

Laminate candy bag with pre-cut

The candy bag is produced in a vertical packing machine welding the bag shut after packing. The bag is equipped with a pre-cut in the top which can be used for easy opening.

Focus area

The producers' opening strategy for the candy bag is to use the pre-cut pulling with two hands in opposite directions. A focus area is to study whether the end user has a similar opening strategy. This is also connected to the graphics on the bag guiding the end user to the easiest way to open the bag. Furthermore the physical force needed for opening the bag using the pre-cut is studied by end user test and mechanical measurements.

REFERENCE TO GUIDELINE: Physical force, Graphics and choice of colour, Opening strategy.

Design

It is a well-known fact that end users open this type of packaging by holding the bag's sides in a pincer grip. Therefore it is important for the producer to clearly state if another opening strategy is relevant for this packaging. On the packaging in question it is not clearly stated by using contrast colours where the bag should be opened. This could be made clearer in order to ensure an easy opening.

Mechanical test

The ripping force for the bag was measured by using a traction bench (Figure 1). The approach differs from the end user's as the bag is ripped from the bottom instead of from the top. This is due to the fact that the equipment could not get at good grip on the top of the bag and it was considered as insignificant concerning the result. The ripping force was measured to $9\pm 4\text{N}$.



Figure 2 Mechanical measurement of ripping force needed for the candy bag with pre-cut.



Figure 1 Laminate candy bag with pre-cut is studied.

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 for flaps and bags was chosen to the test, where the flap length is more than 2 cm long (which in the relevant literature is stated as the length needed for maximal force transfer). The model shows based on the stated ripping force and the dimensions that practically everybody should be able to open this packaging (Figure 3). Further information on the model and background data can be found in the guideline under "Calculation of critical force".

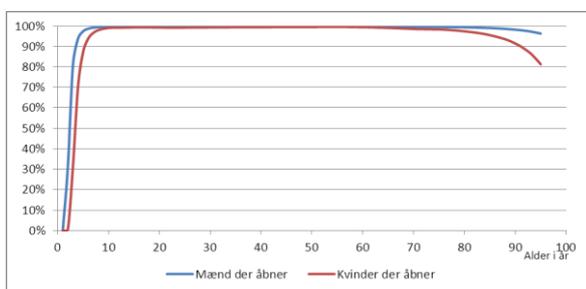


Figure 3 Share of men and women able to open a bag requiring 9N to open with a maximal gripping surface, that is the "flap" being more than 2 cm long (Model based on data from DTI, UK 2002).

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 a similar packaging. Test users consisted of 32 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 a 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.

Table 1 End user test of how the laminate candy bag 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 32 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 candy bag	MD (2)	FD (16)	MN (7)	FN (7)	total (32)
Difficult to open	100 %	63 %	43 %	43 %	56 %
Easy to open	0 %	31 %	0 %	57 %	28 %

When we compare the results from the calculation model with the end user study the results do not correlate. 43 % of the end user group's healthy men find the packaging difficult to open (Table 1), while the calculation model indicates that everybody should be able to open the packaging (Figure 3). The explanation can be found in the end user's opening strategy. We observed that the persons finding the packaging easy to open used the built-in pre-cut while the persons using alternative opening methods experienced great difficulties. The sealing cannot be broken by using a "bag grip" (Figure 4) where the end

user holds with both hands (not pincer grip). The significant problem therefore is, that the end user expects the opening method to be different than what the bag is designed for. In an English study where different opening strategies were studied (Packag. Technol. Sci. 2007; 20: 217–229), as little as 5 % of the test persons used a “bag grip” for opening bags, while the pincer grip using different hand angles was the most commonly used.



Figure 4 An end user trying to open a candy bag using a “bag grip”. End user study conducted at Danish Technological Institute 2008.

Evaluation

There was a significant difference between the end users’ evaluation of the packaging and the prediction by the calculation model of the critical force needed for flaps and bags. This is due to the fact that the opening strategy used by the mechanical test and the one the end user applies are very different. The mechanical test used the method recommended by the packaging producer.

The candy bag can be made easier to open in two ways: 1) making it possible to open the bag using “bag grip” by a lighter welding or 2) by using the graphics to make it clear where the packaging should be opened. Finally there is the possibility of using tools to open the bag. A study conducted by Danish Technological Institute in 2008 of the end users’ acceptance regarding the use of tools to open with showed that 80 % of the end users accept the use of scissors in the kitchen. Candy is not likely only to be consumed in the home but also on-the-go or at the office where scissors might not be available. The study showed that the acceptance of tools would be less than 40 % in the office and less than 10 % on-the-go. See more in “End user study” in “User-friendly packaging - Guideline for the industry”.

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).