



BSI Standards Publication

Packaging — Ease of opening — Criteria and test methods for evaluating consumer packaging

National foreword

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This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature. It should be applied on this provisional basis, so that information and experience of its practical application can be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the international organization responsible for its conversion to an international standard. A review of this publication will be initiated not later than 3 years after its publication by the international organization so that a decision can be taken on its status. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into an international Standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent to the Secretary of the responsible BSI Technical Committee at British Standards House, 389 Chiswick High Road, London W4 4AL.

The UK participation in its preparation was entrusted to Technical Committee PKW/0/-/12, Packaging - Ease of opening.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Date	Text affected
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ICS 55.020

English Version

**Packaging - Ease of opening - Criteria and test methods for
evaluating consumer packaging**Emballage - Facilité d'ouverture - Critères et méthodes
d'essai pour évaluer un emballage destiné aux
consommateursVerpackung - Leichtes Öffnen - Kriterien und Prüfverfahren
für die Bewertung von Verbraucherpackungen

This Technical Specification (CEN/TS) was approved by CEN on 17 January 2011 for provisional application.

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Foreword

This document (CEN/TS 15945:2011) has been prepared by Technical Committee CEN/TC 261 “Packaging”, the secretariat of which is held by AFNOR.

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Introduction

Ease of opening is an important factor when designing consumer packaging, as it is important that consumers of all ages, and of both genders, should be able to access the contents of the package. Consumers may ultimately avoid the purchase of a particular type of packaging which has proved consistently to be difficult to open. It is recognised that there is a difference in strength on average between male and female consumers.

Knowing that strength in the hands reduces with age, a panel test method that focuses on elderly consumers, with less than the average hand strength, can help to gain a new perspective on the ease of opening of packaging. Packaging that is easy to open for elderly consumers will, in most cases, be easy for the average consumer to open. It is recognised that there will be consumers with extreme impairment that this specification cannot represent.

To present valid mechanical test methods for the wide range of packaging present on the market today is not possible in this specification at this time. A test protocol inspired by the principles described in the ISO 20282 series of standards is therefore used in Annex A. However, it should be noted that mechanical testing and sensory test by trained panel are useful tools when developing easy to open packaging or for quality control. We recommend the generation of mechanical data to allow the introduction of new methods, as a means of demonstrating compliance with this specification.

When appropriate; CEN-CENELEC Guide 6, "Guidelines for standards developers to address the needs of older persons and persons with disabilities" and the referenced documents were considered when drafting the specification.

This document specifies procedures for ease of opening. It should commensurate with the maintenance of:

- functionality throughout the supply and user chain;
- safety and hygiene for both product and user/consumer;
- acceptability of the packed product to the user/consumer.

The purpose of the test methods should be to evaluate whether a particular design of packaging can be considered easy to open by the large majority of consumers, including elderly consumers. The test methods may be used by, for example:

- a designer or manufacturer; to check whether ease of opening requirements have been met;
- a potential purchaser or consumers organisation to check whether a particular design of packaging meets their requirements regarding ease of opening;
- a manufacturer, potential purchaser or consumers organisation to compare alternative products.

The results can provide evidence of the ease of opening of a particular design of packaging to potential purchasers. A test may be carried out by the manufacturer or purchaser directly or by assigning the task to an appropriate test organisation.

Where the information derived from the test is used for any purpose other than for internal technical or product development, for example to make a public statement regarding packaging ease of opening in relation to this specification, testing should be carried out, or should be independently verified, by an accredited test organisation. The information should be provided in sufficient detail to allow replication of the data-scoring methods by another organization if the test is repeated.

1 Scope

This Technical Specification specifies the following for all adult consumers:

- criteria for ease of opening of packages;
- methods for evaluating the ease of opening of consumer packages.

The purpose of this Technical Specification is to specify test methods to evaluate the ease of opening of consumer packages, in order to improve easy access to the contents. For packages regulated for safety or similar reasons, e.g. packaging of dangerous goods and substances, medicinal products, and medical devices, those regulations take precedence.

