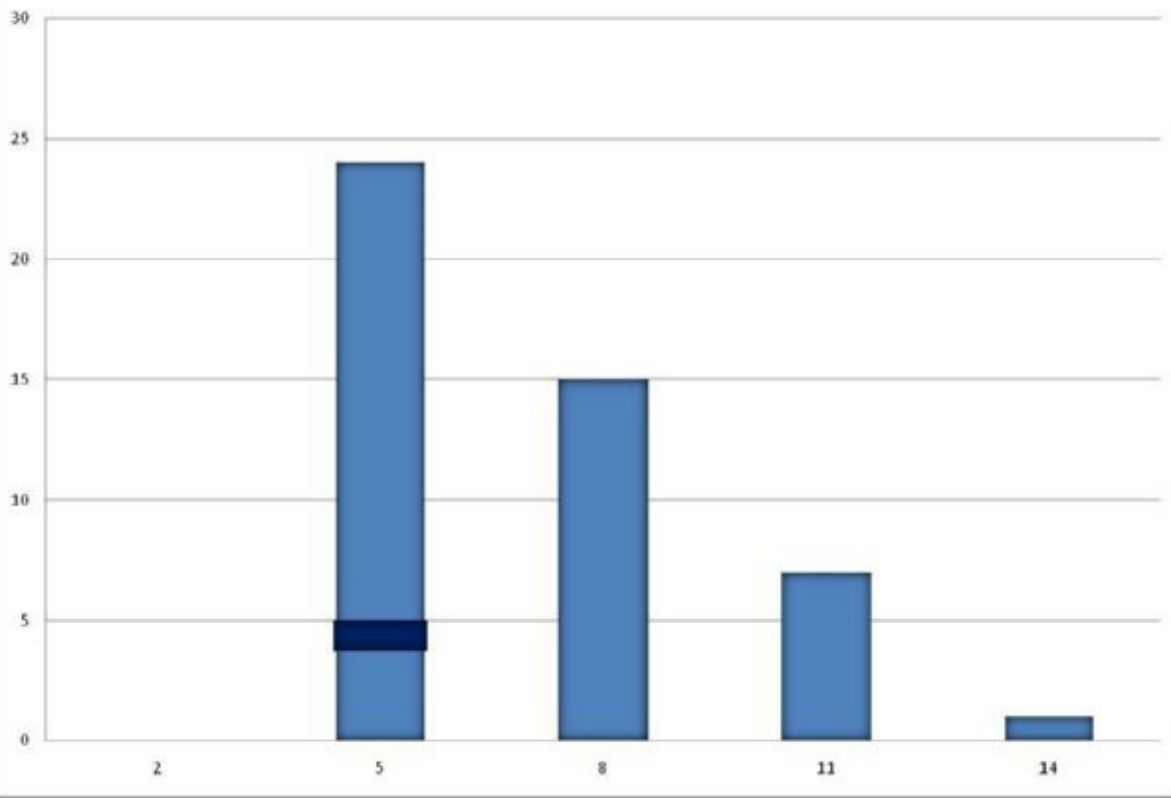
Example of single sample in service population

