Vacuum-packed coffee in a block

Vacuum-packed coffee in a block packed in metallised foil. The packaging is equipped with a re-sealing tape function. The foil is sealed in a design with two sets of wings glued together.

Figure 1 Vacuum-packed coffee in metallised foil is studied.

Focus area

The opening procedure for the coffee packaging is to remove the tape and separate the wings thereby puncturing the packaging. When the vacuum is released it is possible to pull the bag open as the sealing is peel-able.

The producer has intended the packaging to be opened by hand. This case therefore is an effort to test the extremes and evaluate the tool developed for the mechanical test. Our focus is primarily the physical force and use of tools. Furthermore to evaluate the designed re-sealing function as well.

REFFERENCE TO GUIDELINE: Physical force, Opening strategy.

Design

The re-sealing function on the coffee packaging consists of tape fastened to the top of the packaging. The tape is designed to be removed before opening. This could easily be designed in a more user-friendly way.

Mechanical test

The mechanical test was conducted by using a traction bench measuring the force needed for pulling the wings apart. An average pulling force of 45±10N was measured. This covers a maximum force of 61N and a minimum force of 30N when opening the packaging.

Figure 2 Mechanical measurement of the pulling strength when separating the wings of the foil bag.

End user's physical force needed

A calculation model has been developed for the guideline estimating the end user's critical force needed related to different packaging types. Based on dimensions and force measured the model illustrates which people potentially could have difficulties opening the packaging.

The model is in this case able to estimate how many men and women are able to open the coffee bag as this is the model based on flaps and bags. Only very few women and maximum up to 60 % men can open a bag requiring 45N to open according to this model (see Figure 3). The measurements of the force needed to open the packaging varied a great deal. The maximum force measured on one packaging would imply that a very limited number of people actually would be able to open the packaging and this means according to the model that only up to 20 % of all men would be able to open the bag (see Figure 4a). Likewise did the low force measured on a number of this type of packaging an entirely different picture of the critical force needed by both men and women (Figure 4b). As a whole this shows that the same packaging needs very fluctuating amounts of force and thereby influence greatly on who will be able to open the packaging. Further information on the model and background data can be found in the guideline under "Calculation of critical force".

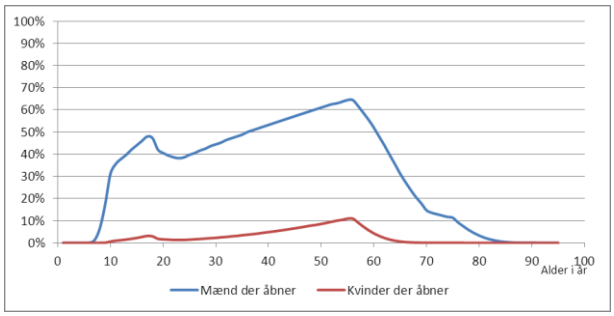

Figure 3 Share of men and women who are able to open a bag requiring 45N to open with a maximal gripping surface, in other words the "flap" being more than 2cm long (Model bases on data from DTI, UK 2002).

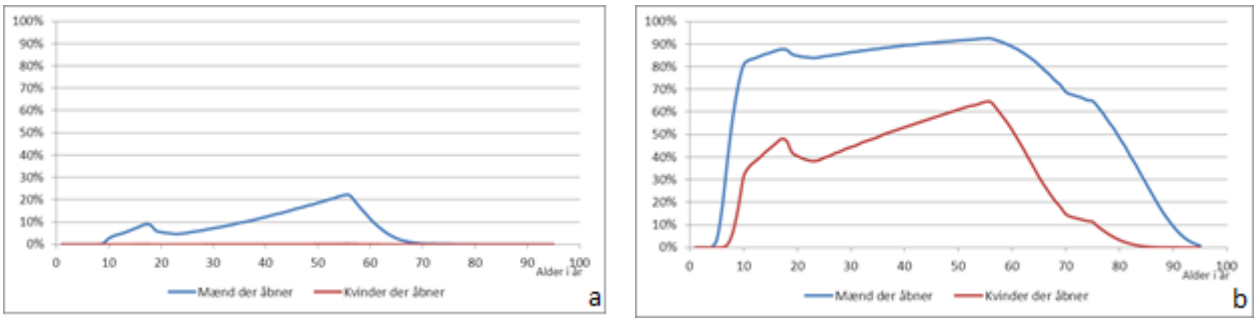

Figure 4 Share of men and women who are able to open a bag requiring a bag requiring a) 61N to open and b) 30N to open with a maximal gripping surface, in other words the "flap" being more than 2cm long (Model based on data from DTI, UK 2002).

End user test

In relation to an evaluation of the new technical specification "DD CEN/TS 15945:2011 Packaging. Ease of opening. Criteria and test methods for evaluating consumer packaging" user tests were conducted in 2008 at Danish Technological Institute with this type of coffee packaging. Test users consisted of 34 randomly chosen elderly people in the age group of 50-90 yrs. Of these 1/3 was men and 2/3 were women. Half of the group had a physical ailment, e.g. arthritis in the hands. The group was asked to open the packaging

and then evaluate how easy or difficult they found it on at scale from 1 to 5 where 1 is very easy and 5 is very difficult or impossible to open. The result is depicted in Table 1.

As expected very few are able to open the bag. It is impressive though, that two women – the one with arthritis – evaluated the packaging as being easy to open. We assume that it is due to them being presented with a packaging of a less sturdy closure and possibly also the fact that they are experienced in this type of packaging. None of the men participating were able to open the coffee bag with their hands which is a bit surprising considering with the model predictions. Several of the end users mentioned that the foil material is very smooth making it difficult to open the packaging. The large variation in the force needed to open the packaging can be an important factor why the calculation model results and the user study results do not correlate.

Table 1 End user test of how the coffee packaging was to open on a scale from 1-5, where 1-2 is easy to open and 4-5 is difficult or impossible to open. The test group consisted of 34 persons, men (M), women (F), with (D) or without (N) physical ailments affecting their hands. Number of persons in the group is given in parentheses.

End user's evaluation of the coffee packaging	MD (3)	FD (10)	MN (7)	FN (14)	total (34)
Difficult to open	100 %	90 %	100 %	93 %	94 %
Easy to open	0 %	10 %	0 %	7 %	6 %

Use of tools

The coffee packaging is designed to be opened using scissors. This is accepted by roughly 80 % of the end users while the use of a knife is only accepted by 40 %. Accepting use of tools depends very much on the end users' health where the middle group (neither many nor few problems with packaging) accepts the use of scissors more readily. The use of a knife is potentially dangerous which is also why the acceptance of using knife as a tool for opening is less.

Conclusion

Generally this coffee packaging is difficult to open without using tools as scissors or knife. In order to appeal better to the end user an entirely new type of packaging can be considered in order to eliminate the use of tools. This has to be accompanied by a clear description on the packaging to avoid the end user's use of tools. Furthermore we recommend that the re-sealing function is optimised.

These suggestions to improvements are pretty obvious. If the company requires more unorthodox or innovative solutions we suggest that a workshop for idea generation is held (see User-friendly Packaging - Guideline for the industry).