TECHNICAL REPORT

IEC 61902

First edition
1998-09

Household microwave ovens –
Visual clarity of see-through oven doors

Fours domestiques à micro-ondes –
Transparence optique des portes de fours à fenêtre

Reference number
IEC 61902:1998(E)

Numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series.

Consolidated publications

Consolidated versions of some IEC publications including amendments are available. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Validity of this publication

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology.

Information relating to the date of the reconfirmation of the publication is available in the IEC catalogue.

Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is to be found at the following IEC sources:

- **IEC web site***
- **Catalogue of IEC publications**
  Published yearly with regular updates
  (On-line catalogue)*
- **IEC Bulletin**
  Available both at the IEC web site* and as a printed periodical

Terminology, graphical and letter symbols

For general terminology, readers are referred to IEC 60050: *International Electrotechnical Vocabulary* (IEV).

For graphical symbols, and letter symbols and signs approved by the IEC for general use, readers are referred to publications IEC 60027: *Letter symbols to be used in electrical technology*, IEC 60417: *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets* and IEC 60617: *Graphical symbols for diagrams.*

* See web site address on title page.

TECHNICAL REPORT – TYPE 2

IEC 61902

First edition
1998-09

Household microwave ovens – Visual clarity of see-through oven doors

Fours domestiques à micro-ondes – Transparence optique des portes de fours à fenêtre

International Electrotechnical Commission 3, rue de Varembé Geneva, Switzerland
Telefax: +41 22 919 0300 e-mail: inmail@iec.ch IEC web site http: //www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE M

For price, see current catalogue

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD MICROWAVE OVENS –

VISUAL CLARITY OF SEE-THROUGH OVEN DOORS

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but no immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

Technical reports of types 1 and 2 are subject to review within three years of publication to decide whether they can be transformed into International Standards. Technical reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

IEC 61902, which is a technical report of type 2, has been prepared by subcommittee 59H: Microwave ovens, of IEC technical committee 59: Performance of household electrical appliances.

The text of this technical report is based on the following documents:

Committee draft	Report on voting
59H/75/CDV	59H/87/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This document is being issued in the type 2 technical report series of publications (according to subclause G.3.2.2 of part 1 of the IEC/ISO Directives) as a “prospective standard for provisional application” in the field of household electrical appliances, because there is an urgent need for guidance on how standards in this field should be used to meet an identified need.

This document is not be regarded as an “International Standard”. It is proposed for provisional application so that information and experience of its use in practice may be gathered. Comments on the content of this document should be sent to the IEC Central Office.

A review of this type 2 technical report will be carried out not later than three years after its publication, with the options of: extension for a further three years; conversion into an International Standard; or withdrawal.

Annex A is for information only.

INTRODUCTION

After a general description of the concept of visual clarity and the reasons for considering it as a performance factor, the ambient conditions are discussed. The proposed measurements and evaluations are then described. Finally, some technical test results and comparisons with panel testing results are given.

HOUSEHOLD MICROWAVE OVENS –

VISUAL CLARITY OF SEE-THROUGH OVEN DOORS

1 Scope

This technical report specifies the characteristics of the visual clarity of see-through microwave oven doors.

The tests outlined here may also be applicable to ranges and other household appliances where the workload is enclosed but visible during the treatment.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitutes provisions of this Technical Report. At the time of publication, the edition indicated was valid. All normative documents are subject to revision, and parties to agreements based on this Technical Report are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60705:1988, *Methods for measuring the performance of microwave ovens for household and similar purposes*

3 General

The visibility into microwave oven cavities may be a performance factor of interest to the user. Many heating operations are of short duration and the user normally remains in the vicinity of the oven when it is operating. Boiling and similar phenomena may begin and become vigorous within a very short time. The appearance of browning in microwave combination ovens is another phenomenon which may be important to follow.

