Control the washboard effect

FAG CORRCHECK – a new measurement technology for corrugated

The success of any packaging is linked closely to its appearance. The global market leads to stronger competition and more similar products to be offered to potential buyers. The appearance of the packaging is the only possibility to make your product stand out from all the others. Plastics, metal, glass, wood, cardboard and corrugated are possible materials to design the packaging for your products. In addition lamination, printing and labeling can give additional value to your packaging.

Corrugated offers several unique advantages compared to other materials. Corrugated is high in strength while low in weight. High volumetric efficiency is achieved through high stacking strength and compact, flat size for transportation. It is flexible in box design, low cost even in small volume and environmentally friendly. Corrugated offers excellent protection for the product whether used as simple shipping container or as a consumer presentation package.

Figure 1: Corrugated packaging.

You can print on corrugated. Printed corrugated often shows a fluting defect (Stripyness), a consequence of the washboard effect on the liner of the corrugated.

The washboard effect, an undulating surface of corrugated card board, is an undesired effect resulting from the corrugated cardboard manufacturing process. The washboard effect can be seen also on corrugated before printing. Fluting defects (Stripyness) are the combination of washboard effects and printing problems including gloss variations, dot gain variations, density variations and trapping variations.

Figure 2: Washboard effect and fluting defects (Stripyness) on packaging is a message about the quality of the product itself.

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Corrugated board is produced by applying glue to the peaks of the flutes and bonding them to the liner. As the glue dries it shrinks, stretching the liner into the valley between two flutes. The more glue applied, the more water has to evaporate, the more the liner will be stretched, the more washboard effect will appear. There exists a linear relationship between the amount of glue and washboard effect.

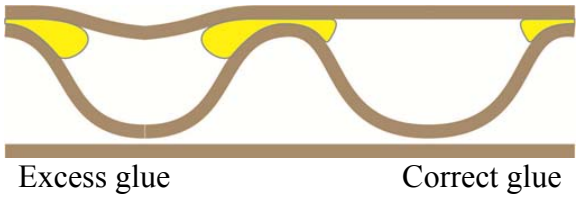

Figure 3: Relationship between amount of glue and washboard effect

The moisture content of the air, the paper, and the glue influence the quality of the finished product. High atmospheric humidity, high moisture content in the paper fiber, and high moisture content in the glue will swell the cardboard and reduce the amount of glue applied to the construction. There is a linear relationship between water content and washboard effect: the higher the water content, the lower the washboard effect is.

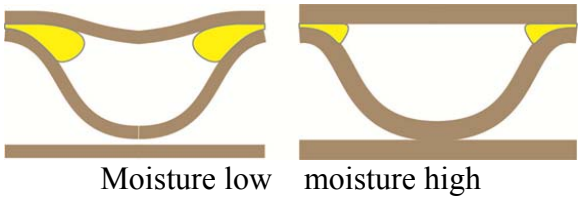

Figure 4: Relationship between moisture and washboard effect

There is a limit in applying water to the process, however. The water needs to evaporate during drying, thus slowing down the process and occasionally damaging the cardboard surface. Side effects like Cockling or Honeycomb may appear when the water content is too high.

Figure 5: Cockling and Honeycomb effect due to excessive moisture

Because every corrugator differs in size, age, components involved, format, and many other parameters, it is essential to find the optimal settings to control the process and to keep the process constant.

Process variations and washboard effect can lead to high costs because of waste, idle machine time, discussions with customers, additional bad quality rebates, and loss of image.

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A simple number, quantifying the washboard effect in a repeatable, easy to understand manner is needed. Like in other applications such as color or density control, this number can be used in contracts. Agreements about the quality can be easily defined.

To meet this requirement the manufacturer of Quality Control Solutions. The FAG ***CORRCHECK – Corrugated Checker***. The FAG CORRCHECK is a camera based, hand-held tool that measures the surface of corrugated in a non-contact manner. In a few seconds the microscopic undulating surface is analyzed over approximately 1.6 inches taking more than 6.000 depth measurements. The resulting washboard effect number **WBE** is displayed with a resolution of 1µm.

