Chapter 6 Corrugated cardboard packaging
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6.0.0 Contents

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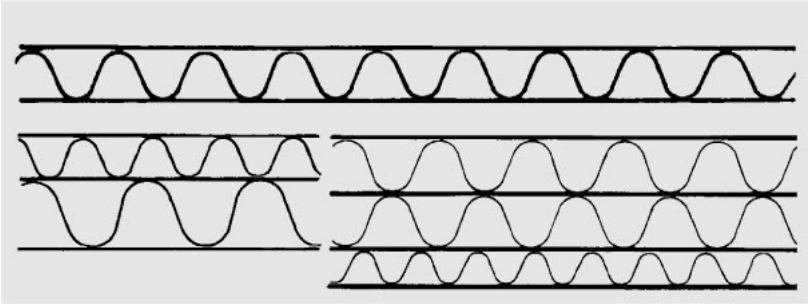
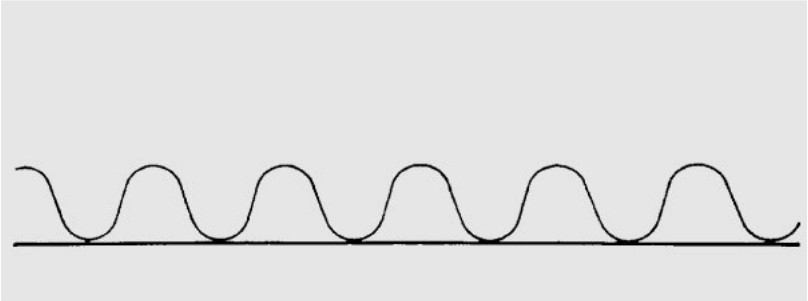
6.0.1 Introduction

Corrugated cardboard packaging is produced out of renable raw materials, which can be optimally integrated into cycles of valuable substances. The packaging material connects effective product protection with very low material usage and low weight as well as their outstanding mechanical processability. Therefore, their economical and ecological advantages are joint ideally. The good physical characteristics enable a wide range of applications due to the flute profiles and their combinations.
Corrugated cardboard is according to DIN 55405-2 cardboard made up of one or more layers of corrugated paper, that is glued to one layer or between several layers of paper or cardboard. Corrugated cardboard is distinguished between single-layer or multi-layer cardboard. Corrugated cardboard is manufactured-in a continuous automated process from pre-made paper and cardboard.

Structure of corrugated cardboard



The type of flute mainly used is the circular flute shape (sinus wave)



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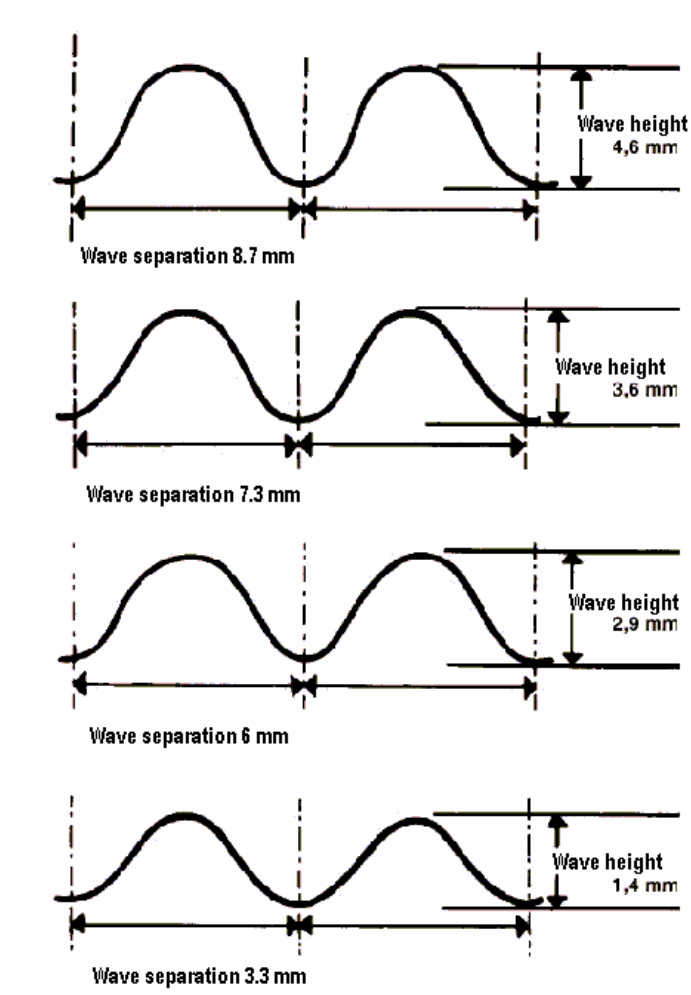
For corrugated cardboard the size of the flutes determines their nomenclature and their main point of usage.



Flute A (coarse) springs well, has good cushioning properties.