The viewing screen of a microwave oven shall not allow microwave leakage and must therefore provide an efficient path for the microwave wall currents in the cavity. The metal surface needed for this is normally either a meshed metal grid or the remaining metal plate parts in a hole screen. For protection and cleaning purposes, there are also glass plates or similar, both in front of and behind the metal screen. All these components limit the visibility through the door by reduction of light transmission and by patchiness due to the hole pattern, as well as reflection of external light by the screen and its glass cover. There are also other contributing factors listed below but not included in the technical measurements.

The term *visual clarity* expresses the contrast, resolution and colour saturation of the image of the food load in a microwave oven cavity (or in a conventional oven) seen through the viewing screen. As indicated by the word *visual*, the clarity is mainly a subjective expression. As a consequence, ranking of ovens may be made by panel testing but some conditions are specified. The test room specifications are given in 4.4. Other requirements for panel testing are given in clause 7.

A more technical series of tests using instruments and physical measurements is specified in clause 6. Results are reproducible but the relevance of the test conditions and specifications – the representativity of the test – may be limited because of differences in the common external conditions. There are also some additional factors which influence the real and perceived visual clarity but are not included in the technical tests since they are too complicated. However, such additional factors are automatically included in a panel test. Their relative influence on the test results becomes subjective and varies with ambient lighting conditions.

The additional factors are given below.

- Specularly reflected luminance caused by the outer glass or viewing screen. The disturbance to the sight depends very much on the ambient lighting conditions. However, it becomes partially quantified by the fact that the specified test room is diffusely illuminated.
- The reflectance of the cavity walls and the interior of the door. If the cavity back wall is white the contrast deteriorates in comparison with a dull or stainless steel colour. A white inside of the door improves the light intensity in the cavity when the door is closed.
- The colour (whiteness) of the external door area surrounding the viewing screen. A white area around the outside of a darker viewing screen causes glare phenomena which disturb visual clarity.
- The thickness (hole length) of the screen holes in relation to the hole diameter. Long length holes with a relatively small in diameter make the viewing sensitive to small oblique viewing angles.
- The size of the viewing screen in relation to the door opening. A small overall viewing screen will reduce the viewing angles and limit the oven placement height.

Some test results and comparisons between technical and panel tests are given in annex A.

4 Test conditions, material and instrumentation

4.1 Light source in the cavity

The light source in the cavity is that provided with the oven. The oven is operated according to clause 8 of IEC 60705 with the cavity lamp(s) operating as in normal operation of the oven but the oven is not operated with microwaves.

NOTE – It may be necessary to disable the microwave generator in order to obtain normal operation without microwaves.

4.2 Artificial cavity load for measurements

A 200 mm diameter and 20 mm high circularly cylindrical disc having a diffusely reflecting neutral grey colour on its top and curved surfaces is used. The disc shall give (50 ± 10) % less reflected luminance (cd/m^2) than a white expanded polystyrene slab when illuminated from above with the luminances measured at a 20° ± 3° elevation angle (the disc and slab are placed horizontally and their top surfaces are illuminated vertically).

NOTE – In order to support the optical sensor during measurements, two small blocks with a half-square triangular cross-section and having a small side length of about 30 mm and a height of 20 mm may be needed. The blocks must have the same grey colour as the disc on all sides.

4.3 Instrumentation

A cosine-corrected and $V(\lambda)$ luminosity corrected light meter with external sensor is used for the illuminance measurements. The height of the sensor body is to be less than 20 mm.

The instrument is also used with a built-in sensor to measure luminance. It is then placed on a tripod or similar. This should not have any large dark areas and may be partially covered with white cloth or similar, if needed.

4.4 Test room specifications

The light sources are two or three 36 W warm white, full colour, high-frequency driven (variable intensity) fluorescent tubes with white light reflectors/diffusers.

NOTE 1 – The fluorescent light source is a compromise between incandescent and daylight source properties.

NOTE 2 – The diffusers are needed to adjust the balance between the vertical and horizontal illuminance specified below.

NOTE 3 – In order not to need excessive dimming of the fluorescent tubes, reflectors may not be needed and the diffusers may be of the transmission rather than reflection type.