This Technical Specification applies to all packaging that does not require an opening tool and to packaging that is purchased with an integrated opening tool.

NOTE 1 The method(s) described in this Technical Specification could also be applicable to other types of packages when measuring ease of opening.

NOTE 2 This Technical Specification can be used to test most consumer packages. There are, however certain packaging types that cannot easily be tested with the described methods, such as e.g. very large packaging used to protect refrigerators and washing machines.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 21067:2007, *Packaging — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21067:2007 and the following apply.

3.1

consumer packaging

packaging constituting, with its content, a sales unit for the final user or consumer at the point of retail

[ISO 21067:2007]

3.2

ease of opening

openability of a consumer packaging when used by the intended users to achieve the main goal(s) supported by the packaging

NOTE Ease of opening is tested as effectiveness of opening, efficiency of opening and satisfaction with opening.

3.3

effectiveness of opening

accuracy and completeness with which users achieve specified goals; percentage of users who achieve the main goal(s)

3.4
efficiency of opening

resources expended in relation to the accuracy and completeness with which users achieve goal; time taken to achieve the main goal(s)

3.5
satisfaction of opening

freedom of discomfort, and positive attitudes towards the ease of opening of the packaging

3.6
goal
intended outcome

3.7
panel testing
panel test is user based performance related measurements

NOTE In a panel test, a product is tested by a group of individuals trying out a product in a relative controlled or experimental setting, where they are given specified task(s) to perform.

3.8
mechanical testing
documented and reproducible mechanical test methods intended to measure the resistance of the relevant features of a package/packaging system by use of appropriate equipment

3.9
sensory test by trained panel
members of the panel are trained to qualify and quantify sensory properties of the ease of opening of consumer packaging

4 Criteria for ease of opening of packaging

Ease of opening of packaging is defined as “the openability of a consumer packaging when used by the intended users to achieve the main goal(s) supported by the packaging”. Such main goals can where appropriate, include opening and closing, as well as accessing the intended quantity of the product.

The users shall be able to achieve their main goals:

- with a high success rate (effectiveness of operation);
- within an acceptable task time (efficiency of operation);
- with an acceptable level of satisfaction with operation.

Packaging will be considered to be easy to open if the large majority of adult consumers find it to be effective, efficient and satisfactory as set out above. The test results, from e.g. the panel test in Annex A, can be used to determine if a packaging meets following requirements:

- a) the packaging under study shall be easy to open;
- b) it shall be easy to take the intended quantity or portion from the packaging¹⁾;

1) It is crucial to the consumer’s satisfaction with the packaging opening system to be able to reach the content of a packaging in an easy and safe way, however, if unfilled packaging is tested, this question can be omitted. The reason for omitting the question is recorded in the test protocol.

c) a reclosable packaging shall be easy to close.

Not all questions apply to all packaging since the goals of the packaging will be different for different packaging designs e.g. reclosable and non-reclosable packaging. The relevant questions will therefore depend on the form and intended use of the packaging. The overall judgement of the packaging under study shall be favourable.

EXAMPLE For non-reclosable packaging only questions a), and b) will apply, while all questions are relevant for most reclosable packaging.

5 Test methods

Ease of opening can be evaluated in several different ways, by panel tests, mechanical tests, sensory panels etc. During the three year to six year lifespan of this Technical Specification new methods will be developed and a set of annexes produced to describe these methods. Figure 1 shows examples of different methods that may be added as annexes to this Technical Specification.

