

Table 26.2 Structure of coated chromoboard.

Component	Thickness (g/m <sup>2</sup> )	Proportion (%)
White coating	20	5.0
Bleached cellulose: white covering	60	15.0
Mechanical wood pulp: middle later cream	260	65.0
Bleached cellulose: white back	55	13.8
Pigment preparation	5	1.2
Total	400	100

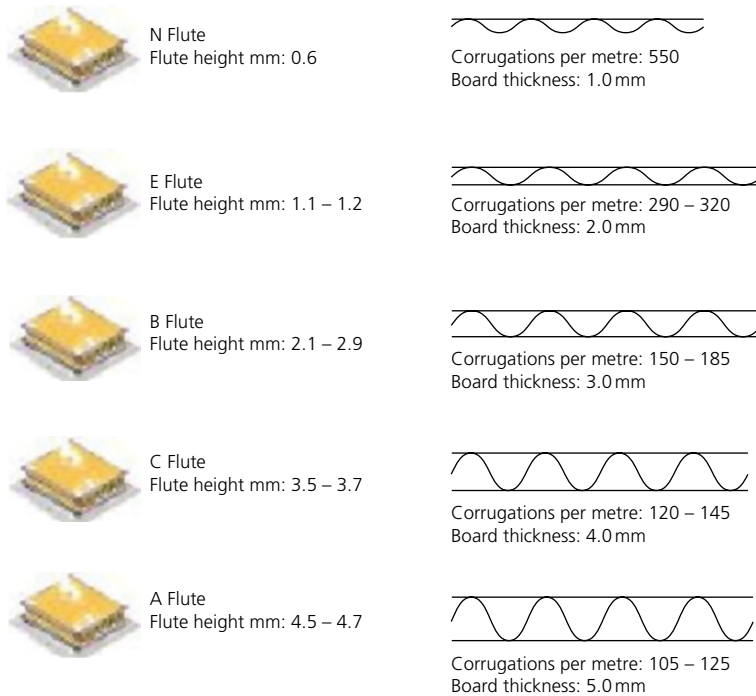
The finished slurry is dried out in sheet form and passed through rollers to make paper or built-up in layers to make board. The layers can be of different qualities, making a multilayer sandwich by including different materials, such as reclaimed waste paper and pure fibres. If the board or paper is to be printed, it normally has a top layer of good-quality bleached fibres plus a coating of china clay-containing pigment such as titanium dioxide and possibly an optical brightening agent. This is known as coated paper or board, and many different types and qualities are available.

Different chemical techniques can produce glassine, in which the fibres are completely destroyed, giving a very high degree of resistance to oil and grease in the final product, but making the paper relatively weak. Glassine can be formed into rudimentary shapes by heat and pressure, producing, for example, paper cups into which chocolates can be placed or into which very fatty product such as noisette can be directly deposited. Glassine is frequently used laminated to board, in order to protect it from fat penetration and staining. It can also be incorporated in a non-heat sealed wrap to stop fat migration from chocolate bars in hot climates. Glassine in corrugated form is also in widespread use, ranging from sincor (wave-embossed) to single- and double-faced fluted material to provide cushioning inside boxed chocolates.

Similar cushioning, but of rather coarser quality, can be achieved by using corrugate made from greaseproof or vegetable parchment. The latter is produced by the action of concentrated sulfuric acid on wood pulp, giving greater strength along with grease resistance.

In many instances, cartonboard outers are packed into shipping cases for distribution, particularly where rail or sea transportation is involved, and here corrugated board is used. No other material offers corrugated board's unique combination of product protection, stacking strength, printability, lightweight and relatively low cost.

In general, corrugate board is made of two plies of liner material separated by a layer of fluting or corrugating medium. The fluting is formed from the flat material by huge meshed rollers: glue is applied to the tips of the fluting and the liners are then stuck on. Usually this is done on one long machine, which also prints the finished material and cuts it into the appropriate shape for the finished



**Figure 26.14** Common flute grades.

case. The type of corrugate is described by the number of flutes per centimetre or foot. The most widely used version is B-flute, which has some 1.7 flutes/cm (52 flutes/ft). For smaller boxes where a finer material and more decorative surface are required, E-flute, with 3.2 flutes/cm (98 flutes/ft), is often used; even finer “microflute” such as F- and N-flute are now also available. The most common flute grades are shown in Figure 26.14.

Depending on the use to which the finished box is put, many different qualities of material can be used for the liners, ranging from heavy-duty kraft down to glassine or greaseproof. The liners also have different characteristics: colour natural, white top, mottled, fully bleached, printability (e.g. clay coated) and barrier (e.g. PE laminate).

*Kraft liners (virgin fibre-based):*

- Typically 70% virgin soft wood fibres and 30% recycled fibres;

*Test liners (recycling-based liners):*

- Typically 100% recycled fibres;

*Test liners are divided into different classifications:*

- Test liner 2 Corrugated factory recovered paper,
- Test liner 3 Supermarket recovered paper,
- Chip: the cheapest test liner grade based on urban recycled fibres.

When deciding which combination of liner and fluting to use, the first question to be asked must be: does the corrugated box take the load or does the product