November 1994 (amended March 1997)

# *Determination of the Compression Resistance of corrugated fibreboard containers*

## 1 Scope

This testing method specifies the procedure for determining the resistance to compression of empty corrugated fibreboard packagings, with or without interior fittings, using a compression testing machine.

## 2 References

FEFCO testing method n° 1 : sampling procedure

EN 20 187 : paper, board and pulps - Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples.

EN 22 206 : packaging - complete, filled transport packages - identification of parts when testing.

EN 22 233 : packaging - complete filled transport packages - conditioning for testing.

## 3 Principle

Placing the test packaging between the platens of a compression testing machine and subjecting it to a crushing force.

The force and platens displacement are recorded during the test.

## 4 Apparatus

**4.1.** Motorised compression testing machine, platen type, capable of applying a force through uniform movement of one or both platens at a relative speed in the range of 12.5 mm/mn ± 2.5 mm/min.

*Note: compression testing machines with relative platen speeds outside the specified range may be used but their speed must be indicated in the test report, as it may influence the result.*

The platens shall be :

- *horizontal and rigidly mounted*
- *flat, with at most 1 mm deviation from the median plane, local fixing bolts recessed excepted*
- *dimensioned so as to extend over the whole area of the packaging*
- *parallel within 2 : 1000*
- *rigid, so as not to deform by more than 2 mm at any point when the compression testing machine applies a force of 75 % of its maximum rating to a centrally placed 100 x 100 x 100 mm block having sufficient strength to withstand this force.*

The lower platen may bear markings to facilitate the centering of the test packaging prior to testing.

**4.2.** Device for recording forces with at most 2 % error and platen displacements, with at most 1 mm or 5 % error, whichever is greater.

## 5 Sampling

Sample in accordance with FEFCO Testing Method N° 1.

## 6 Conditioning

Unless otherwise specified, containers shall be conditioned in accordance with EN 20 187 (i.e. 23°C ± 1°C, 50 % ± 2% r.h.).

*Note : In case other conditions are used, preference should be given to the conditions mentioned in EN 22 233.*

## 7 Preparation of the packaging

Erect the packaging by direct folding and if necessary, assemble it according to the procedure agreed upon by the interested parties and compress it in the agreed direction.

## 8 Procedure

Wherever possible the test shall be carried out in the same atmospheric conditions as used for conditioning. In other circumstances, the test shall be carried out immediately after conditioning, with indication of the elapsed time in the test report.

**8.1.** Place the test packaging centrally on the lower platen of the compression testing machine, in the pre-determined attitude.

**8.2.** Start the compression testing machine and continue compressing until complete collapse of the packaging.

**8.3.** Note the maximum resistance of the packaging in N to three significant figures.

**8.4.** Unless otherwise specified, the deflection shall be measured on the force/deflection curve from a pre-load datum point of 5 % of the maximum resistance of the packaging, with a maximum of 200 N, see figure.

**8.5.** Unless otherwise specified, test at least 10 replicate packagings.

## 9 Test report

The test report shall at least include :

- a *Date and place of the testing*
- b *Reference to this FEFCO testing method*
- c *Number of replicate packagings tested*
- d *Full description of the packaging, including dimensions, structural and material specifications of the packaging and its fittings*
- e *Temperature, relative humidity*
- f *The particulars of preparation of the packaging covered by a special agreement, and attitude in which the packaging was tested using the method of identification given in EN 22 206*
- g *Conformance of the compression testing machine, including the relative speed of the platens*
- h *Measurements of the maximum resistance to compression of the packaging in N to three significant figures ; and if requested, associated deflections, or force/deflection recordings*
- i *Arithmetic mean and standard deviation of the results*
- j *Any deviation from the procedure specified in this testing method*
- k *Any observation which may assist in the correct interpretation of the results*
- l *Name and signature of the operator*

## Appendix

For packaging made up of several pieces each contributing to the overall resistance (i.e. full telescopic boxes, packaging with internal fitments, etc.), it may be useful to separately determine the resistance of its components according to this procedure and then to compare the resistance of the packaging to the sum of the resistances of its components.

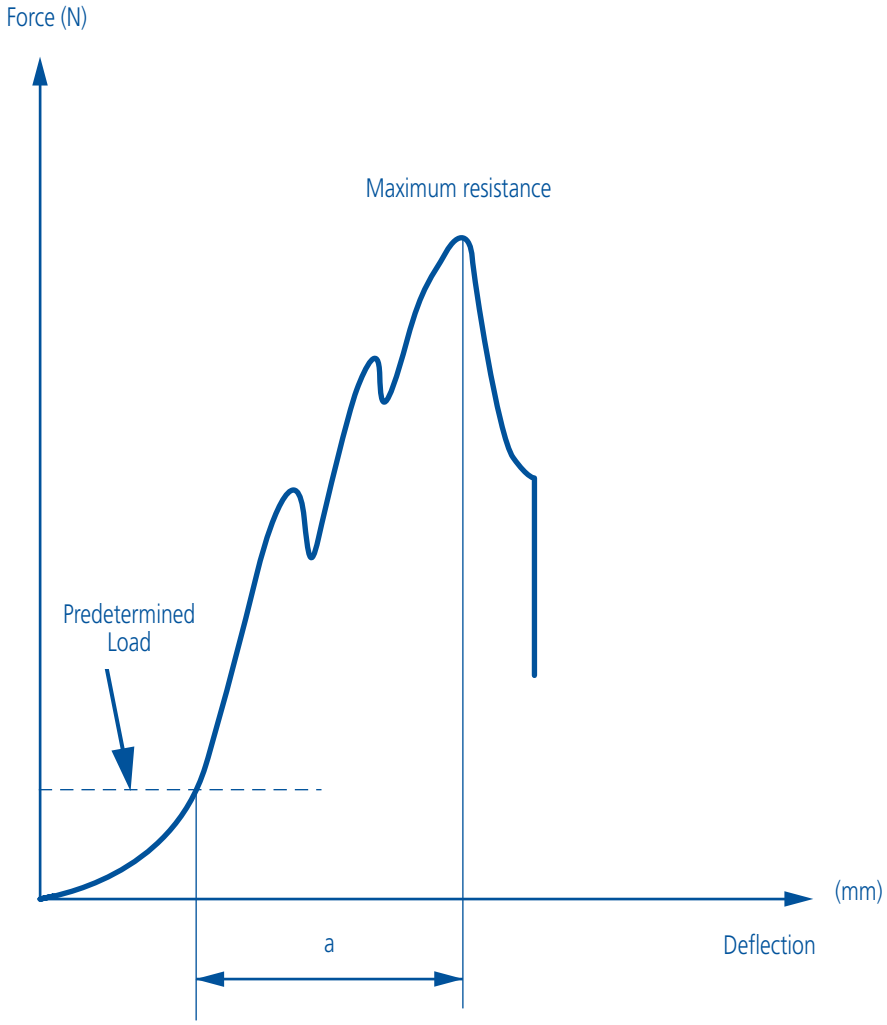
Force (N)
Maximum resistance
Predetermined
Load
(mm)
Deflection
a

*Fig. 1*