Handling paperboard

When working with multi-ply paperboard and handling it properly, the reward will be a material with superior properties in all areas of manufacture. The multi-ply construction is the basis of many of the excellent characteristics that help to achieve the best quality and runnability in the printing and finishing operations. The multi-ply construction also requires a few special – but very important – precautions when it comes to handling.

Board, moisture, and flatness
Paperboard is sensitive to changes in humidity. The main factor for retaining the original characteristics of the paperboard throughout all production steps is to maintain its original moisture content. Paperboard is manufactured to be flat in a defined environment of 50% relative humidity at 20 °C. Exposure to variations of humidity will result in a change of paperboard shape or dimensions. Drying out will make the paperboard more brittle.

Prior to printing/converting
A relative humidity of 45–60% at a temperature of about 20 °C in the production areas is recommended to prevent curl and/or misregister. Leave the moisture proof wrapping on the pallet or reel up to the point where the paperboard is to be converted. The wrapper ensures protection against moisture changes, but only as long as it is undamaged. The moisture-proof wrapping must also not be removed until the paperboard has attained the temperature of the converting environment. Recommended warming-up times are given in the following table.

When cold paperboard is exposed to a warm environment the air adjacent to the board can be cooled below its dew point (point of condensation) and this moisture is then absorbed by the board. The time for the temperature equilibrium to be established varies depending on the temperature difference and the weight of the board (pallet or reel).

After printing/converting
Paperboard in sheet form should be rewrapped with moisture-proof material after printing. The printing process can cause a reduction in the paperboard’s moisture content, especially when the sheet has been IR or UV dried. In this case if the temperature of the pile reaches more than 60 °C and the paperboard is not properly protected, then the result could be a loss of moisture to the environment during cooling. Rewrapping is particularly important in order to ensure good register when the paperboard is printed in two or more passes through the printing press. It is also important to wrap in this way to achieve good register between the print and the next process, e.g. cutting and creasing, guillotining or bookbinding. Paperboard products should be wrapped in moisture-resistant material after conversion and prior to shipment to the customer (end user) or to further conversion operations.

Keeping the equilibrium moisture and thereby the flatness and stability is important for the converting line efficiency. Printing presses and packaging lines can only be tuned to a degree to accommodate curled, twisted or brittle material. The most sensitive operations where a well-balanced and flat paperboard plays a vital role are:
- in-feed in a printing press or post press operations
- sheet transport between print units
- delivery/stacking in a neat pile to accommodate efficient post-press converting
- register between print units, both sheet-fed and reel-fed
- accuracy and register in die-cutting and embossing
- consistent result from creasing operations
- predictable and undisturbed runs in a folding/gluing operation
- accuracy in final carton shape or cover alignment in bookbinding
- uninterrupted carton erection prior to filling.

Handling during operation
Multi-ply paperboard needs to be handled with caution or it can easily be damaged. One particular damage is the cigar rolls (or roll backs) caused by the rolling-up of the top layer of a sheet. Should you need to restack the paperboard, avoid sliding stacks of paperboard across the edges of the rest of the pile; this may tear the surface and create cigar rolls. This risk is evident when using ream-wrapped material.

<table>
<thead>
<tr>
<th>Pallet or reel weight (kg)</th>
<th>Temperature differences board – printing room (print room temp. about 20 °C)</th>
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</thead>
<tbody>
<tr>
<td>400</td>
<td>10 °C: 2 days</td>
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<tr>
<td></td>
<td>20 °C: 2 days</td>
</tr>
<tr>
<td></td>
<td>30 °C: 3 days</td>
</tr>
<tr>
<td>800</td>
<td>10 °C: 2 days</td>
</tr>
<tr>
<td></td>
<td>20 °C: 3 days</td>
</tr>
<tr>
<td></td>
<td>30 °C: 4 days</td>
</tr>
<tr>
<td>1200</td>
<td>10 °C: 2 days</td>
</tr>
<tr>
<td></td>
<td>20 °C: 4 days</td>
</tr>
<tr>
<td></td>
<td>30 °C: 5 days</td>
</tr>
</tbody>
</table>
Precautions should also be taken when guillotining material, when sliding the paperboard stack over a worn cutting stick may damage the bottom sheet in the same manner.

The problem of cigar rolls can be prevented entirely if the board is stacked directly on the pallet at the board mill and the pallet is then directly fed into the printing press, then cigar rolls will not be seen.

To prevent damage to the effects of a corona surface treatment it is important to avoid contact of any kind with the surface of the extruded/laminated board prior to conversion.

**Storage and age**

Paperboard manufactured from virgin fibres will change little over time when properly stored, i.e. stored at the correct temperature and equilibrium moisture. Virgin fibre paperboard, when stored in such a way, will show little or no change in mechanical properties and only marginal change in surface or optical properties; these changes are more noticeable in FBB products when compared to SBB products. In general the above applies to converted creased blanks in store, however, particular attention must be paid to tight stacking and protective wrapping of flat stored blanks to ensure the moisture equilibrium is maintained and avoid shape distortion.

Iggesund Paperboard recommends a maximum of 1 (one) year time limit, from delivery, for paperboard in store and 6 (six) months for all corona-treated material.