



Test Method for Determining the Bursting Strength of Cardboard, Fiberboard and Similar Rigid Materials

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard shall be used to determine the strength properties of cardboard, fiber board, and similar rigid materials by measuring, under specified conditions, the pressure necessary to rupture a test piece of the material.

1.2 Applicability. Fiberboard, cardboard, and similar rigid materials.

1.3 Remarks. The test is carried out using hydraulic pressure applied to a rubber diaphragm over which the test piece is tightly clamped, until the test piece ruptures.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3221

3 Resources

3.1 Facilities.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 Burst Strength Tester (Mullen Tester) such equipment available at www.mullentesters.com.

3.2.1.1 Pressure shall be transmitted hydraulically and it shall be uniformly increased. The circular free test area of the test piece shall be $(780 \pm 5) \text{ mm}^2$ corresponding to a diameter of $(31.5 \pm 0.05) \text{ mm}$. The hydraulic pressure on the rubber diaphragm shall be transmitted by technically pure air free glycerin.

3.2.2 The tester shall consist of a metal base plate covered by a thin rubber diaphragm over which the test piece can be placed, and securely clamped by a metal ring. The internal diameter of the ring shall be $(31.5 + 0.05) \text{ mm}$.

Note: A schematic representation of the test head is shown in Figure 1.

3.2.3 The clamping device shall consist of two annular steel rings, the contacting surfaces of which are spirally grooved and parallel such that, when clamped onto the test piece, the clamping pressure is uniform and sufficient to prevent slippage of the test piece during test. The inner diameter of the clamping rings shall be (31.5 ± 0.1) mm and the outer diameter shall be 96.0 mm minimum. The lower inside edge of the upper clamping rings shall be rounded with a radius of 0.5 mm. The lower clamping ring shall be (6 ± 2) mm thick and its lower inside edge shall be rounded with a radius of (6.0 ± 0.5) mm to prevent damage to the diaphragm during testing. The clamping pressure shall be adjustable (either manually or automatically) to give the approximate pressures shown in Table 1.

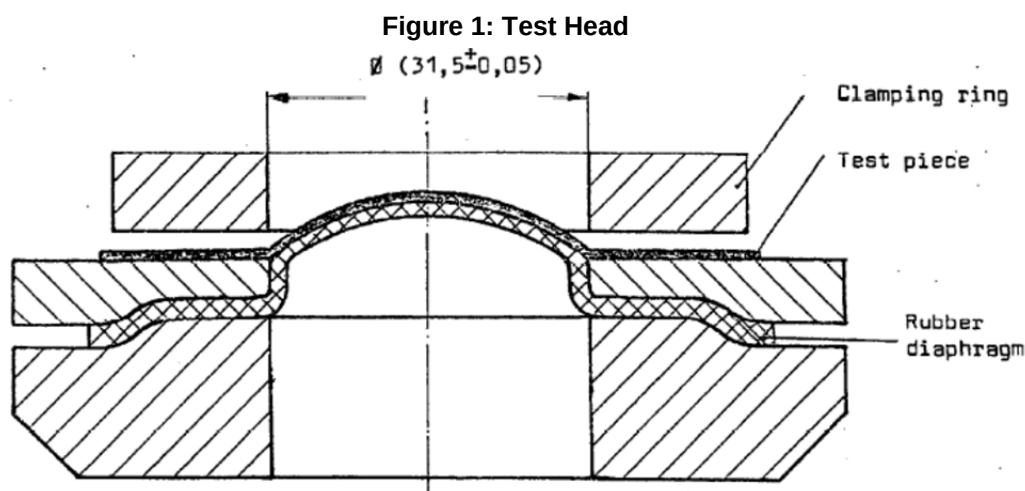


Table 1: Clamping Pressure

Bursting strength in MPa	Clamping pressure in MPa	
	Solid board or corrugated cardboard	Paper or similar thin materials
≤ 1.5	0.4	0.7
1.5 to 2.0	0.6	0.7
2.0 to 2.5	0.8	0.7
> 2.5	1.0	0.7

3.2.4 Pressure gauges capable of measuring the applied pressure to an accuracy of ± 0.02 MPa shall be fitted. The capacity of the machine shall be such that the bursting strength shall be between 5% and 90% of the maximum scale deflection.

3.2.5 The replaceable rubber diaphragm shall be made of high quality rubber such that even after repeated stress a permanent set is minimal. The diaphragm shall be replaced when the pressure to achieve an arching height of (10.0 ± 0.1) mm above the base pressure plate face, falls outside the range (0.16 to 0.21) MPa.

3.2.6 Cutting dies or shears for preparation of the test pieces.

3.3 Test Vehicle/Test Piece.

3.3.1 The complete component shall be used as test piece or, from the available material, test pieces ≈ 110 mm x 220 mm shall be taken from various areas of the component.

3.3.2 Test pieces shall, wherever possible, be taken in the longitudinal direction or parallel to an outer edge.

3.3.3 With this size test piece it is possible to perform two tests, one face up and one face down.