1982 (amended in 1989, 1994, March 1997)

Edgewise crush resistance of corrugated fibreboard

1 Definition

The edgewise crush resistance of corrugated fibreboard is the maximum compressive force that a test piece will sustain before being crushed, the test piece standing on one edge and the force being applied to the opposite edge under specified conditions.

The edgewise crush resistance of corrugated fibreboard can be very much affected by conversion of board into packaging. It is also affected when the packaging is in use. It is therefore important that the origin of the sample being tested is fully identified under 10. Test report.

2 Scope

To define the apparatus and test procedure used to determine the edgewise crush resistance of corrugated fibreboard. This method is applicable to all types of corrugated fibreboard.

3 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.

4 Principle

A rectangular specimen of the corrugated fibreboard is placed between the platens of a crush tester with the flutes perpendicular to the platens, and is subjected to an increasing compressive force until failure occurs.

The maximum force sustained by the specimen is recorded and the edgewise crush resistance calculated.

5 Apparatus

5.1. *Crush tester*

A power driven crush testing machine with horizontal platens designed to measure compressive force, shall be used.

For testing machines operating on the principle of beam deflection, see note.

5.2. *Platens*

The platens must meet the following conditions :

- *size large enough to take test specimens of 100 mm length*
- *deviation from parallel not greater than 1:1000*
- *lateral play not exceeding 0.05 mm*
- *flat with at most 0.1 mm deviation from the median plane.*

5.3. *Compression speed*

The tester operates with one fixed platen, the other having a direct positive drive, the rate at which the platens approach each other shall be 12.5 mm/mn ± 2.5 mm/min.

5.4. *Cutting equipment*

Cutting equipment designed to give rectangular test pieces with parallel, clean, straight edges.

The cutting shall be done perpendicularly to the flutes in one operation for instance by single bevelled knives which have a thickness of about 0.5 mm, used not more than 50 times or by a high speed rotary saw.

5.5. *Guide blocks*

Two rectangular, smooth finished, metal blocks, 20 mm x 20 mm, and at least 100 mm in length, to support the test piece and keep it perpendicular to the platens.

6 Sampling

Sample in accordance with FEFCO Testing Method N° 1.

7 Conditioning

Samples shall be conditioned accordance with EN 20 187 (i.e. 23° C ± 1° C, 50 % ± 2 % r.h.)
The corrugated board has to be conditioned before cutting, and to be kept conditioned throughout the test.

8 Preparation of test pieces

8.1. From the corrugated board to be tested, strips 100 mm ± 0.5 mm wide will be cut in the direction of the glue lines.

8.2. Out of these strips, perpendicularly to the glue lines, test pieces of 25 mm ± 0.5 mm nominal height will be cut. The maximum difference between any two dimensions having the same nominal value must not exceed 0.2 mm.

8.3. Unless otherwise stipulated, 10 test pieces of the board shall be tested.

8.4. When converted board is tested, test pieces should be free from converting machine marks, printing and any damaged areas.

9 Procedure

The test piece shall be placed centrally on the platen with its shorter edges perpendicular to the platens and supported by the guide blocks.

By operating the tester, the load is increased until the test piece collapses. The maximum load sustained is rounded to the nearest 10 N.

Calculate the edgewise crush resistance R, in kilonewtons per metre according to the equation below, where F is the maximum load, in newtons. L is the length of the test piece in millimetres (here L = 100).

$$R = \frac{F}{L} \text{ kN/m}$$

10 Test report

The test report shall contain the following details :

- **a** *Date and place of testing*
- **b** *Reference to this FEFCO Method*
- **c** *Description and identification of the product tested*
- **d** *Results of individual tests to be stated in kN/m*
- **e** *Arithmetic mean and standard deviation of all the replicate test results*
- **f** *A specific statement that a testing machine working on the principle of beam deflection has been used if relevant*
- **g** *Details of any deviation from this testing method*
- **h** *Any other information which may assist in the interpretation of the test results*
- **i** *Name and signature of the operator*

Note: when a tester operating on the principle of beam deflection is used, results are valid only if they occur between 20 % and 80 % of the maximum range of deflection, that can be measured with the beam and dial in question.

