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Technical Association of Pulp and
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Standard Method T 803 m-50

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Standard Test Methods for PUNCTURE AND STIFFNESS OF PAPERBOARD, AND CORRUGATED AND SOLID FIBERBOARD¹

This Standard is issued under the fixed designation D 781; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval.

1. Scope

1.1 These methods cover the determination of puncture and stiffness of paperboard and corrugated and solid fiberboard.

1.2 The methods appear in the following order:

	Sections
Puncture Test	2 to 7
Stiffness Test	8 to 12

PUNCTURE TEST

2. Significance

2.1 The puncture test (also known as the Beach or G. E. Puncture test) measures the resistance of board in either single sheets (that is, components) or in combined form to puncture. Such puncture may result from contact with solid objects such as a corner of a box, or the like. The unit measured by the instrument is the energy required to puncture the containerboard in the designated manner (one unit equals 0.265 in.·lb (0.305 cm·kg)). These units are actually made up of several components, the principal ones being the energy required to tear the material and the energy required to bend it out of the way of the point. By conducting both puncture and stiffness tests (see Section 8) on the same lot of material, the relative contribution of the tearing and the stiffness may be evaluated.

2.2 The test evaluates in a composite fashion some fabrication factors and material values, although it is not possible to isolate the two specifically.

3. Apparatus (Fig. 1)

3.1 *Pendulum*, incorporating an arm in the

form of an arc of 90 deg.

3.2 *Puncture Point*, affixed to the end of the arm and having the shape of a right angle triangular pyramid 1 in. (25 mm) in height with rounded leading edges of 0.062 ± 0.002 -in. (1.57 ± 0.05 -mm) radius. The point shall be honed to a 0.062-in. radius and base edges left sharp.

3.3 *Puncture Point Collar*, loose fitting around the base of the puncture point to avoid friction that would result if the punctured material rubbed against the puncture arm.

3.4 *Trigger or Latch*, to hold the pendulum in the horizontal position.

3.5 *Clamping Jaws*, spring-actuated, for holding the specimen to be tested.

3.6 *Pointer and Scale*, to indicate the arc through which the pendulum travels after penetrating through the specimen.

3.7 *Weights*, which when attached, give a maximum scale value of at least 1300 units of energy when the pendulum is in the horizontal position, and scale graduations to correspond to the weights used.

NOTE—Modified machines having greater range are available.

3.8 *Loose Plate*, inserted between the clamping jaws for the purpose of defining the test area. Means shall be provided for securing the removable plate once it has been properly positioned (see 4.1.7). The loose plate shall be removed when checking the zero reading of the apparatus.

¹ These methods are under the jurisdiction of ASTM Committee D-6 on Paper and Paper Products.

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