The room is windowless and has no other light sources. The size of the room is to be between 3,0 m and 5,0 m in width and 2,0 m to 2,6 m in depth. The height is 2,2 m to 2,6 m. The room walls, door and ceiling should be bright or preferably painted white. The benchtop should be at a height of 0,9 m and 0,6 m deep and painted neutral grey with (50 ± 10) % reflected luminance measured as described in 4.2. It should be located along the entire length of a long side wall.

The position of the room light sources, reflector and diffuser is such that no part is lower than 2,0 m above the floor. The system is arranged so that an even illuminance is created at the positions where the ovens are later to be placed. The vertical illuminance (E_W) is to be (300 ± 20) lx and the horizontal illuminance (E_{vh}) is to be (0,6 ± 0,1) times E_W. The vertical illuminance is measured with a horizontal sensor placed at the front edge of the bench. The horizontal illuminance is measured with a vertical sensor placed at the top edge of the front side of the bench. The uniformity of the illuminance should be within ±15 % over the whole edge length of that part of the bench which is used.

NOTE 4 – A suitable light source configuration may be to arrange single tubes along a line in the length direction of the room and to leave about 1 mm near the walls without sources.

NOTE 5 – If needed in order to achieve the proper balance between vertical and horizontal illuminance, the upper part of the room wall opposite that with the bench may also be grey.

NOTE 6 – The choice of only one lighting condition is in order to reduce the complexity of the tests. The specified condition is considered to represent an average of comparatively well-lit kitchens without daylight conditions. Daylight conditions or conditions with ambient illumination with 2 klx to 4 klx may not change the ranking between most ovens.

The presence in the test room of the person performing the measurements in 6.3 and 6.4 and the panel test participants in clause 7 should not affect the measurements significantly. It is therefore recommended that white or lightly coloured clothes be worn.

5 List of measurements

The technical tests for visual clarity are specified in table 1.

Table 1 – Technical tests for visual clarity

Item of measurement	Subclause	Performance factor	Complete technical test	Requires test room	Internal light source	External light source
Internal vertical illuminance at the shelf	6.2	Internal illuminance *E*	x		ON	OFF
Light transmission through the door	6.3	Transmitted illuminance (E_t)	x		ON	OFF
Diffusely reflected luminance from the viewing screen	6.4	Screen luminance (L_s)	x	x[1)]	OFF	ON
Raster patchiness of the viewing screen	6.5	Raster performance factor *F*	x		–	–

[1)] Ovens having an external depth of more than 500 mm and stationary ovens cannot be properly tested in the test room.

6 Technical tests and evaluation

6.1 General and oven placement

The position of the oven(s) is on the benchtop with about 10 cm free bench depth in front of the oven, measured from the plane of the outer (glass or plastic) surface of the viewing screen.

NOTE – Three or more ovens are placed at the bench simultaneously and adjacent to each other depending on the evenness of the external lighting.

The disc described in 4.2 is in the cavity during all tests. It is placed at the centre of the shelf.

In the test in 6.2 the small blocks described in 4.2 may also be needed for supporting the light sensor.

6.2 Measurement of internal vertical illuminance at the cavity shelf

The test room light source is switched off and the light source in the cavity is switched on.

Five horizontal sensors are placed in the positions shown in figure 3a of IEC 60705 for rectangular shelves and figure 3b for circular shelves. The sensors are placed on the disc and/or one or two small blocks depending on the specified position in relation to the disc. Measurements are made with the door closed (or almost closed to accommodate the sensor leads).

The results are evaluated by excluding the single highest and lowest values and then calculating the average value of the three remaining to obtain the *internal illuminance E* (in lux).

6.3 Measurement of light transmission through the door

The test room light source is switched off. The light source in the cavity is switched on. The luminance of the grey disc is measured from the outside with the sensor directed towards the centre portion of the disc at a height angle of 20° and a side angle 0° (i.e. straight towards the vertical plane of the closed door but from a height of 34 cm/m horizontal distance from the disc centre). Care should be taken that the measured area is much larger than any door screen hole pattern periodicity.

The measurements are made with the sensor 0,8 m or more from the external surface of the door in the closed position. The measured values are to be averaged over a reasonably large part of the disc.