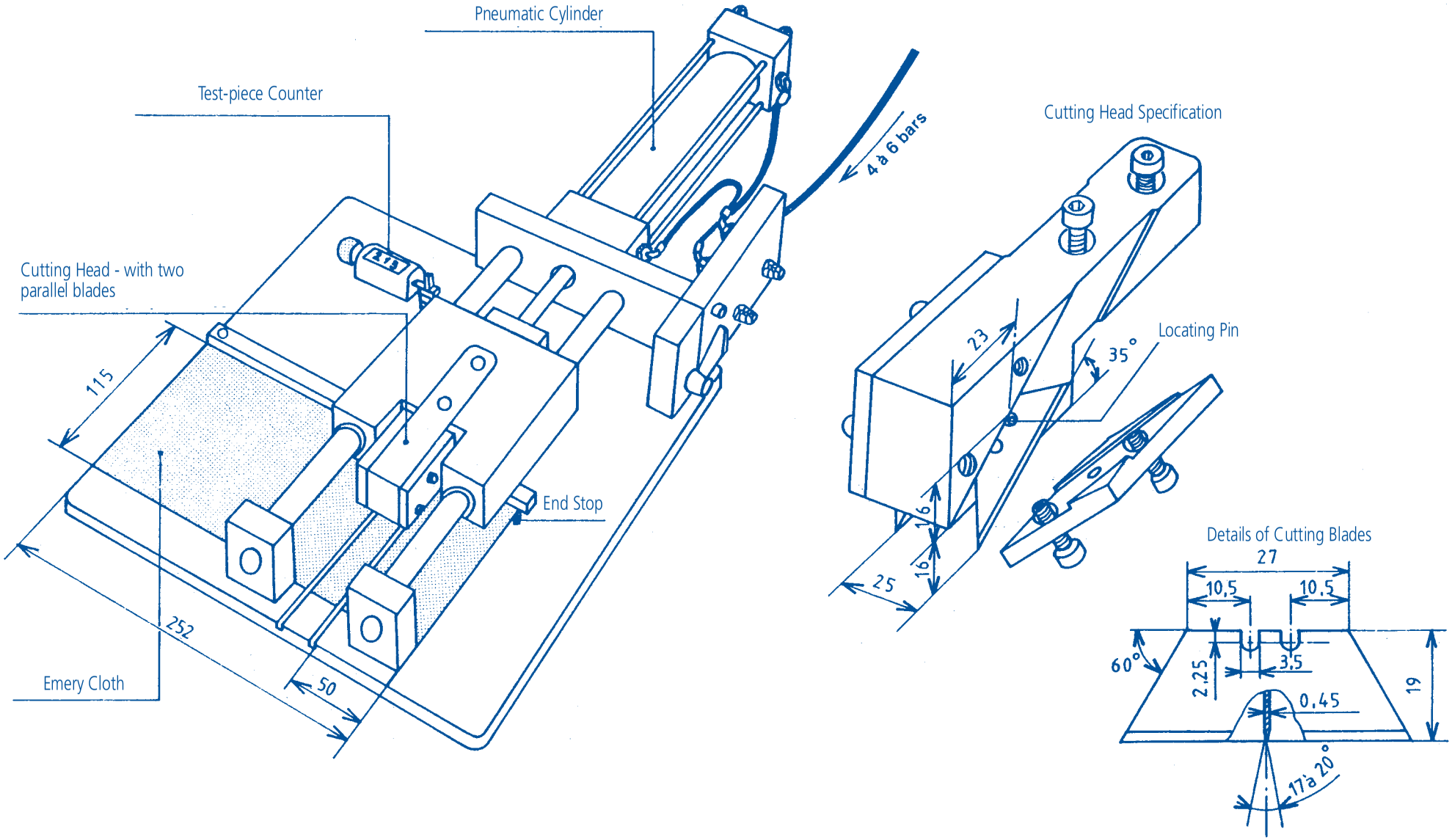

Fig. 1

Edge Crush Sample Cuttier