Quality embossing, blind or foil embossing, preprinted metal foil, and holograms add the touch of class needed for the promotion of luxury products such as greeting cards, covers, folders, etc.

Even though all types of paperboard can be embossed, there are restrictions due to the construction and composition of the paperboard. The paperboard has to be strong and tough, but rigid and elastic at the same time. The finer the detail and the deeper the depth of embossing needed, the fewer types of paperboard grades there are available that will successfully fulfil the requirements.

Metallic foil can be used independently in foil printing or holograms or in combination with embossing for promotional reasons. Stamping foils have an effective metallic finish that make an immediate and striking impact.

If the relief pattern is to be covered with metallic stamping foil, the two operations are carried out simultaneously to minimise the risk of misregister between the relief and the foil.

Embossing means the shaping of paperboard into well-defined permanent relief patterns. If the paperboard is dense and strong, embossing can be done with complicated patterns and with pronounced relief. Often the embossed surface is printed or foiled. If the relief is raised, it is defined as positive. If the relief is impressed, it is negative. The possible patterns obtained by embossing are almost limitless. Some types of relief are shown in the illustration here.

Embossing can also be applied as a pattern covering the entire surface, for example paperboard embossed with a linen structure.

Please refer to the fold-out at the end of this manual for an example of embossing.

Description of the embossing method
The embossing stamp (or die) is specially produced for every embossing operation. The paperboard grade and the relief shape and depth are of major importance for the stamp construction.

The embossing operation is carried out with heat and pressure to make the relief precise and permanent. The embossing tool is a thin metal sheet with the surface shaped as the relief pattern and the make-ready with the inverted pattern. The embossing stamp pushes the paperboard into the groove of the make-ready, which is located under the paperboard, and embosses a permanent relief.
A relief pattern can be 0.15 to 2.5 mm high or deep. If hot foil stamping is performed at the same time, the relief can be 0.25 to 0.60 mm. By using both raised and immersed reliefs in the same pattern, a visual effect of a greater depth will be obtained.

**Key paperboard characteristics**
The impression from the tool will be accurate, precise and permanent if a strong and dense paperboard is used. The paperboard must allow a high degree of elongation without cracking but also retain permanent deformation after the impression. This is known as having good formability.

Paperboard with a uniform density throughout the different layers contributes to the quality of the embossing. The strength and elongation of the paperboard permit complicated patterns and large deformations without any visible damage.

**Different paperboard ply constructions**
Good formability is enhanced by the length of the fibres in the paperboard and their ability to bond together. In this respect, the ideal paperboard should consist of chemically processed long fibres. High elasticity of the coating is also important to avoid surface cracking. For this reason, Solid Bleached Board can reproduce advanced designs with relief exceeding the thickness of the paperboard. Folding Box Board is also capable of giving embossing results which meet design needs.

**Key properties**
Key paperboard features for embossing operations are:
- strength
- elongation
- toughness
- moisture content
- thickness
- density.

### Relief patterns

#### Material | Production technique | Durability | Configuration
--- | --- | --- | ---
Brass | Engraved | ++++ | Multi-level
Copper | Etched | +++ | Mostly single level
Magnesium | Engraved | ++ | Limited multi-level
Magnesium | Etched | ++ | Only single level
Embossing in practice
If the relief has only small differences in levels, the machine speed can be higher. There will also be fewer problems with stacking and further converting the embossed sheets. Embossing of plastic-coated or laminated paperboard must be carefully tested.

The paperboard moisture content is essential for good formability. It is therefore important to prevent the paperboard drying out.

The tool preparation is usually specific to a particular paperboard grade. This means that it is very difficult to use the tool with other grades.

To achieve the best results we recommend that you always give your tool supplier a sample of the substrate you intend to use. When producing the tool there are a number of factors to take into account. The run length will determine the choice of material for the stamp. The grade and grammage of paperboard will determine the design of the make-ready.

FBB-type paperboard (Folding Box Board) is somewhat more compressible than SBB-type (Solid Bleached Board) and will therefore absorb some of the pressure within its structure. The make-ready needs to compensate for this, i.e. it needs to be properly adjusted to both the compressibility and the thickness of the substrate.

Therefore please note that we recommend you purchase the make-ready as well as the stamp from your tool supplier rather than use a do-it-yourself material (e.g. a make-ready board or a moulded make-ready from a one- or two-component paste). A do-it-yourself make-ready will only withstand short run lengths. Even more important, it will not provide the required precision, that is, you will not be able to adjust the make-ready properly to the board.

Testing the embossing result
The embossing result is subjectively evaluated regarding defects, cracks, etc. See below.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
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| The blanks tear during the embossing operation. | • Paperboard too dry.  
• Combination of paperboard strength/flexibility and embossing height is incorrect. |
| The pigment coating cracks and peels off during embossing. | • Coating adhesion insufficient.  
• Coating too dry or the surface structure is too rough.  
• Coating too weak or too brittle. |