Recommendations

For the best visual appearance of the foil, it is important to have a clean and very smooth paperboard surface with a minimum of interfering surface irregularities, since these are strongly accentuated when foiled. The tool's ability to conduct heat and the smoothness of the tool surface are equally important factors. To produce the best gloss during longer runs, the surface of the tool should be polished.

Key paperboard features when performing hot foil stamping are:

- smoothness
- surface appearance and surface finish
- adhesion
- surface strength
- flatness and dimensional stability at the specified moisture content.

Embossing and debossing in practice

Embossing and debossing involve shaping the paperboard into well defined permanent relief patterns. Embossing creates a raised pattern and debossing creates an indented pattern. Both these methods create strikingly impressive design results. They can be applied to cover the entire paperboard surface or used to achieve pronounced relief patterns.

The embossing and debossing operation

Embossing and debossing are done at high pressure to make the relief patterns precise and permanent. The tool consists of a stamp and a make-ready (or counter die) onto which the relief pattern and its mirror image are respectively etched.

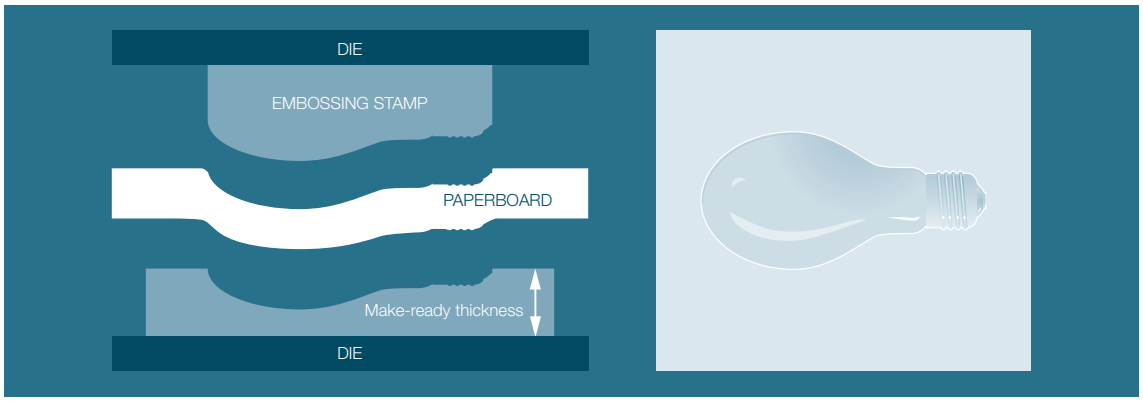
A relief pattern can be 0.15 to 2.5 mm high or deep. If the relief has only small differences in levels, the possible machine speed will be higher and stacking the finished sheets will also be easier.

Embossing and debossing may be carried out either "blind" or combined with other techniques.

Embossing/debossing principle.

Tool preparation

The tool must be specially produced for every embossing operation. The paperboard grade and thickness as well as the relief shape and depth are of major importance for the tool construction. Therefore tool preparation is usually individual for a specific paperboard grade and grammage, which means that it is very difficult to process different grades with the same tool.