Flute C (medium size) is suitable for folding box boards, dimensions lie between the coarse and the fine flute.

Flute B (fine) is suitable for printing on sales packaging.

Flute E/F (finest) area of usage for e.g. solid fibre board.

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6.0.2 Application

The classification of corrugated cardboard in different types and their respective technical characteristics is illustrated in DIN 55 468-1.

Table: Abstract made from DIN 55 468-1 burst resistance, puncture test, and edge crush test of corrugated cardboard in use.

	Type	Bursting strength kPa	Penetration energy* J	Edge crush resistance- kN/m
single-layer	1.01 1.02 1.03 1.04 1.05		2,5 3 3,5 4 4,5	3,5 4 4,5 5,5 6,5
	1.10 1.20 1.30 1.40 1.50	600 850 1 100 1 350 1 600	3 3,5 4 4,5 5	3,5 4 4,5 5,5 6,5
multi-layer	2.02 2.03 2.04 2.05 2.06		5,5 6 6,5 7 7,5	6,5 7 7,5 8,5 9
	2.20 2.30 2.40 2.50 2.60 2.70	850 1 100 1 350 1 600 1 900 2 200	6 6,5 7,5 8,5 9,5 10,5	6,5 7 8 8,5 9 9,5
	2.90 2.91 2.92 2.95 2.96		15 18 22 27 30	14 16 18 21 24
Note: strength parameter do not apply to cardboards only from waves D,E,F and G				
* For single layer cardboard in flute type B the indicated values of the sort reduce by 10%				

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6.0.2 Application

The broad application spectrum for corrugated cardboard packaging ranges from small size packaging (e.g. for samples) to IBCs (e.g. octagonal box). Corrugated cardboard packaging is used as primary and secondary packaging. The standardised types are laid down in international codes (ASSCO and FEFCO).