Measurements are made both with the door closed (L_c) and the door open (L_o).

NOTE 1 – If the cavity lamp cannot be operated with the door open, the test is not made and this is reported.

The result is evaluated by calculating the *transmitted illuminance* $E\, L_c/L_o = E_t$ (in lux).

NOTE 2 – For calculations of a total visual clarity grade, the factor $50/E_t$ may be used for the relative importance of the light transmission. The constant 50 is empirically deduced for achieving the best agreement with results of panel testing.

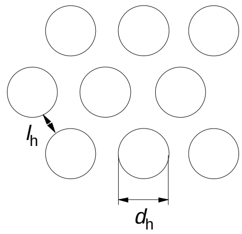
NOTE 3 – A separate independent factor related to the light transmission is also used (see 6.6).

6.4 Measurement of diffusely reflected luminance from the viewing screen

The measurement is made as in 6.3 with regard to the sensor position and direction but with the light source in the cavity switched off and the test room light source switched on. The door is closed. A new value (L_s) is obtained.

The result is evaluated by directly using the *screen luminance* L_s (cd/m^2).

6.5 Measurement of the raster patchiness of the viewing screen



IEC 1 407/98

Figure 1 – Raster dimensions

NOTE 1 – The reason for this aspect being a performance factor in addition to the transmitted illuminance measured in 6.3 is that visual see-through effects resulting in partial or full shadowing of parts of the cavity load by the raster geometry may occur. No part of the load is fully obscured if the rays to the diameter of the eye pupil going through a hole diameter periphery leaves an unobstructed view or a half-shadow view which overlaps the view through an adjacent hole (see figure 2). A dimension of the pupil is assumed for the purpose of grading.

The screen hole diameter d_h is measured. The screen distance (minimum blocking length) between the peripheries of two adjacent holes ℓ_h is also measured (see figure 1).

NOTE 2 – Since the hole screen may not be accessible for direct measurement, it is recommended to use a loupe (type thread-counter with ocular scale).

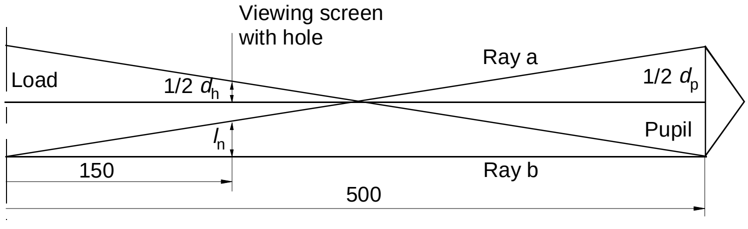
NOTE 3 – If the raster has a more complex geometry than that in figure 1, the largest ℓ_h between any two adjacent holes is measured.

For calculation of a raster performance factor, the nominal diameter of the pupil d_p is set to 3 mm, the distance from the eye to a significant area of the food load is set to 500 mm and the distance from the screen to the food load set to 150 mm. Furthermore, an idealization is made by assuming essentially perpendicular viewing through the screen. Referring to figure 2, the two equal-angled triangles with vertical sides d_p and ℓ_h (rays a and b) are used to obtain the criterion for overlapping in the figure, the rays just meet and there would be a full shadow zone if ℓ_h were slightly larger. The condition becomes $\ell_h < 150\ d_p/500$. With d_p set to 3 mm, the condition becomes $\ell_h < \approx 1$ mm. This means that an ℓ_h larger than about 1 mm is unfavourable. A proper choice for a grading where a small figure is favourable is a linear function with a correction term due to the fact that the actual shadowing structure is normally irregular and has shadowing parts larger than ℓ_h, so that even $\ell_h = 0$ results in some shadowing. A factor $(\ell_h + 0{,}2)$ is suggested with all dimensions in millimetres.

The perception of clarity of the view through the screen is also influenced by the overall size of the hole pattern periodicity. A small distance $d_h + \ell_h$ in comparison with the pupil diameter is then favourable. Multiplication by this period length then gives the *raster performance factor F* (with all dimensions in millimetres; a lower value represents a better performance) as $F = (\ell_h + 0{,}2)\ (d_h + \ell_h)$.

