cph Deutschland Chemie GmbH • Heinz-Bäcker-Str. 33 • 45356 Essen

Bonding Price Labels to Bottles/Peel-off Labelling

Tips & Tricks No. 8

Definition of defects and effect

Almost all products carry data concerning contents, as well as additional information, on the containers or the packing into which they were filled. Thus is it is important that the customer should find the packed commodity in perfect condition because, according to investigations by sales psychologists, a close relationship exists between the external appearance of the product and the purchase decision. However, there are also examples where the visual appearance is correct, but which can nevertheless subsequently give rise to complaints, regardless of the quality of the contents. An example of this could be promotional labels, which are applied to bottles with a special adhesive. They must withstand damage through the various stages up to distribution. Up to this point the labels must be firmly fixed onto the bottle, i.e. adhere firmly so that they cannot easily be removed. In the case of promotional/peel off labelling, however, the label must be capable of being replaced easily, since either there is information which is important for the purchaser on the back of the label or the whole label as such may possibly have a certain value as a collectable.

Causes and remedies

In these cases it must be possible to remove the label easily by hand. A special release coating must be applied to the back of the label to enable this to be done. For this, it is important that the type of adhesive be matched correctly to the system as a whole and the minimum spread of the type of adhesive plays a large role. In the case of label printers, which are breaking new ground here, appropriate preliminary tests and agreements with the adhesive manufacturer are necessary.

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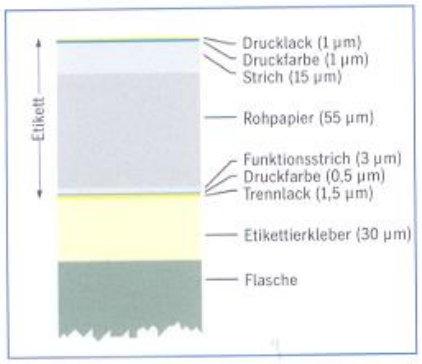
Practical example

The front of a promotional /peel off label was four-coloured printed and inline release-coated. On the back a money token was printed in a single colour. The purchaser was assured that by collecting one hundred of these labels he could redeem the printed amount. For this system to work, a release coating, which would, of course, remain in contact with the labelling adhesive and/or the bottle after peeling off the labels but which would prevent full adhesion of the label, was applied to the back of the label wet on wet in two printing units (the complicated structure of such a label is shown in the illustration). After the bottles were distributed to the drinks sector the first complaints soon arrived. In some of the bottles the neck labels did not separate, although on looking at the back of the bottle the requirement for collecting could be clearly seen. Attempts to remove the label from the bottle to led to its complete destruction. The objections built up, so that legal actions were anticipated.



Schematischer Aufbau des Etiketts.

Investigations

Visual evaluation: With the bottles considered as "good" the neck labels could be removed cleanly from the glass surface without leaving paper residues, while the labels complained of remained partially or completely stuck. Afterwards, it was no longer possible for the printer to state when the labels were produced or which batch of paper was used. However, it was possible with complete certainty to determine which release coating (D) was used for the faulty labels.

Comparative examination of the papers used in the case of the order gave no indication of the cause of the defect. Moreover the two release coatings used were found on chemical examination to contain essentially identical materials. Since these investigations gave no indication of the cause of the problem which had occurred, recourse was had to the influence of the quantity of release coating applied. To this end test coatings and subsequent adhesion tests were carried out. A series of weighed printings with the materials used for the stickers were conducted on a test printing machine (two papers and two release coatings C and D). The coatings were applied by wet-on-wet printing with quantities of 1.0 g/m², 2.5 g/m² and 3.5 g/m².

Adhesion tests: different paper samples with

1. different release coating spreads and

2. original labels – indicated as "good" and "complained of" –

were submitted to a comparative, defined adhesion test using the labelling adhesive employed. The adhesive was applied with a notched blade to a layer thickness of 10 µm and/or 50 µm on the backs of the labels to be tested. The labels were then applied immediately.

