BS EN 62875:2015

BSI Standards Publication

Multimedia systems and equipment — Multimedia e-publishing and e-book technologies — Printing specification of texture map for auditory presentation of printed texts

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The UK participation in its preparation was entrusted to Technical Committee EPL/100, Audio, video and multimedia systems and equipment.

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

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Multimedia systems and equipment - Multimedia e-publishing and e-book technologies - Printing specification of texture map for auditory presentation of printed texts (IEC 62875:2015)

Systèmes et appareils multimédia - Technologies de L'édition électronique multimédia et des livres électroniques - Spécification d'impression de la carte de texture pour la présentation auditive de textes imprimés (IEC 62875:2015)

Multimediasysteme und -geräte - Druckfestlegung der Textur-Abbildung für die auditive Umsetzung von gedruckten Texte (IEC 62875:2015)

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Foreword

The text of document 100/2292/CDV, future edition 1 of IEC 62875, prepared by IEC/TC 100, "Audio, video and multimedia systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62875:2015.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2015-12-31
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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

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Publication	Year	Title	EN/HD	Year
IEC 62665	-	Multimedia systems and equipment - Multimedia e-publishing and e-books technologies - Texture map for auditory presentation of printed texts	EN 62665	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MULTIMEDIA SYSTEMS AND EQUIPMENT – MULTIMEDIA E-PUBLISHING AND E-BOOK TECHNOLOGIES – PRINTING SPECIFICATION OF TEXTURE MAP FOR AUDITORY PRESENTATION OF PRINTED TEXTS

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The text of this standard is based on the following documents:

CDV	Report on voting
100/2292/CDV	100/2400/RVC

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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MULTIMEDIA SYSTEMS AND EQUIPMENT – MULTIMEDIA E-PUBLISHING AND E-BOOK TECHNOLOGIES – PRINTING SPECIFICATION OF TEXTURE MAP FOR AUDITORY PRESENTATION OF PRINTED TEXTS

1 Scope

The texture map for auditory presentation of printed texts is printed on paper or shown on display devices. This International Standard specifies the printing quality of this texture map on paper.

In order to ensure an interoperability of the texture map specified in IEC 62665, a printing specification based on the quality of this International Standard should be employed.

2 Normative reference

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

IEC 62665*, Multimedia systems and equipment – Multimedia e-publishing and e-books technologies – Texture map for auditory presentation of printed texts*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
texture map
two dimensional cell patterns which include alignment lines and a data matrix

[SOURCE: IEC 62665, 2.1, modified – Definition has been clarified.]

3.2
data matrix
two dimensional cell patterns generated from text data compression and error correction encoding

3.3
cell
minimum square dot which constitutes a data matrix

3.4
alignment line
border line which encloses a texture map

Note 1 to entry: An alignment line consists of solid lines and tick marks. The solid lines have a cell's width and may partially be interrupted.

Note 2 to entry: For additional information on alignment lines, see IEC 62665.

3.5
tick mark
positioning mark which intersects perpendicularly with the solid lines and is given at equal intervals on the solid lines of an alignment line

Note 1 to entry: A tick mark indicates the unit boundary and has a cell's width.

3.6
quiet zone
non-printing area outside of a texture map

3.7
unit
square area which consists of 11 × 11 cells in a texture map

4 Printing specification

4.1 General

Texture maps generated by a system are specified by IEC 62665 and a printing quality of the texture maps has to be standardized to ensure interoperability of the printed texture maps.

Texture maps should be printed on paper with a resolution of ≥600 dpi (dots per inch, ≥23,622 dot/mm). In order to minimize specular reflection, a mat coated paper or a low reflection paper should be used.

4.2 Size of a texture map

Four sizes of a texture map are specified by IEC 62665 and they have their dimensions shown in Table 1.

Table 1 – Sizes of a texture map

Size	Number of cells	Number of units	Dimensions at printing mm
XS	40 × 40	3 × 3	6,8 × 6,8
S	73 × 73	6 × 6	12,4 × 12,4
M	106 × 106	9 × 9	17,9 × 17,9
L	117 × 117	10 × 10	19,8 × 19,8

4.3 Printing quality of a texture map

4.3.1 Printing quality

Printing quality of a texture map is defined by the average Q of values of the following quality measures and indicated with the symbol A, B, C, D or F, as shown in Table 2.

The following aspects define the printing quality:

a) print contrast;
b) symmetry of cell pattern;
c) squareness;
d) size accuracy,
e) tick mark identification;
f) quiet zone sufficiency;

g) uselessness of error correction, and

h) decodability.

Table 2 – Printing quality of a texture map

Q (average of the values of quality measures a) through h))	Printing quality of a texture map
$3,4 \leqq Q \leqq 4,0$	A
$2,6 \leqq Q < 3,4$	B
$1,8 \leqq Q < 2,6$	C
$1,0 \leqq Q < 1,8$	D
$Q < 1,0$	F

4.3.2 Sampling line

The values of quality measures a) through d) are defined by scanning cells on 10 sampling lines (5 horizontal and 5 vertical lines). A sampling line connects the corresponding tick marks on the opposite alignment lines, as shown in Figure 1. For the size XS texture map, every tick mark is connected by a sampling line. For size S, M and L texture maps, every other tick mark is connected by a sampling line.