NOTE 4 – For rasters of more complex geometry, $d_h + \ell_h$ is the average of the periodicity in two perpendicular directions.

NOTE 5 – For calculations of total visual clarity grade the term 1,5 F may be used (see 6.6). The constant 1,5 is empirically deduced for achieving the best agreement with results of panel testing.



IEC 1 408/98

Figure 2 – Raster analysis of viewing screen

6.6 Total result – Presentation of data

There will be four general results:

- the *internal illuminance* E (in lux): a larger value is better;
- the *transmitted illuminance* $E \cdot L_c/L_o = E_t$ (in lux): a larger value is better;
- the *screen luminance* L_s (in cd/m^2): a smaller value is better;
- the *raster performance factor* $F = (\ell_h + 0{,}2)\ (d_h + \ell_h)$: a smaller value is better.

The relative importance of these results to the user depends on the environment where the oven will be used. The four general factors are independent. Comparison with panel testing results show that F and L_s have a large importance and that E_t is more of a correction factor. Since E is included in E_t, there is no need to include it again in the total grade.

The formula below may be used to obtain an overall technical performance grade. It must then be noted that the additional factors in clause 3 are not included. However, corrections may be made for those factors if a ranking of ovens is to be made. The formula and results should therefore be used with caution.

Total technical visual clarity grade $G \approx 50/E_t + L_s + 1{,}5\ (\ell_h + 0{,}2)\ (d_h + \ell_h)$

A lower G value indicates a better performance.

7 Panel tests and evaluation

7.1 Cavity load

This should be a real or simulated food load such as a ready meal in a package (without wrapping) or the sponge cake in test B in subclause 17.3.2 of IEC 60705. Two or three different test loads should be used and care should be taken to ensure that the details of the replicates are very similar.

7.2 Comparative testing conditions

The test room conditions specified in 4.4 should be available. It is recommended that at least four ovens be compared at a time and that each oven appear twice in a different position on the benchtop.

If the oven has a rotating shelf, this should rotate during the test at the lowest possible power setting.

Two ambient lighting conditions are used: no (or very weak) light and the lighting specified in 4.4. If also the specular reflection is to be compared, white slabs should be used in front of each oven. This results in three different conditions and rankings for some ovens.

The panel participants should be allowed to stand at any distance and position they would normally prefer in actual situations for viewing food in the oven. Two distances are recommended: 1,2 m and a shorter distance determined by the participant. Effects of any shadows caused by the participants should be neglected.

7.3 Tests

The participants are asked to provide an overall ranking of the ovens appearing in each set.

7.4 Evaluation

The significance of the ranking is verified by statistical methods using the duplicate appearances of each oven.

Weighting factors are applied to the results with each of the three test conditions in order to obtain an overall ranking, unless the results under each condition are reported and explained separately. The weighting factor for the two results with the ambient lighting specified in 4.4 is recommended to be 3 and 1 for the dark room.

Annex A
(informative)

Test results obtained in the laboratory of the National Swedish Board for Consumer Policies

The table below gives measured and calculated values obtained by tests according to the procedures described in the technical report, in a room according to 4.4.