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Summary evaluation of the adhesion tests:

- The adhesive spread had no influence on the test result.
- With original labels designated "good" there was slight adhesion on peeling off but complete separation was possible without paper residues.
- The faulty labels adhered firmly.
- With a release coating spread of 2.5 g/m² and/or 3.5 g/m² a perfect release could be obtained with both coatings. A minimum spread of 2.5 g/m² is required by the release-coating manufacturer.
- At a spread of 1.0 perfect separation of the samples showed up on use of coating type C, while the type D coating caused complete adhesion under otherwise the same test conditions.
- Both papers behaved absolutely identically in the tests.

The tests thus show that the cause of the problems which had occurred was to be sought neither in the adhesive spread nor in the paper quality. Rather it became clear that with the type D release coating separation was only possible with a relatively heavy spread but that at low spread separation it was impossible to remove the label.

Examination of surface tension

On completion of the tests the surface tensions were determined on the backs of release-coated samples and of original labels. These tests took place with the test inks available in the trade, which differ in surface tension. A test ink with a surface tension of 41 mN/m was used.

Results:

- In the case of the faulty labels and test coatings using the type D release agent at low spreads there was a spreading of the droplets - good wetting at low coating weights.
- With the high spreads, the labels classified as "good" and test coated with coatings C and D showed marked beading of the droplets – poor wetting at coating weights.
- The tests showed a close relationship between the weight of release coating applied and the surface tension.
- In practice, this test is a proven means of recognizing on site possible difficulties from too little separating agent in good time.
- The illustrations show the testing of the surface tension of a perfect and a problem label.

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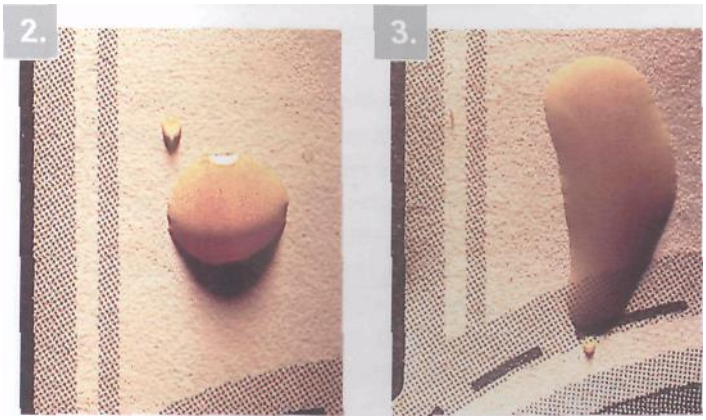

Good label with poor wetting. Faulty label with good wetting

Result

Labels normally must not separate from the bottle. In the present case, however, the neck labels should be capable of being removed in their entirety. The labels concerned were tokens, which have to be collected by the customer. In part of the production the labels had adhered to the bottle so firmly that they could not be removed and were therefore useless as exchangeable tokens. Investigations showed that neither the paper nor the quantity of adhesive applied were the source of the difficulty. Only after test coating with two release coatings used in production and subsequent adhesion tests was it possible to determine the cause: The two batches of release agent from the same manufacturer behaved very differently in their separating efficiency. While coating C "functioned" at low spreads, coating D under the same printing conditions resulted in adhesion, thus rendering the collectable tokens entirely useless. After carrying out the investigations two causes were found:

1. Coating D was substantially less efficient than coating C from the same manufacturer in its separating efficiency.

2. Furthermore the tests made clear that on falling below the minimum spread quantity of 2.5 g/m² required by the release-coating manufacturer, problems in the separation efficiency can occur.

In the cph paper laboratory and in close co-operation with paper manufacturers, label printers and our customers, problems like those described above can be solved. Use the know-how of cph, which has also supplied special adhesives for peel-off labelling for over 25 years.

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