The values of quality measures a) through d) are defined by scanning cells on 10 sampling lines (5 horizontal and 5 vertical lines). A sampling line connects the corresponding tick marks on the opposite alignment lines as shown in Figure 1. For size XS texture map, every tick mark is connected by a sampling line. For size S, M and L texture maps, every other tick mark is connected by a sampling line.

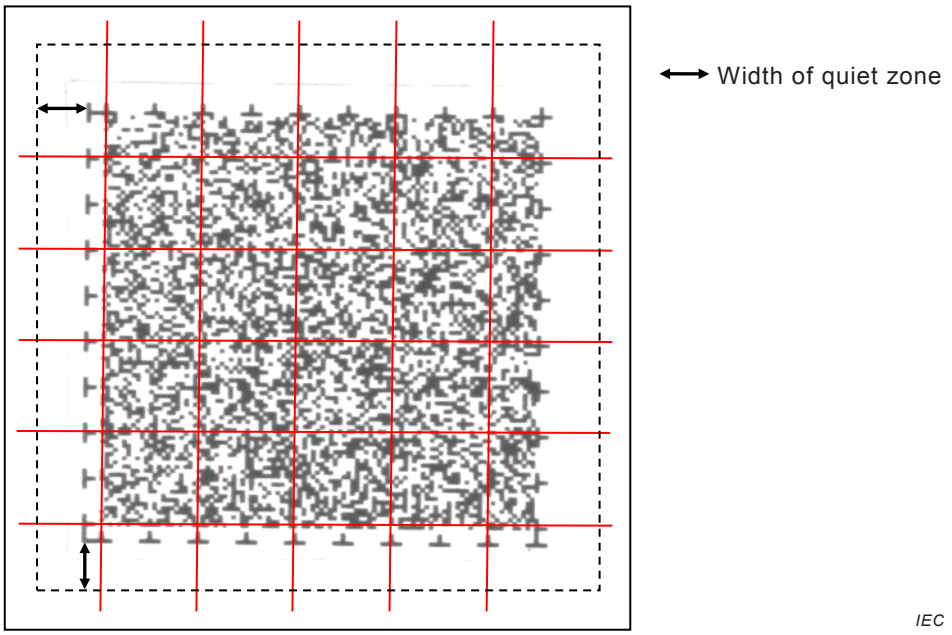

Figure 1 – Sampling lines in case of size M texture map

4.3.3 Quality measure

Each quality measure is defined as follows:

a) print contrast

For the reflectance pattern of white and black cells on scanning the sampling lines, using

RL_{min} minimum value of reflectance of white cells,

RL_{ave} average value of reflectance of white cells, and

RD_{max} maximum value of reflectance of black cells,

RC is defined as

$$RC = (RL_{min} - RD_{max}) / RL_{ave}. \quad (1)$$

The value of the print contrast is determined in accordance with the range of RC, as shown in Table 3.

Table 3 – Value of print contrast

RC	Value of print contrast
$0{,}90 \leqq RC$	4
$0{,}85 \leqq RC < 0{,}90$	3
$0{,}80 \leqq RC < 0{,}85$	2
$0{,}75 \leqq RC < 0{,}80$	1
$RC < 0{,}75$	0

b) symmetry of cell pattern

For the reflectance pattern of white and black cells on scanning the sampling lines, using

RL_{ave} average value of reflectance of white cells, and

RD_{ave} average value of reflectance of black cells,

the threshold RT (see Figure 2) is defined as

$$RT = (RL_{ave} + RD_{ave}) / 2. \quad (2)$$

Using the maximum value WL_{max} and minimum values WL_{min} of

WL width of the reflectance pattern of 4 connected white cells (interval between the leading and trailing points crossing RT),

and the maximum value WD_{max} and minimum values WD_{min} of

WD width of the reflectance pattern of 4 connected black cells (interval between the leading and trailing points crossing the RT),

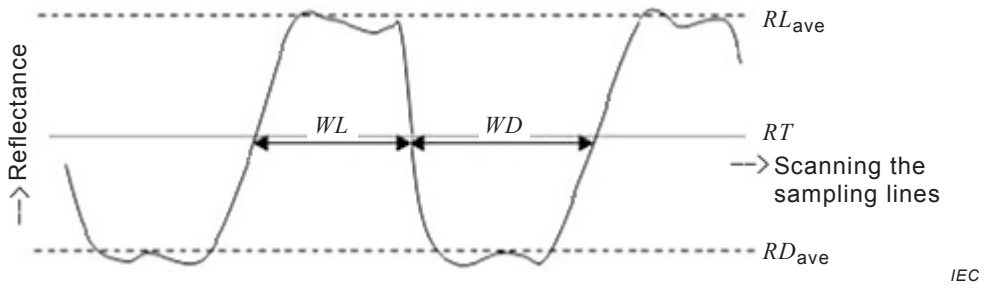

Figure 2 – Reflectance pattern of cells on scanning the sampling lines

WS is defined as

$$WS = |WD_{max} - WL_{min}| / WD_{max} \text{ (or } |WD_{min} - WL_{max}| / WL_{max}) \quad (3)$$

The value of the symmetry of cell pattern is determined in accordance with the range WS as shown in Table 4.

