

A NOTE ON THE CONSTRUCTION OF A SMALL-SCALE DOUGH EXPANSION APPARATUS FOR THE ESTIMATION OF WHEAT QUALITY¹

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Suitable apparatus for conducting dough expansion tests were described by Miller, Edgar, and Whiteside (1,2). Since these publications were issued, improvements have been made on the dough expansion apparatus and several requests have been received for detailed plans for reproducing this device.

The Expansion Test is essentially a dough-ball gas-retention test for indicating baking strength and was developed as a method for assessing wheat samples in the early stages of the wheat breeding program when only small quantities are available. A dough mixed from 5 g. of flour using a suitable formula is fermented in air before being molded and placed in the expansion apparatus. The expansion of the dough takes place in a weak brine solution and the liquid displacement is measured in the calibrated tube. The apparatus provides a tight seal for the head and a dough holder for supporting the expanding dough. The plastic top enables the operator to note the behavior of the dough during the test. Studies with spring wheats grown in Canada have shown that expansion values are highly correlated with loaf volume, and the test is being used currently for the screening of hybrid lines for quality.

Specific dimensions and details of construction for this dough tester are presented in an engineering drawing, Fig. 1. The metal cup is fabricated from a brass tube, one end being closed off by a circular plate soldered into the tube. A brass ring with a machine-cut thread is soldered to the outside of the tube at the top. The cup and knurled collar are nickel-plated.

The plastic head assembly is fabricated from acrylic plastic, the dome-shaped crown being formed in a compression mold at a temperature of 250°F. A cone-shaped piece of hardwood was cut in a carpenter's wood lathe to serve as a mold for the bottom of the crowned plastic plate; a corresponding piece of wood was used as the top section of the mold. After the plastic plate is formed it is machined to provide a close fit onto the cup and to provide a groove for the neoprene washer. A ring cut from plastic tubing is set into the top

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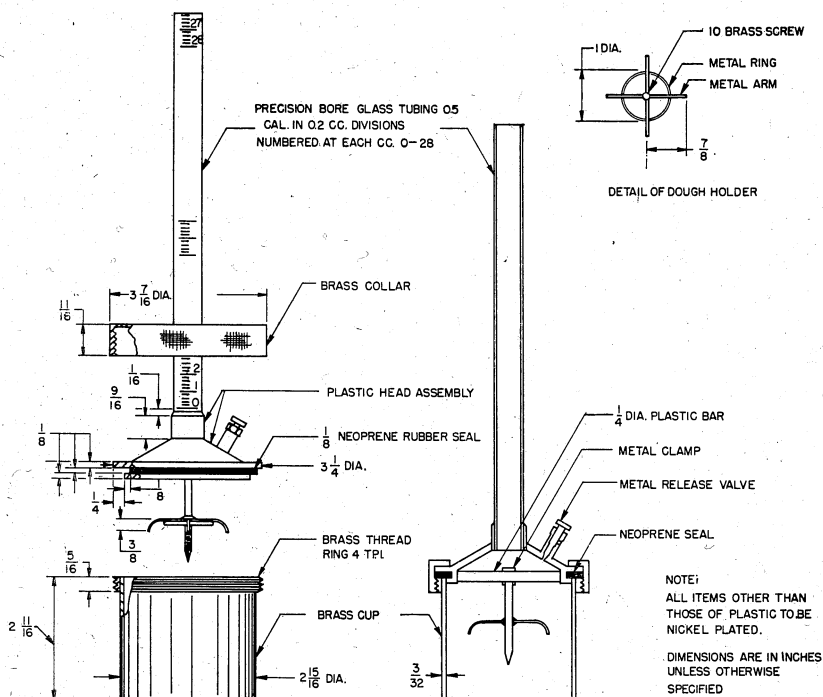


Fig. 1. Engineering drawing of dough expansion apparatus.

to hold the graduated glass tubing which is cemented in place with thermosetting cement. A simple metal relief valve is fitted into the plastic dome to adjust for zero in the graduated tube.

The dough-holding device is made from a threaded screw nail, to which are attached four wing blades and a ring. This, in turn, is mounted on a small plastic bar cemented to the bottom of the plastic head assembly.

Literature Cited

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