



Designation: D 1225 – 66 (Reapproved 1971)

Standard Test Method for FLAT CRUSH OF CORRUGATED FIBERBOARD¹

This Standard is issued under the fixed designation D 1225; 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 This method² covers the determination of the resistance of the flutes in corrugated board to a crushing force applied perpendicular to the surface of the board when tested under prescribed conditions. This test may be used on single-wall or single-face corrugated board. It is not suitable for measuring the crushing resistance of double-wall or triple-wall board.

NOTE 1—Failure of corrugations in single-wall board may occur in either of two ways:

(1) When no lateral motion is permitted, the tips of the arches flatten followed by the crushing of the sides of the arches, or

(2) If lateral motion is permitted, the tips of the arches flatten followed immediately and at a reduced load by lateral motion of the facings, permitting the corrugations to fall over sidewise or roll.

Double-wall or triple-wall corrugated board usually fails by lateral motion of the center facings. No satisfactory technique has been developed for the prevention of this type of failure on multiwall board. The test therefore does not yield significant results when applied to double-wall or triple-wall board.

2. Significance

2.1 The flat-crush test evaluates the resistance of the flutes in corrugated board to a crushing force applied perpendicular to the surface of the board. Although not directly correlating with compression tests on finished containers, it is a measure of the value of some of the factors involved in the operation of fabricating the board and of the material used to form the corrugations. Low flat-crush values may reflect poor formation of the corrugations, sub-standard materials, or damage to the corrugations after they are formed. Such damage may occur in subsequent manufacturing operations in the box plant (such as

crushing under printing dies) or through careless storage and handling by the box user. For this reason, great care should be exercised in selecting flat-crush test specimens to be sure that they reflect the conditions to be evaluated, and that causes of low test results are properly interpreted.

3. Apparatus

3.1 *Compression Machine*, consisting of an upper and lower platen held rigidly parallel and free from lateral movement within 0.002 in. (0.05 mm). The parallelism of the platens shall be held to within a part in 2000 when measured diagonally across the bare platens. To prevent slippage of the specimens, the platens shall be covered with crocus or fine emery cloth, free of ridges, by means of double-coated adhesive tape. The facing cloth should be changed after every 2000 tests. Means provided for compressing a specimen placed between the two platens at a uniform rate. The rate of applying the load shall be 25 ± 5 lbf (111 $\pm$ 22 N)/s, when platens are in contact. The capacity of the tester may be either 500 or 1000 lbf (2224 or 4448 N) and the pulley ratio such as to achieve this rate in either case. Means for measuring and indicating the applied load within 1 lbf (4.45 N), and such that the indicator can be accurately calibrated with dead weights. The accuracy required is 0.5 percent or 0.5 lbf (2.22 N), whichever is greater.

¹ This method is under the jurisdiction of ASTM Committee D-6 on Paper and Paper Products.

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² See Nelson, H. G., and Maltenfort, G. G., "Study of Flat Crush Test of Corrugated Board," *Tappi*, TAPPA, Vol 44, No. 9, 1961, p. 614.