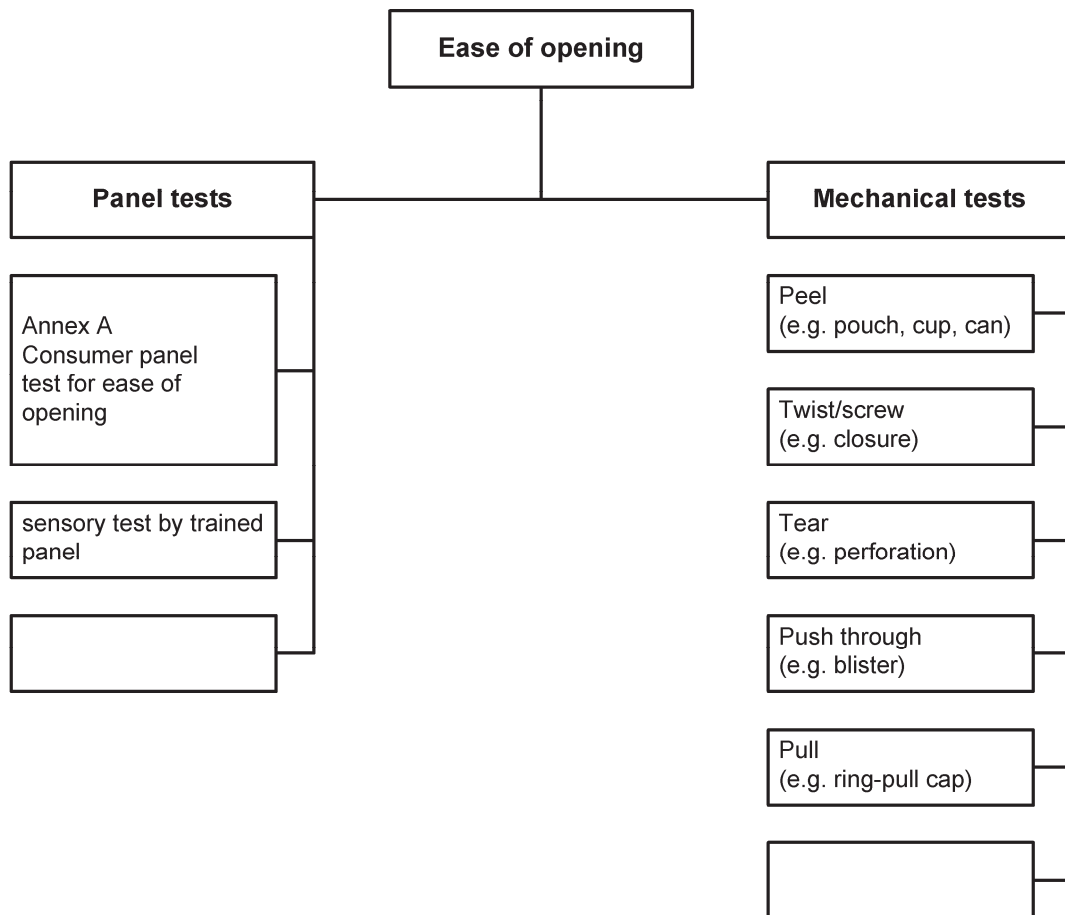


Figure 1 — Examples of methods that can be used gain information of the openability of packaging

Mechanical test methods can provide quantitative data with regards to certain attributes, such as removal torque, peel strength and ring-pull force. These data can inform on the performance of a packaging.

Panel tests enable the qualitative assessment of packaging designs and allow the development of an understanding of users approach to packaging openability and handling. Panel tests can be used in conjunction with other qualitative research methods such as questionnaires and structured or unstructured

interviews. Panel tests can aid in the development process and the resulting data can inform on the performance of a packaging against predetermined criteria.

For any new tests suggested for inclusion in this Technical Specification, the importance of showing clear correlation in assessing operability between the panel test described in Annex A and the new suggested methods is fully recognized.

Annex A (normative)

Consumer panel test for ease of opening

A.1 Panel test method

A.1.1 General

Knowing that strength in the hands reduces with age, a panel test method that focuses on elderly consumers, with less than the average hand strength, can help to gain a new perspective on the ease of opening of packaging. Packaging that is easy to open for elderly consumers will in most cases, be easy for the average consumer to open. It is recognised that there will be consumers with extreme impairment that this specification cannot represent.

To limit the size of the test panel, while maintaining the validity of the test results, a sequential test method is used. Groups of 20 panellists are selected as described in Table A.1.

