

INSTRUCTIONS FOR USING STANDARD SAMPLE No. 704
with TAPPI Standard T 414* or ASTM Designation D 689

INTERNAL TEARING RESISTANCE OF PAPER

Sufficient standard material is provided for 40 or more measurements. Open the sealed package only in a room maintained in accordance with ASTM-TAPPI standards, at $50 \pm 2\%$ R.H. and $23 \pm 2^\circ\text{C}$. Reseal half the material in the package for future use in the event that it is necessary to repeat the calibration. Precondition and condition the other half of the material in accordance with your usual procedure for high precision work (see ASTM Designation D 685 or TAPPI Standard T 402). The certified value for this standard material was obtained on specimens preconditioned for a minimum of 24 hours at 11-12% R.H., 23°C and then conditioned for a minimum of 24 hours at 50% R.H., 23°C .

From the conditioned standard material, prepare at least 20 specimens, each specimen consisting of 16 plies. Take each ply of a specimen from a different sheet, and cut to proper size for tearing in the long direction (machine direction) of the sheet as received.

Before testing, determine that the tearing tester is in proper adjustment (see T 414* or D 689). Then, following the prescribed procedure, carefully clamp the 16 plies of a specimen together in the jaws of the tester, and make the tear. Record the scale reading. Repeat for all 20 specimens. Compute the average scale reading. Since the tester is direct reading for a 16-ply specimen, the tear value is equal to the scale reading. Therefore, this average scale reading is your "measured" value of the standard material.

Determine which model of the tearing tester was used in making the measurements. In the newer model the section of the pendulum near the clamp is severely cut out (see Figure 1, T 414* or D 689). For the newer model, if the measured value of the standard material differs from the NBS certified value by more than 3%, compare in detail the procedure used against that prescribed in the standard method. Especially check (a) the relative humidity and temperature conditions (use wet-dry bulb psychrometer or dew-point hygrometer, not hair hygrometer), (b) preconditioning procedure, (c) dimensions of specimen and tear distance, (d) movement of table or instrument during swing of pendulum, (e) bearing and pointer friction, and (f) level and zero adjustment.

For the older models of the tester, first add **7.5%** to the certified value of the standard material, and then determine agreement with the measured value.

Any instrument that does not give results that agree with the certified value within 3% should not be used in referee testing. Since it will not always be possible to find immediately the source of error, the following procedure may be used for other than referee work in the interim until the cause of the error is found. Multiply the tear values obtained on the material being tested by the appropriate correction ratio: (a) for measurements made with the new model instrument use the ratio of the certified to the measured value of the standard material; (b) for measurements made with the old model instruments use 1.046 times the above ratio.

*Technical Association of the Pulp and Paper Industry (TAPPI) Vol. 46, No. 11, November 1963, pp 132A-134A.