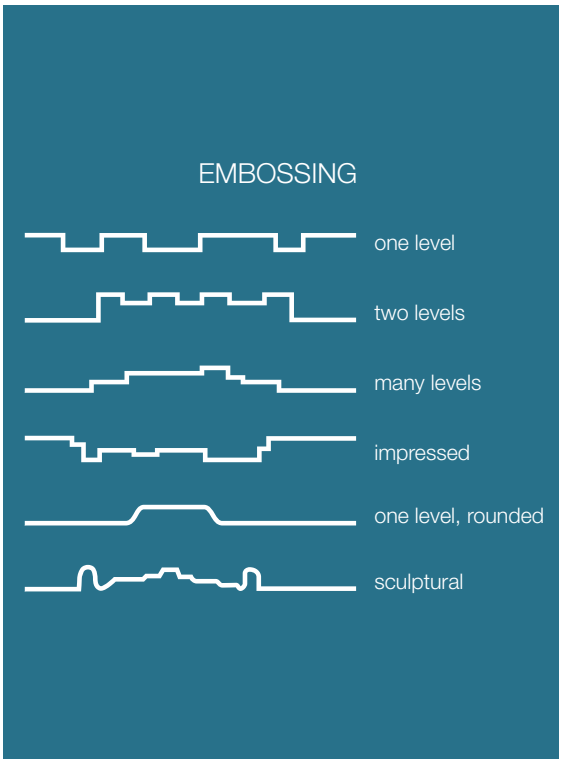


Details of an embossing stamp.

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.



Examples of different embossing and debossing configurations.

Material	Production technique	Durability	Configuration
Brass	Engraved	++++	Multi-level
Copper	Etched	+++	Mostly single level
Magnesium	Engraved	++	Limited multi-level
Magnesium	Etched	++	Only single level

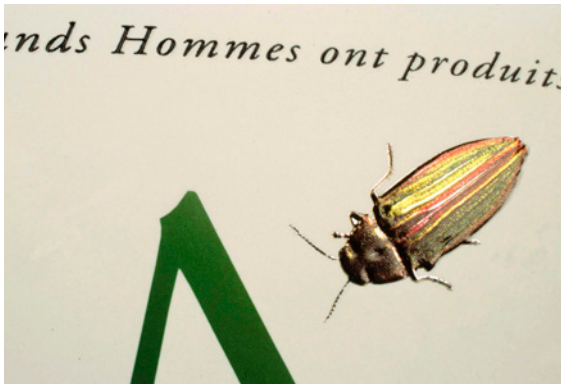
Recommendations

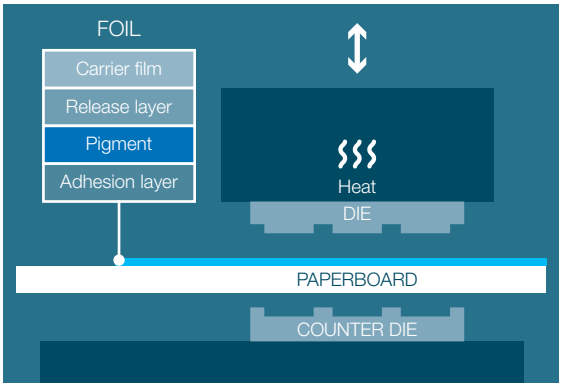
All types of paperboard can be embossed or debossed but their individual construction and composition do pose limitations on achieving optimal results. To achieve an accurate, precise, and permanent impression from the tool, you need to use a paperboard that is strong and rigid enough but also elastic. The paperboard must “forgive” a high degree of elongation without cracking but also retain a permanent deformation after the impression, i.e. have good formability. To avoid surface cracking, high elasticity of the coating is important.

The finer the details and the deeper the relief required, the fewer types of paperboard exist that can successfully fulfil the requirements. Paperboard made from chemically processed long fibres will satisfy all these requirements. A fully bleached paperboard gives the best result for a deep relief, thanks to its multi-ply construction and its long, strong fibres. The board’s density, strength and elongation permit complex patterns and large deformations without any visible damage. Uniform density throughout the different layers contributes to the quality of the embossing. There will be a permanent relief and no cracking.

Foil embossing and other combinations

Embossing and debossing are often combined with other creative methods such as print, varnish, or film lamination. If so, the embossing/debossing operation is the last one to be carried out. However, if the relief pattern is to be covered with metallic stamping foil – hot foil stamping – these two operations are carried out simultaneously (foil embossing) to achieve perfect register between the relief and the foil. In this case the depth of the relief can range from 0.25 to 0.60 mm.





Details of tools and materials in a foil embossing operation.