Panellists who need reading glasses should wear them during the test.

The purpose of the test shall be explained in reasonable detail, but no opening demonstration shall be given.

Randomization shall be the guiding criterion in panel selection.

The 20 valid panellists shall be randomly selected between the ages of 65 to 80 according to the criteria given in Table A.1.

The panellists shall indicate for every packaging tested if they have experience with identical or similar types of packaging. The information shall be presented in the test report, but shall not be decisive for the result of the test.

Table A.1 — Composition of the test group for sequential testing

Age range (years)	Male %	Female %	Total %
65 to 69	10	25	35
70 to 74	10	25	35
75 to 80	10	20	30
Total	30	70	100

When a test group of 20 panellists have completed the test, the total number of failures noted is summarized.

- a) If the total number of failures is equal or less than what is noted in Table A.2 for the number of panellists tested, the test is successfully completed.
- b) If the total number of failures recorded is more than what is noted in Table A.2 for the number of panellists tested, the test can either be interrupted or continue adding another group of 20 panellists.

Table A.2 — Sequential test method

Number of panellists	Number of successes recorded	Number of failures recorded	Confidence intervals (%)
20	20	0	85 to 100
40	38	2	82 to 99
60	56	4	83 to 97
80	75	5	85 to 97
100	94	6	87 to 97

NOTE The confidence interval shown in the Table A.2 gives an indication of the reliability of the test and has been determined assuming a 95% confidence level. Detailed analysis of how these confidence intervals have been determined is outlined in Lewis et al., [11, 12].

Hazardous products are not to be used in the panel tests and should be substituted where necessary with harmless alternatives with similar physical characteristics.

