

Determination of the strength of the manufacturers' joint of corrugated fibreboard containers (compression method)

This is one of a series of performance tests for corrugated fibreboard containers and may be selectively applied, as specified, either singly or in combination with other tests.

1 Object

To define the apparatus and test procedure to be used to determine the strength of a section of the manufacturers' joint taken from a corrugated fibreboard container.

2 Scope

The test is applicable to all types of manufacturers' joints made at the edges of corrugated fibreboard containers.

3 Normative references

EN 22 233 : Packaging – Complete, filled transport packages – conditioning for testing.

4 Principle

A section of the board containing the manufacturers' joint and adjacent panels is cut from the container and clamped in a test assembly. The test assembly is then placed between the platens of a compression tester, and is subjected to compressive action until the specified value is obtained or rupture of the joint occurs.

5 Apparatus

5.1. Type of compression tester : a suitable motor driven, mechanical or hydraulic, platen type tester shall be used.

5.1.1. Compression speed : load shall be applied through uniform movement of one or both platens at a relative speed of 12,5 mm/min \pm 2,5 mm/min. Some existing testers operate outside this range and when one of these is used, the actual relative speed shall be stated in the test report.

5.1.2. Recording device : the compression tester shall be equipped with an autographic load/deflection recording device with zero setting adjustment.

5.1.3. Calibration : the rate of loading shall be maintained within the specified limits and checked by direct measurement of the relative movement of the platens in a measured period of time. The recording of load shall be within a total tolerance range of 2 % checked by applying weights, or with a load cell or other appropriate means. Calibration correction factors shall be applied, where necessary to comply with the specified accuracy for load recording.

5.2. Test assembly

5.2.1. A typical test assembly is shown at fig 1. This consists of a rigid metal frame, fitted with clamps at each side to secure the free ends of the test piece parallel to the manufacturers' joint and a movable shaft, fitted with a radiused V shaped pressure head (see fig.1). Load is applied to the test piece by vertical movement of the platen acting on the pressure head assembly.

5.2.2. To prevent slippage, the clamping surfaces of the assembly shall be faced with emery cloth, free of ridges, secured by means of double sided adhesive tape or adhesive. The emery cloth should be replaced when necessary.

5.2.3. To facilitate positioning of the test pieces, the design of the assembly should be such that the upper clamps are removable and can be replaced to ensure positive clamping.

6 Conditioning

6.1. Unless otherwise specified test specimens shall be conditioned in accordance with EN ISO 22 33. Unless otherwise specified, condition 'G' (23°C \pm 2°C, 50 % rh \pm 3% rh) shall be used.

Note : For packaging tests, FEFCO recommends 23°C \pm 2°C, 50 % rh \pm 3 % rh, but draws the attention that ISO sets \pm 2 % rh, which is quite strict for plants that cannot climate a big room.

7 Procedure

7.1. Test specimens

A test specimen shall be a rectangular section cut from a case to provide two equal panels on either side of the angle formed by the manufacturers' joint. The normal crease formed by the joint during manufacture shall not be reversed.

Each of the panels of the test specimen shall be of sufficient length to permit adequate clamping in the test assembly when the test piece suspended below and in line with the centre line of the pressure head forms a 90° angle.

The dimension parallel to the joint shall be, where possible, at least 150 mm and shall not exceed the length of the pressure head.

7.2. The test should be carried out in the standard atmosphere used for conditioning.
Alternatively the test shall be commenced within five minutes of removal of a test specimen from the conditioning atmosphere.

7.3. Individual tests : with the inner facing (liner) of the test piece uppermost, the panels shall be positioned so that the V of the joint forms a 90° angle directly below and in line with the centre line of the pressure head. Ensuring that the test specimen is maintained in this position the free ends shall then be firmly secured in the test assembly clamps.

The test assembly shall be placed centrally on the lower platen of the compression tester and the tester operated until the specified load is obtained or until rupture occurs.