Oven #	E(lx)	E_t lx	L_s cd/m^2	d_p mm	ℓ_h mm	$50/E_t + L_s + 1,5 (\ell_h + 0,2)(d_p + \ell_h)$	Grade G	**Technical ranking**[1)]	**Panel ranking**[1)]
1	39	17,4	4,4	0,7	0,5	2,9 + 4,4 + 1,3	8,6	1	1
2	84	27,5	3,0	1,4	1,2	1,8 + 3,0 + 5,5	10,3	2	1
3	104	18,0	1,85	1,4	1,3	2,8 + 1,9 + 6,1	10,8	2	2
4	38	10,2	2,7	1,9	1,0	4,9 + 2,7 + 5,2	12,8	3	3
A	50	15,2	3,6	1,3	1,3	3,3 + 3,6 + 5,9	12,8	3	3
5	106	57,1	11,9	1,3	0,8	0,9 + 11,9 + 3,2	16,0	3	3
6	159	41,1	11,3	1,0	2,1	1,2 + 11,3 + 10,7	23,2	4	3
B	68	32,9	13,3	1,2	1,6	1,5 + 13,3 + 7,6	22,4	4	4
7	106	63,8	12,4	1,5	1,0	0,8 + 12,4 + 4,5	17,7	3	4
8	61	6,8	1,2	1,1	2,0	7,4 + 1,2 + 10,2	18,8	3	4
C	82	25,3	3,6	1,3	1,3	2,0 + 3,6 + 5,9	11,5	2	2

[1)] Made in four categories where category 1 is the best.

It is seen that the variability between ovens is substantial and that the factors contributing to the ranking have widely varying influences for the different ovens. However, the technical and panel rankings do not differ by more than one unit for any of the 11 ovens and coincide for seven of them. For at least two of the remaining four ovens the difference between the technical and panel rankings can be attributed to the white door insides, the stainless back walls of the cavity and the size of the viewing screen in relation to the door opening. All these factors are listed in clause 3 and their possible use for corrections is addressed in 6.6.

Standards Survey

The IEC would like to offer you the best quality standards possible. To make sure that we continue to meet your needs, your feedback is essential. Would you please take a minute to answer the questions overleaf and fax them to us at +41 22 919 03 00 or mail them to the address below. Thank you!

Customer Service Centre (CSC)

International Electrotechnical Commission
3, rue de Varembé
1211 Genève 20
Switzerland

or

Fax to: **IEC**/CSC at +41 22 919 03 00

Thank you for your contribution to the standards-making process.

Nicht frankieren
Ne pas affranchir

Non affrancare
No stamp required

A Prioritaire

RÉPONSE PAYÉE

SUISSE

Customer Service Centre (CSC)
International Electrotechnical Commission
3, rue de Varembé
1211 GENEVA 20
Switzerland

Q1 Please report on **ONE STANDARD** and **ONE STANDARD ONLY**. Enter the exact number of the standard: *(e.g. 60601-1-1)*

....

Q2 Please tell us in what capacity(ies) you bought the standard *(tick all that apply).* I am the/a:

purchasing agent ❑
librarian ❑
researcher ❑
design engineer ❑
safety engineer ❑
testing engineer ❑
marketing specialist ❑
other...

Q3 I work for/in/as a: *(tick all that apply)*

manufacturing ❑
consultant ❑
government ❑
test/certification facility ❑
public utility ❑
education ❑
military ❑
other...

Q4 This standard will be used for: *(tick all that apply)*

general reference ❑
product research ❑
product design/development ❑
specifications ❑
tenders ❑
quality assessment ❑
certification ❑
technical documentation ❑
thesis ❑
manufacturing ❑
other...

Q5 This standard meets my needs: *(tick one)*

not at all ❑
nearly ❑
fairly well ❑
exactly ❑

Q6 If you ticked NOT AT ALL in Question 5 the reason is: *(tick all that apply)*

standard is out of date ❑
standard is incomplete ❑
standard is too academic ❑
standard is too superficial ❑
title is misleading ❑
I made the wrong choice ❑
other ....

Q7 Please assess the standard in the following categories, using the numbers:
(1) unacceptable,
(2) below average,
(3) average,
(4) above average,
(5) exceptional,
(6) not applicable

timeliness ....
quality of writing....................................
technical contents...................................
logic of arrangement of contents ....
tables, charts, graphs, figures...............
other ....

Q8 I read/use the: *(tick one)*

French text only ❑
English text only ❑
both English and French texts ❑

Q9 Please share any comment on any aspect of the IEC that you would like us to know:

....
....
....
....
....
....
....
....
....
....
....
....

ISBN 2-8318-4498-3

9 782831 844985

ICS 97.040.29

Typeset and printed by the IEC Central Office
GENEVA, SWITZERLAND