A.1.2 Flow chart describing panel test

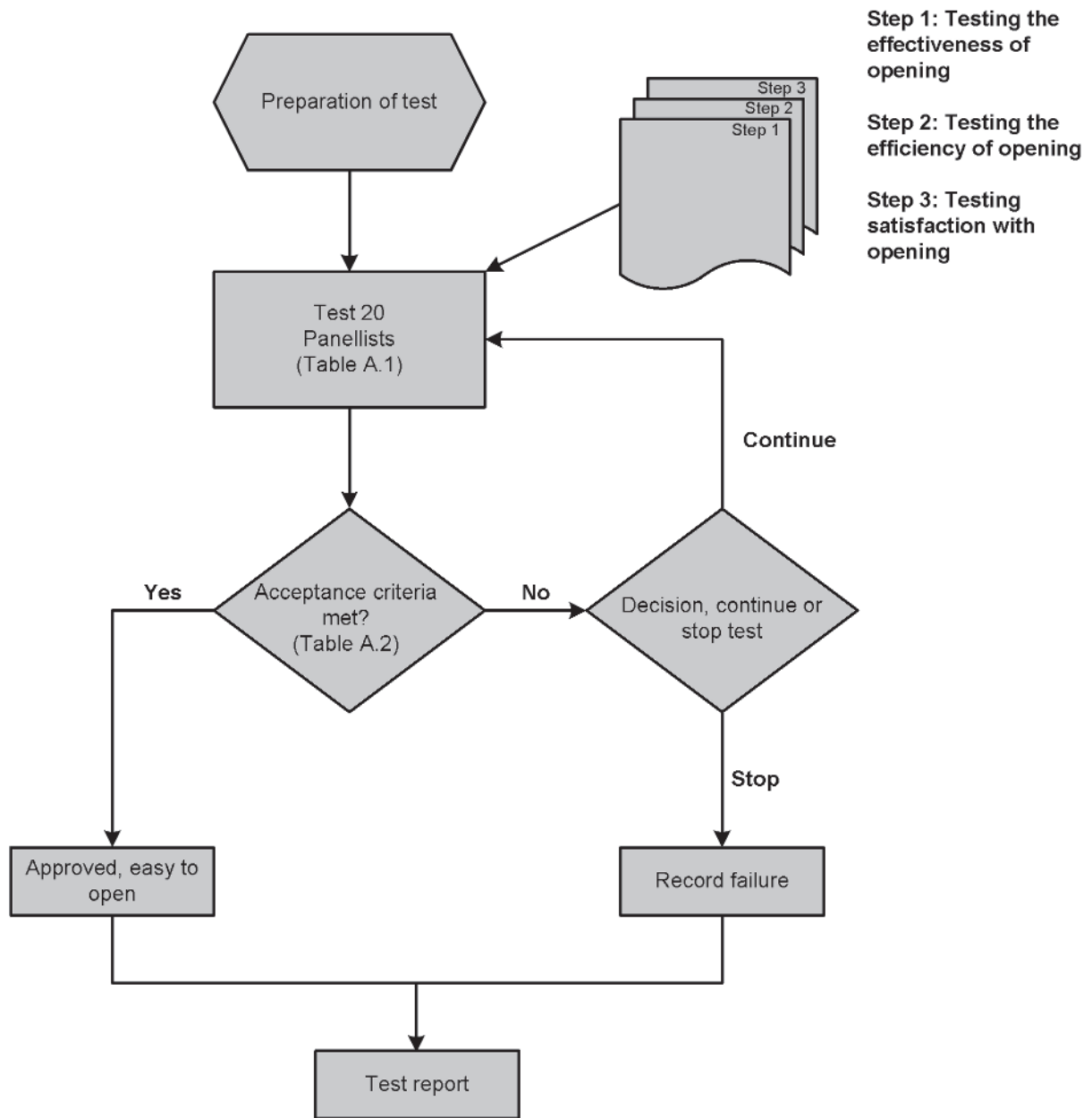


Figure A.1 — Flowchart for testing the ease of opening

A.1.3 Test procedure

A.1.3.1 General

The test will be carried out in three steps, each one of the steps representing one evaluation criterion.

Each panellist shall be given a sample of packaging together with only such written instructions on how to open it properly as will be printed in or on the packaging when supplied to a consumer.

Although the test may be undertaken in a public place, individual testing of panellists shall be done under privacy.

No tools other than those integrated in the packaging should be available for the panellist.

The test supervisor shall explain the test protocol found in A.2.2 to the panellists and inform that the opening system of the packaging under study may differ from packaging with similar design previously known to the panellists and that they should read any supplied instructions. No demonstration of how to open the packaging shall be given.

If more than one packaging is tested at a single occasion, the order of packaging to be tested shall be randomized. Several packing with identical opening systems shall not be tested at the same time.

The panellists shall go through the relevant opening steps while the test-supervisor times the test and fills out the test protocol, the satisfaction-score should however be noted by the panellist.

NOTE It is often valuable for representatives from the manufacturer to participate during the tests as observers. To participate creates good insight and understanding of the difficulties experienced by consumers when handling packaging.

A.1.3.2 Step 1: Testing effectiveness of opening

A period of up to five minutes should be allowed for the panellists to open the packaging, the panellist should not be informed about the time limit set. In this period, the panellists shall familiarize themselves with the packaging to be tested by studying the opening instructions.

If a panellist is unable to perform the opening in a period of five minutes the test shall be stopped and the fact noted.

A.1.3.3 Step 2: Testing efficiency of opening

After step 1 the panellist shall be given a new identical packaging with a request to open it. The time used to perform the opening of the packaging shall be recorded by the test leader.

The test shall be stopped after a successful opening or after maximum 1 min.

A.1.3.4 Step 3: Testing satisfaction with opening

After the opening of the packaging has been successfully performed, the panellist shall try to take an intended quantity of the contents from the packaging (tools, such as forks, spoons cups etc., should be provided to the panellists if necessary). In the case of reclosable packaging, after the first opening of the packaging the panellist shall proceed to close the packaging. A maximum of five minutes will be allowed for the whole testing procedure (opening, take the intended quantity and, if relevant, reclose the packaging).

When the panellist has performed these steps, the closed packaging shall be submitted to the test supervisor to confirm that the packaging has been properly closed.