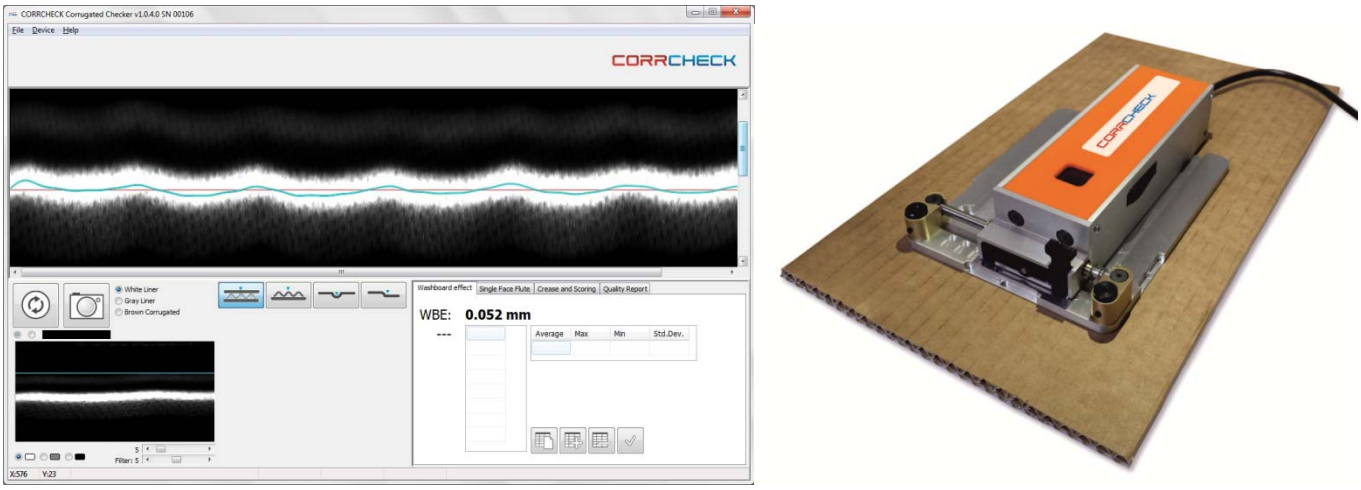

Figure 6: CORRCHECK – the ideal measurement tool for corrugated card board

For the first time in the world, the FAG CORRCHECK enables you to measure your cardboard directly as it comes out of the processing line. There is no need to prepare samples for measurement. Simply place the device onto the surface and start to measure. If the resulting WBE is higher than allowed, corrective actions can be taken immediately.

Preliminary testing in real-world applications are showing an excellent correlation with the visual appearance. Depending on the application and the corrugated composition, different target WBE numbers are typically used. An objective measurement tool for washboard effect will allow you to define your quality parameters upfront, as is done for most other production parameters.

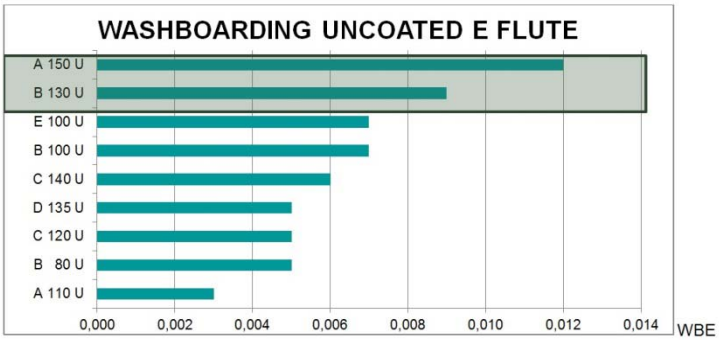

Figure 7: High end application: WBE > 0.007 is visible

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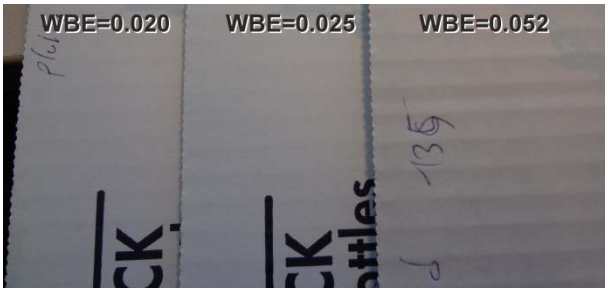

Figure 8: Same packaging – different top liner.

The FAG CORRCHECK offers new possibilities to the corrugated packaging industry in becoming more competitive. It is now possible to offer consistent high quality products to packaging buyers. As in any other production environment there is a simple truth: Quality means measure, measure, measure.

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