

EUROPA

needs a uniform

Corrugated Board Standard



Prof. Dipl.-Ing. R. Eschke
Institute for BFSV
at the Hamburg University of Applied Sciences Germany

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1. Background

Most of the European countries have a
Corrugated Board Standard

Examples of flute profiles:

Standard	Country	Flute profile B	Flute profile C	Flute profile E
SIS	S	Board thickness 2,4 - 3,0 mm	Board thickness 3,25 - 4,25 mm	not described
DIN	D	HEIGHT: Range: 2,2 - 3,0 mm PITCH Range 5,5 - 6,5 mm	HEIGHT: Range: 3,2 - 3,9 mm PITCH Range 6,8 - 7,9 mm	HEIGHT: Range: 1,0 - 1,8 mm PITCH Range 3,0 - 3,5 mm
GIFCO	I	Board thickness > 2,5 mm	Board thickness > 3,5 mm	Board thickness > 1,2 mm

2. Requirements for Corrugated Board

The enduser has requirements to the performance of the box!

from:

- the point of technical properties of the product**
- point of the price according to their own specification (Quality Management System)**

In the age of hard cost pressure, the enduser now more needs comparability of the offers. Otherwise there is a big risk that performance decrease to levels where the material is questioned.

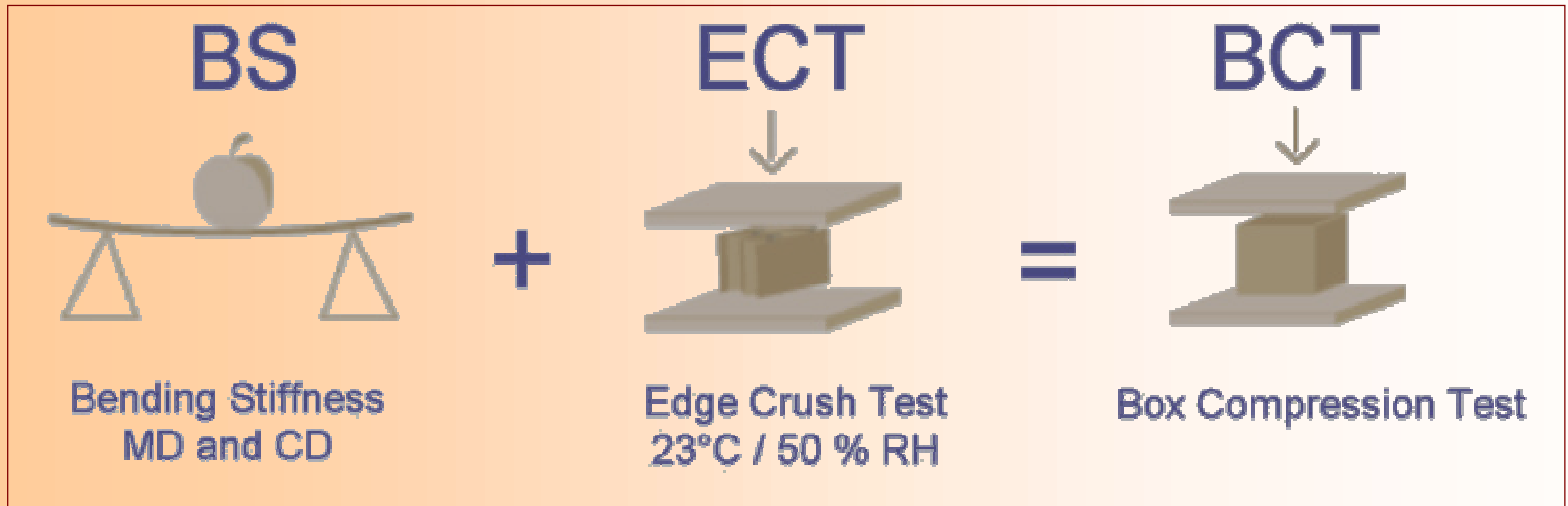
Development

On condition that BCT is the most important value for the enduser

it is necessary to calculate - Mc Kee Formula - and to measure the Box Compression Strength

Steps:

- ⇒ Calculation of Bending Stiffness of the board on the basis of the Tensile Stiffness of the used papers (MD and CD)
 - ⇒ Predicting of the Geometrical Mean Stiffness of the corrugated board (theoretical)
 - ⇒ Measurement of the ECT
 - ⇒ Measurement of the BS
 - ⇒ Calculation of the BCT
 - ⇒ Measurement of the BCT
- Comparision***



3. WHY we use the Bending Stiffness?

According to calculating and testing of other materials i.e. steel or plastics, we need test results with limits in the elastic/plastic area, that means:

- not destroying properties**

4-Point Bending Stiffness is a non destroying property and gives the relationship between the applied load and deflection within the elastic area!

4. Requirements of the Enduser

- * Specifications must be independent from the paper qualities and the corrugated board profiles
- * flute geometry must not be fixed
- * thickness of the board is necessary

5. Why we need the Bursting Strength ?

Bursting strength is needed for:

- ⇒ pulling resistance
- ⇒ lifting resistance
- ⇒ containing strength during distribution and enduser transport
- ⇒ opening
- ⇒ the production of Corrugated Board
 - crack resistance

6. Why we need ECT, Geometrical Mean of BS and FCT

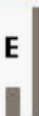






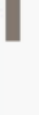



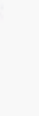




- *transportability*
- *stacking strength*
- *constant thickness of single wall corrugated board*

7. The new range of Corrugated Boards

independent from:

- ⇒ the used papers**
- ⇒ construction of the corrugated board**

Definition of the End Use Performance Standard

Flute geometry		EUPS code	Corrugated board properties ¹				BCT
			Geom BS ² (Nm)	ECT ² (KN/m)	BURST ² (kPa)	FCT ² (kPa)	
E		Board 10	0.7	4.2	700	500	
		Board 20	0.9	4.8	1 000	500	
B		Board 30	2.7	4.2	700	320	
		Board 40	3.0	4.6	800	320	
		Board 50	3.3	5.4	1 000	380	
C		Board 60	5.5	4.6	800	230	
		Board 70	6.5	5.4	1 000	300	
		Board 80	8.0	6.0	1 250	300	
BC		Board 90	9.0	7.0	1 500	370	
		Board 100	17	8.0	1 000		
		Board 110	22	9.5	1 450		
		Board 120	31	12.0	1 900		

¹ Testing methods » ² Average values

8. Test procedures and Standards

Testing method	Unit	Standards
ECT	kN/m	EN ISO 3037 / FEFCO 8:1982
4-point bending stiffness	Nm	ISO 5628:1990
Bursting Strength	kPa	EN ISO 2759 / FEFCO 4:1994
FCT	kN/m	EN 23035 / FEFCO 6:1985

We do not need the puncture test in the future!

9. Aim of the EUPS

- ⇒ Supporting performance selling with logical steps between the board grades
- ⇒ Providing a good selection of board qualities
- ⇒ Optimising material utilisation and box design
- ⇒ Reducing costs of the logistic chain
Calculation of the BCT
- ⇒ Cutting stock levels and transport costs
- ⇒ Improving board quality
- ⇒ Reducing waste ordering longer lengths in the corrugator