

Perten Instruments Methodology Check List

Falling Number Method

- 1. Water bath** On the FN1500, FN 1700, FN 1900 and FN 1000 models, ensure that the water bath itself is pressed firmly towards the tower until it “clicks” and comes to the rear stop.
- 2. Cooling lid** Crystals may develop along the edge of the aluminum cooling lid and prevent the lid from being pushed firmly down into the water bath. Scrape off crystals and ensure that the cooling lid is pressed firmly down into the water bath.
- 3. Cooling system** Cooling water should have a rate of approximately 400 ml/min.
- 4. Water for water bath** Use distilled water or water of equivalent purity in the water bath. DO NOT add chemicals to adjust the water bath temperature as this will lead to erroneous results. The AACCI Falling Number method 56-81.03 was revised on this point per September 9, 1992, and it is now forbidden to adjust the boiling temperature.
- 5. Water bath level** Periodically check the water level in the water bath. Try to keep the level within 1 cm. When adding water, note that cold water will cool the water surface. Allow the bath to reach the boiling temperature again by waiting approximately 5 minutes after adding water to the water bath. FN 1000 has automatic water bath level control, but the refill bottle needs to be checked daily.
- 6. Altitude correction** The FN value is affected by the boiling temperature of the water in the water bath, which is a function of the atmospheric pressure. Therefore, elevated locations may obtain FN values that are different (higher) from those determined at sea level.
Corrections must be applied if the altitude of the laboratory is higher than 610 meters (2,000 feet) for flour and 760 meters (2,500 feet) for meal. See the operation manual for details.
- 7. Is water boiling?** Push down a steam flap with a rod. Check that the water is actually boiling vigorously – the surface should be bubbling.
- 8. Viscometer tubes and stirrers** Tubes should be sparkling clean and dry. Stirrers should be clean and dry. Verify that all gelled material is removed from the inside of the black ebonite neck of the viscometer stirrer. Check that the stirrer is not bent and ring is firm and perpendicular to the rod. For safety reasons NEVER USE DAMAGED TUBES.
- 9. Sample amount** Obtain a representative sample. When performing analysis on grain, be certain to obtain a minimum of 250-300 gram of well mixed, cleaned sample. Remember that you are trying to represent entire loads with the sample. The grain itself has high variability from kernel to kernel. Extensive research has gone into specifying minimum 250-300 gram.
- 10. Grinding – particle size distribution** The entire 250-300g grain sample must be ground in a hammer mill equipped with a 0.8 mm sieve. Allow the mill to run for at least another 30 seconds when the last kernels have entered the grinding chamber. ICC 107/1 and AACCI 56-

81.03 describes the correct particle size distribution to use for Falling Number analysis.

- 11. Mix ground sample** Grinding can cause separation into various components. Be sure to mix the ground sample well before sub-sampling the 7g for FN analysis.
- 12. Sample weight** Check that the balance used for weighing the sample is correct, by comparing with known standard weights.
- 13. Sample weight correction** The FN result is influenced by sample moisture content. ICC methodology requires the sample weight to be adjusted according to the actual moisture content of the ground meal or flour. Refer to operation manual for details. The ICC107/1 requires a 14% moisture basis correction. AACCI methodology uses either a weight adjustment or a recalculation to a fixed (14%) moisture content. ISO FN standard has 15% moisture basis correction. Check that comparisons are being made using the same moisture correction methods.
- 14. Dispenser 25 ml volume** The ICC/AACCI requires that 25.0 +/- 0.2 ml of water should be used. Check dispenser or pipette volume by weighing the water. 5-10 replicates may be done to prove repeatability of the dispensed volume. The weight of 25.0 ml should be 24.96 g at 20°C or 24.93 g at 24°C.
- 15. Water quality** Use distilled water or water complying with ISO 3696, Grade 3. The pH of the water will affect the measurement. If water quality is suspect, compare by using water from other source (Pharmacies often supply distilled water, which could be used for a comparison). **NOTE:** Water pH changes during storage. Use fresh water.
- 16. Dispenser water temperature** The temperature of the dispensed water should be 22 +/- 2 °C. Large temperature variations would affect the measurement. The viscometer tubes must not be hot (for example being dried in an oven) as this will heat the dispensed water and affect the test.
- 17. Mixing the sample** Shake the tube(s) up and down 20-30 times, or more if necessary. Alternatively, use the Shakematic to mix the sample in the tube(s). Make sure the sample is fully suspended by turning the tube(s) upside down and verifying that there are no “pockets” of unsuspended sample. Old worn tubes increase the risk for dry “pockets” at the bottom of the tube.
- 18. Scrape rubber stopper and sides of tubes** Thorough scraping of the stopper and the tube is important to make sure all material is included in the sample analysis.
- 19. Timing** Insert tubes within 30-60 seconds after mixing.
- 20. Start the test immediately after insertion** When the tube (tubes) has been inserted in the water bath, the test must be started immediately. Delay in insertion or start of the test causes erroneous results and greater variability.