7.4. Number of tests : unless otherwise specified, a minimum of five test specimens shall be tested.

8 Test report

The test report shall contain :

- a** *date and place of testing*
- b** *description and identification of the board*
- c** *length and types of joint (glued, taped, stitched)*
- d** *full particulars of the joint tested, e.g. nature of the adhesive and the width or pattern applied ; width and type of tape ; wire gauge, number of stitches and whether applied in line, parallel to or at an angle with the joint crease.*
- e** *test climate used (if other than 23°C 50% rh)*
- f** *number of replicate tests carried out*
- g** *individual test results as required by the test specification*
 - 1) *load sustained without rupture*
 - 2) *maximum load at rupture in N per m of joint length*
- h** *arithmetic mean and standard deviation where appropriate, of test results*
- i** *details of any variation from this method*
- j** *any other information which may assist in the interpretation of the test results.*

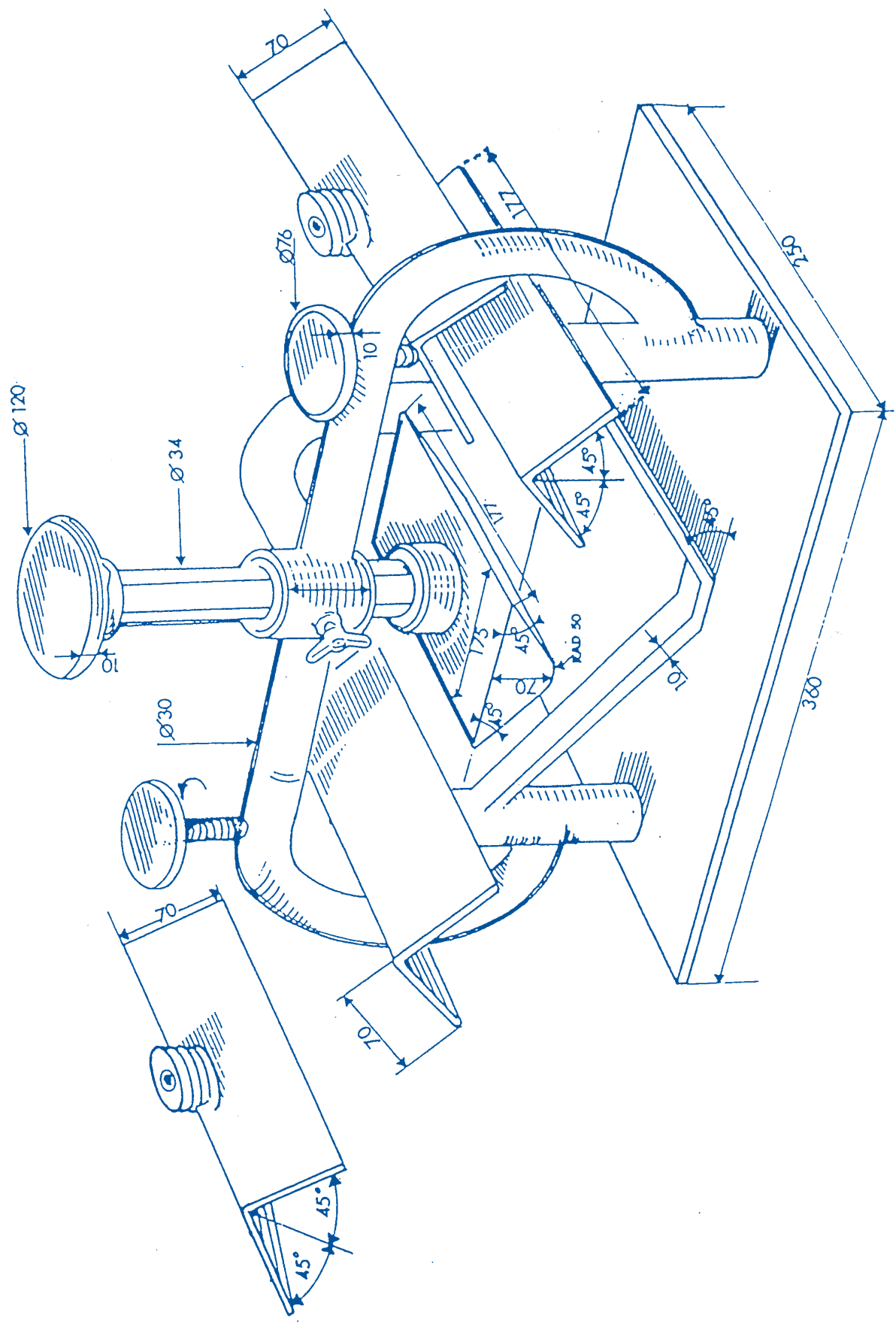


Figure 1
 Not to scale.
 All figures in mm.