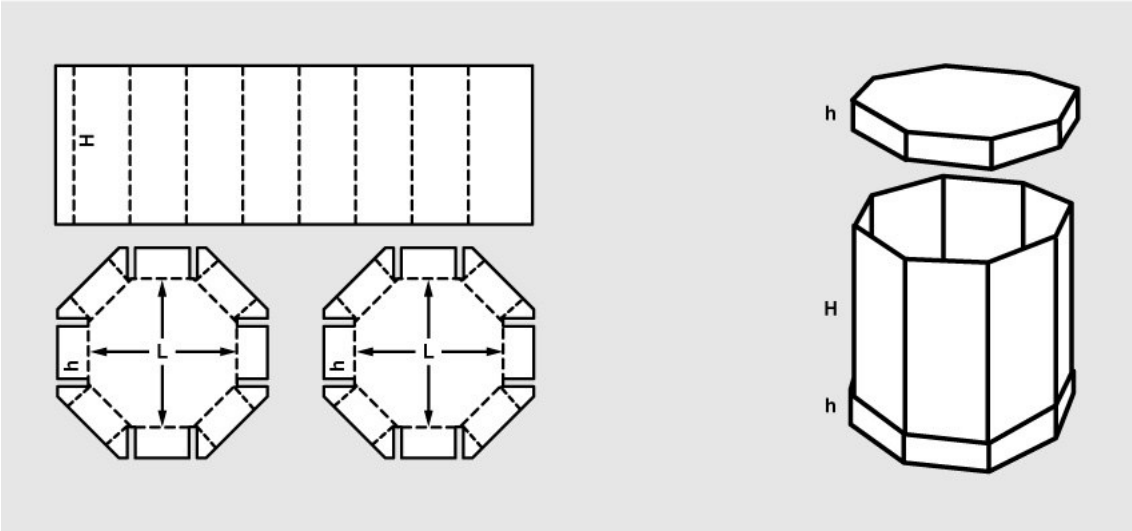

Fig. 1 Octagonal box

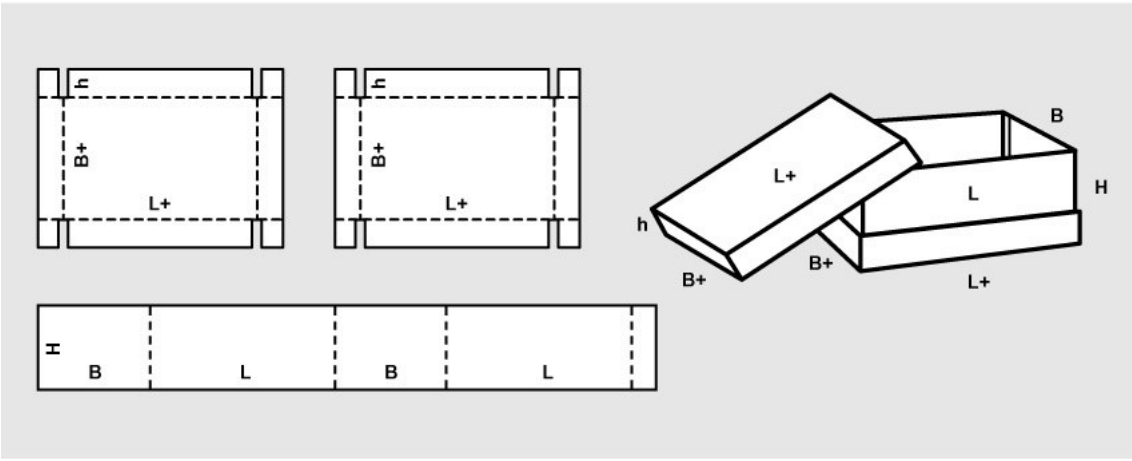

Fig. 2 Hooded lid box

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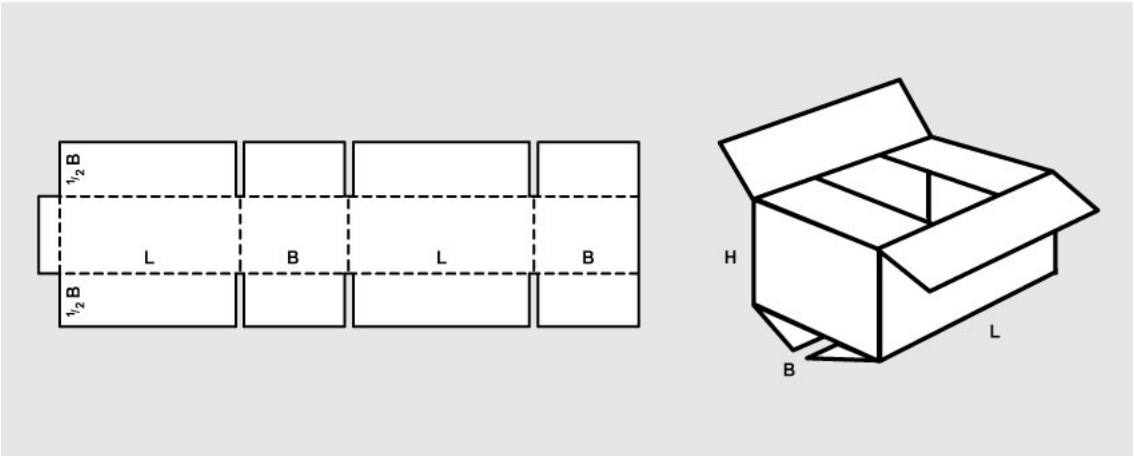

Fig. 3 Corrugated cardboard folding box

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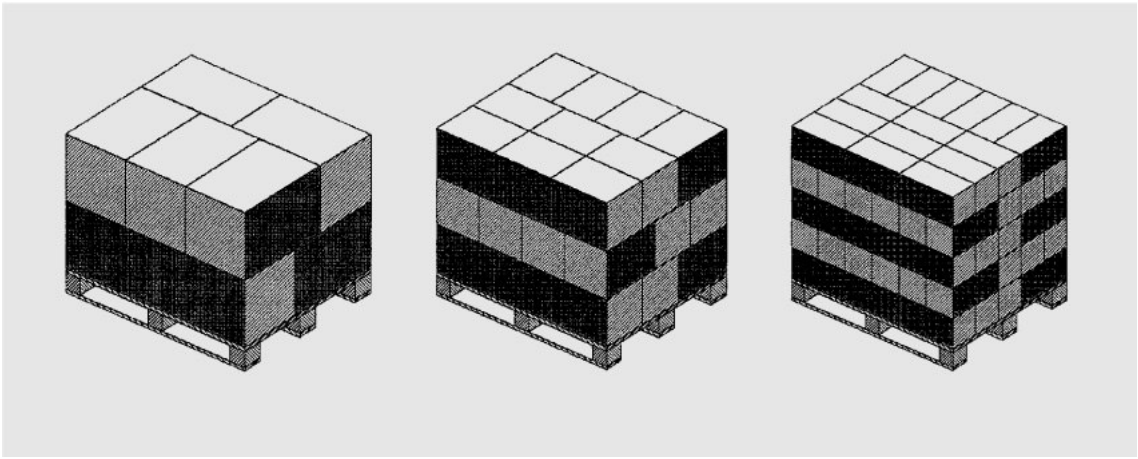
6.0.3 Module systems

A better usage of the mans of transportation can be achieved when using module systems, i.e. usage of corrugated cardboard boxes with base area dimensions of 600x400 mm or a conjugation of them.
CP 1 and CP 2 pallets are adapted to this module system.

Examples for loadings of a CP 1 pallet:

600 x 400 400 x 300 400 x 200



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6.0.4 Approval for hazardous substances

Corrugated cardboard packaging is possible for the transport of hazardous substances in type-approved and UN-certified types. (Further information see chapter 1.3).

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6.0.5 Quality requirements

Information on quality assurance can be taken from chapter 9.

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6.0.6 Return systems

Information on return / recycling systems of used packaging can be taken from chapter 10.6.