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AUSTRALIAN STANDARD
Prepared by the Appita Testing Committee. Endorsed as part of AS 1301 by the Standards Association of Australia—May 1988. Endorsed as suitable for use in New Zealand by the Standards Council of New Zealand.

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RING CRUSH TEST

This test measures the resistance of paper and paperboard to edgewise compression. Corrugated and solid fibreboard containers are subjected to crushing forces in shipment and this test is used for two purposes.

(a) To indicate the edgewise rigidity of the board so that manufacturing processes may be controlled to secure the desired results.

(b) To estimate the probable compression strength of the finished container when tested according to AS 1301.800, *Compression resistance of fibrebord boxes (cases).*

This test can be made on the material in both the machine direction (MD) and cross machine direction (CD). For the purpose of this method MD ring crush is defined as the test made on a test piece cut nominally 152 mm CD by 12.7 mm MD, while CD ring crush is defined as the test made on a sample cut nominally 152 mm MD by 12.7 mm CD.

This method is intended only for paper and paperboard having an average thickness in the range 200 to 580 μm.

1. APPARATUS

1.1 Motor driven crush testing machine as described in AS 1301.449 (Note 6.1).

1.2 Test piece holder. A circular metal block having a cylindrical hole cut square 6.35 ±0.25 mm deep, 49.275 ±0.025 mm inside diameter, and with its base parallel with the base of the block to within 12 μm. A branch groove is cut from the edge of the block tangential to the cylindrical hole to permit insertion of the test piece. A centre 'island' consisting of one of a series of replaceable discs, rests in the centre of the cylindrical hole. The holder is provided with a means of correctly centralizing the disc and of allowing it to turn freely as the test piece is inserted through the tangential groove. The discs are of various diameters such that the width of the groove formed between the edge of the disc and the wall of the cylindrical hole may be varied to accommodate test pieces of various thicknesses.

The discs to be used with various thicknesses of board are listed in Table 1.

1.3 Test piece cutter capable of cutting a test piece to the dimensions indicated in 2.2.

TABLE 1
DISCS TO BE USED WITH VARIOUS THICKNESSES

Average sample thickness μm	Disc number	Groove width μm
up to 250	250	270 to 310
251 to 330	330	350 to 390
331 to 410	410	430 to 480
411 to 490	490	510 to 560
491 to 580*	580	600 to 650
510 to 680*	680	700 to 750
681 to 780*	780	800 to 850
781 to 880*	880	900 to 950

* See Note 6.2.

A die cutter with a male and a female die and a means of clamping the test piece during cutting has been found to be suitable.

Other methods of cutting may be used provided it can be shown that they give the same test result as a die cutter of the style described.

2. PREPARATION OF TEST PIECES

2.1 Condition the sample according to AS 1301.414 in the standard atmosphere prescribed in AS 1301.415.

2.2 Cut at least five test pieces each 12.70 ±0.02 mm wide and 152.4 ±0.5 mm long using a test piece cutter as allowed in 1.3 and cutting only one thickness of board at a time. Ensure that the long axis of the test piece is truly perpendicular to the required direction of the test. When cutting the test pieces ensure that the liner side of the board faces the surface of the male die (Note 6.4). For the purposes of this Standard the liner or fair side is defined as the side of the board which is intended as the outside or exposed surface of the converted product.

2.3 Where the liner or fair side cannot be identified in terms of this definition, cut five test pieces with one side facing the male die and another five test pieces with the other side facing the male die. On each test piece mark the side which faced the male die during cutting (Note 6.5).

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