After all the steps of the opening procedure have been performed the panellists shall be asked to indicate their degree of satisfaction with the opening process. The satisfaction score will represent the overall judgment of the whole opening process (opening, portioning, closing).

A.1.4 Evaluation of results

A.1.4.1 Effectiveness of opening

If a panellist successfully opens the packaging within the test period of five minutes the test shall be noted as a success.

If a panellist is unable to perform the opening in a period of five minutes or chooses to give up due to intense pain or other reasons, the test shall be interrupted, the result shall be noted as a failure and the reason for failure shall be noted.

A.1.4.2 Efficiency of opening

During the second step of the test procedure, the time it takes to open the packaging shall be recorded. If more than one minute is needed for a panellist to perform this step, this shall be noted as a failure to achieve efficiency of operation.

A.1.4.3 Satisfaction with opening

After the opening procedure has been performed and the quantity taken the panellists are asked to indicate their degree of satisfaction with the opening process. If the panellist is not able to open the packaging the score shall be -2.

To be approved, the satisfaction score must reach level 0 or higher on the smiley scale described in Figure A.2.



Figure A.2 — The smiley scale

The smileys correspond to the values -2, -1, 0, 1, 2. No intermediate measures are allowed. Group values may be given as arithmetic average.

The nature of any difficulties encountered by panellists may be recorded in order to identify problems that can be provided as feedback to the manufacturer of the packaging.

A.2 Results

A.2.1 Test report

At least the following information shall be recorded by the test supervisor:

- reference to this Technical Specification;
- date(s) on which the test was carried out;
- name and address of the organization ordering the test;
- name and address of the organization carrying out the test;
- the name and address of the manufacturer and/or filler/packer of the package tested;
- name(s) of the person(s) supervising the test;
- names, addresses and descriptions of the test locations;
- number of panellists tested;
- indicate which steps were undertaken in this test (opening, reclosing, the removal of an intended quantity);

NOTE If the test results obtained are used to compare overall satisfaction of different packaging, it is essential that the same steps have been undertaken in all tests performed.

- specification number, drawing numbers (if available), photograph and a complete description of the package tested;
- a direct quotation of the exact instructions, etc. given to the panellists during the test;
- a copy of the manufacturer's instructions on opening and closing the packaging given during the test;
- overall test results for effectiveness, efficiency and satisfaction with opening;
- a copy of the test protocols (Annex A);
- executive summary.

The nature of any difficulties encountered by panellists may be recorded in order to identify problems that can be provided as feedback to the manufacturer of the packaging. The client may specify other questions or observations of interest that the test supervisor should note in the test protocol.

A.2.2 Test protocol

Sample ID and sample randomization (n of N): _____	
Supervisor ID: _____	Panellist ID/no. _____
Age: _____	Gender: (M) <input type="checkbox"/>
	(F) <input type="checkbox"/>

1. Questions for selecting the panellist

- a) Do you normally wear reading glasses?
- b) Do you have them with you?

(If the answer to question one is yes and two is no, the panellist shall be excluded from the test)

2. Knowledge of sample for test

Have you had experience with identical or similar types of packaging and/or closure mechanisms or systems?

- Yes No Not sure

(The information shall be presented in the test report, but should not be decisive for the result of the test)

3. Effectiveness of operation

Was the panellist able to open the packaging for the first time within 5 min?

- Yes No

(Reasons for failure shall be noted! Observations at the supervisor's discretion)

Observations and notes

4. Efficiency of operation

How long did it take to open the packaging?

Time (s): _____

(Max. 60 s. The eclipsed time and reasons for failure shall be noted by the supervisor)

Observations and notes

5. Satisfaction with opening

(Note that the mark of satisfaction shall be placed by the panellist!)

After having performed the following steps:

- a) Opened the packaging successfully
- b) Taken an intended quantity of the contents
- c) Closed the packaging (if applicable)

The panellist should be asked to mark the smiley best representing their satisfaction with the packaging tested.



(Any spillage during opening shall be noted by the test supervisor and optional client questions can be recorded)

Observations and notes

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