PACKAGES CONVERTORS LIMITED BU-FC	Document type Work Instruction Title INTERNAL BOND STRENGTH TESTING.

Prepared by	Approved by	PAGE	REV	DATE	DOC NO.
Asad Javed Manager R&D&QA	Salman Fazul –ur Rehman BUMFC	1(3)	**1**	**01.07.2024**	WIQA/BU-FC/8.2.4/27

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1.0 PURPOSE

To test the internal bond strength (Z-Direction Tensile) of paperboard

2.0 SCOPE:

This method describes a procedure for the measurement of the internal bond strength (Z-Direction Tensile) of paperboard. This method is based on the following reference.

3.0 REFERENCE:

3.1 T 569 om-00

4.0 DEFINITION:

Sticking together of fibres with paper or paperboard sheet structure that provides toughness and strength.

5.0 EQUIPMENT:

5.1 Internal Bond Tester (Z-Direction Tensile)

5.1.1 A force-measuring device.

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1.1 Double Adhesive Tape
- 1.1.1 One inch wide double coated pressure sensitive tape
- 1.1.2 A 6.45 cm^2 (1 in^2) test platen area.
- 1.1.3 A test cycle consisting of compression stroke, a dwell time and a tension stroke

1.2 Sample Cutter

2.0 TEST PROCEDURE:

2.1 Hang the pendulum on the hook of pendulum stopper.

7.0 TEST PROCEDURE:

2.2 Set the indicator stopper and swing down the pendulum by the push button, then make sure the position of the indicator is "0" point or not. If "0" point is disagree, adjust by the adjuster.

2.3 Set the scale to the prescribed load by the knob.
NOTE: - In case of high or low scale, set a heavy or light plummet on the pendulum correspondingly

2.4 Lower the pressure lever, make loose the Hold down nut and lay the hinge on the side, pull out the angle base from the positioning pin.

2.5 Set 3-pieces of aluminium-angle on the plate spring of the angle base

2.6 Set 3-pieces of the holder on the holder base. Then apply double adhesive tape on the holder and set the test piece on this tape and again apply the double adhesive tape on the test piece.

2.7 Push the angle base in the positioning pin, then give rise the hinge and clump fully the keep nut.

2.8 Keep to give rise the hinge and add the load by the pressure lever. (The load is set at 75 kg).

2.9 After 2 seconds lower the pressure lever.

2.10 Take off the holder with test piece from the holder base.

2.11 Keep pressing the hold-down lever and place the holder on the mount board so that the holder is settled in the groove of the board. Release the pressure lever which in turn fixes the holder with spring.

2.12 After confirmed completely setting. Swing down the pendulum by the push button and write down the indicating value of the indicator in kg-cm/in^2 (scale of the tester)

2.13 Remove the test pieces, being careful not to touch the holders. (if it must be touched to remove tape or other material, clean it with solvent i.e. ethyl alcohol and dry). Return the indicator to zero, if required and test the remaining specimens.

2.14 Any condition of tape-platen bond failure or tape specimen failure, invalidate a test.

2.15 Calculate average reading.

2.16 Report after converting the average reading into J/m^2, by using following formula:
2.17 (Value in kg-cm/in^2) x 152 = (Value in J/m^2)

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The conversion factor 152 has been derived as follows

1 kg_f-m = 9.807 J

Energy => 1 kg_f-cm = 9.807/100 J

Area = 1" x 1" = 2.54cm x 2.54cm

= 0.0254 m x 0.0254 m

= $(0.0254)^2$ m^2

Scott. => Energy/Area = (kg_f–cm)/in^2

= (9.807/100 J) / $(0.0254)^2$ m^2

= 152 J/m^2

1 kg_f–cm/in^2 = 152 J/m^2

Note: Use 5-pieces each of alumi-angle and of the holders when testing Tetra duplex board samples.

7.0 RESPONSIBILITY:

QA Supervisor
Lab Assistant