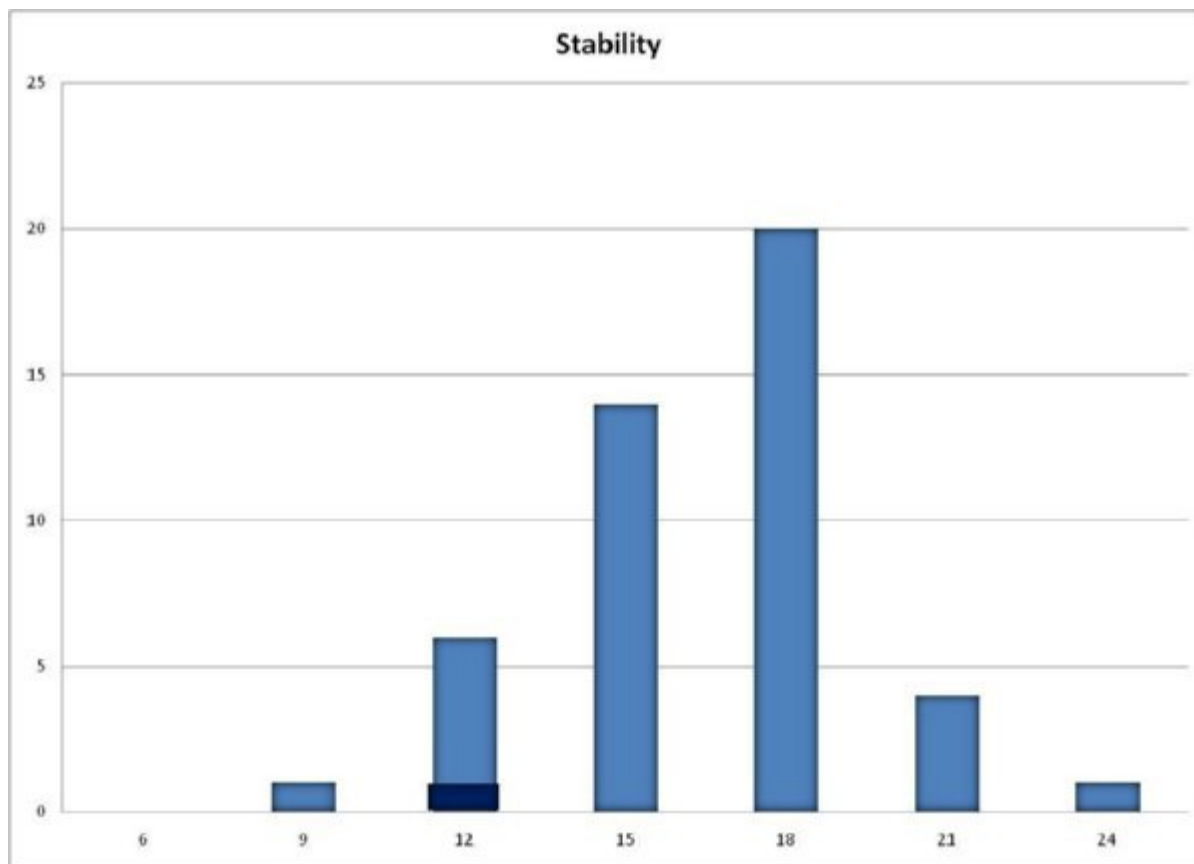
	Water Absorption	Arrival Time	Peak Time	Stability
N	46	47	47	46
Mean	62.7	1.4	5.6	15.1
Min	60.7	1.0	2.4	6.9
Max	64.7	2.0	13.1	21.2
Range	4.0	1.0	10.7	14.3
Std	0.9	0.2	2.8	2.8

Water Absorption



Peak





The following publications include comparisons between the doughLAB and Farinograph™:

Allen, H.M., Pumpa, J.K. and Blakeney, A.B. 2004. Dough mixing using a high speed dough mixer – the doughLAB. In: Proceedings of the 54th Australian Cereal Chemistry Conference and 11th Wheat Breeders Assembly (Black, C.K., Panozzo, J.F. and Rebetzke, G.J. (eds.)), 21-24 September, 2004, Canberra ACT, pp.256-258. (NSOrig968)

Arpas, R.; Derrett, L.; Bason, M.; Trumper, A.; Miskelly, D.: A Mini Comparison of the Newport DoughLab and Brabender Farinograph. Proceedings of the RACI Cereal Chemistry Conference 2008. (NSOrig1172)

Bason, M.L., Dang, J.M.C. and Booth, R.I. 2004. Summary of the paper: 'Dough mixing on the Newport Scientific doughLAB compared to the standard Brabender Farinograph'. Newport Scientific World 1:2-4. (NSOrig926)

Bason, M.L. Dang, J.M.C. and Charrié, C. 2004. Comparison of the doughLAB and Farinograph for testing flour quality. In: Proceedings of the 12th ICC Cereal and Bread Congress, 23-26 May 2004, Harrogate, UK. (NSOrig937)

Dang, J.M.C., Bason, M.L. and Booth, R.I. 2009. Comparing micro-doughLAB and doughLAB mixing results for assessing flour properties. Proc. Australian Cereal Chemistry Conference, 27-30 Sept. 2009, Wagga Wagga (in press). (NSOrig1215)

Dang, J.M.C., Sissons, M. and Bason, M.L. 2004. High speed dough tests on semolina using the Newport Scientific doughLAB. In: Proceedings of the 54th Australian Cereal Chemistry Conference and 11th Wheat Breeders Assembly (Black, C.K., Panozzo, J.F. and Rebetzke, G.J. (eds.)), 21-24 September, 2004, Canberra ACT, pp.263-266. (NSOrig955)