Table 4 – Value of symmetry of cell pattern

WS	Value of symmetry of cell pattern
$0,02 \geqq WS$	4
$0,05 \geqq WS > 0,02$	3
$0,10 \geqq WS > 0,05$	2
$0,15 \geqq WS > 0,10$	1
$WS > 0,15$	0

c) squareness

Using the average NX_{ave} of

NX number of cells between end points of tick marks on horizontal sampling lines (see Figure 3),

and the average NY_{ave} of

NY number of cells between end points of tick marks on vertical sampling lines,

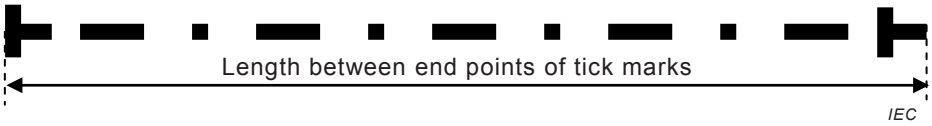

Figure 3 – Length between end points of tick marks on a horizontal sampling line

NQ is defined as

$$NQ = |NX_{ave} - NY_{ave}| / (NX_{ave} + NY_{ave}) / 2. \quad (4)$$

The value of squareness is determined in accordance with the range of NQ as shown in Table 5.

Table 5 – Value of squareness

NQ	Value of squareness
$0,005 \geqq NQ$	4
$0,010 \geqq NQ > 0,005$	3
$0,020 \geqq NQ > 0,010$	2
$0,030 \geqq NQ > 0,020$	1
$NQ > 0,030$	0

d) size accuracy

Using

$(NX_{ave} + NY_{ave}) / 2$ average number of cells between end points of tick marks on a sampling line, and

NE standard number of cells between end points of tick marks on a sampling line (see Figure 1),

NN (normalized difference between them) is defined as

$$NN = |NE - (NX_{ave} + NY_{ave}) / 2| / NE. \quad (5)$$

The value of size accuracy is determined in accordance with the range of NN as shown in Table 6.

Table 6 – Value of size accuracy

NN	Value of size accuracy
0,005 ≧ NN	4
0,010 ≧ NN > 0,005	3
0,020 ≧ NN > 0,010	2
0,030 ≧ NN > 0,020	1
NN > 0,030	0

e) tick mark identification

Using

NI number of identified tick marks, and

NS standard number of tick marks,

ND is defined as

$$ND = |NS - NI|. \quad (6)$$

The value of tick mark identification is determined in accordance with the value of ND as shown in Table 7.

Table 7 – Value of tick mark identification

ND	Value of tick mark identification
ND = 0	4
ND ≧ 1	0

f) quiet zone sufficiency

Using

M horizontal and vertical width of the quiet zone,

the value of quiet zone sufficiency is determined in accordance with the value of M as shown in Table 8.

Table 8 – Value of quiet zone sufficiency

M mm	Value of quiet zone sufficiency
M ≧ 4	4
M < 4	0

g) uselessness of error correction

Using

NC number of error correction enforcements in text decoding of a texture map,

the value of uselessness of error correction is determined in accordance with the range of NC as shown in Table 9.

Table 9 – Value of uselessness of error correction

NC	Value of uselessness of error correction
$5 \geqq NC$	4
$10 \geqq NC > 5$	3
$15 \geqq NC > 10$	2
$20 \geqq NC > 15$	1
$NC > 20$	0

h) decodability

The value of decodability is determined in accordance with the result of the text decoding of a texture map as shown in Table 10.

Table 10 – Value of decodability

Result of text decoding	Value of decodability
Success	4
Failure	0

4.4 Location of a texture map

A texture map shall be printed with its center located at L (25 ± 0,5) mm apart from each edges of paper as shown in Figure 4. Outside the texture map, the quiet zone shall be located with its horizontal and vertical width M of 4 mm or more.

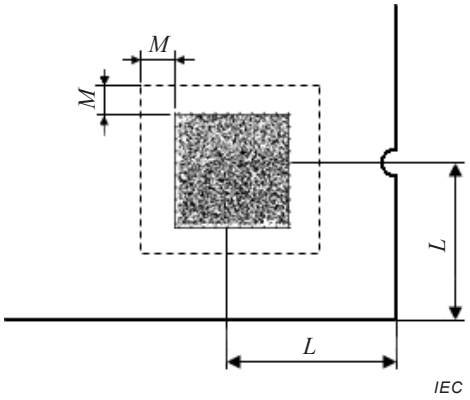

Figure 4 – Location of a texture map

4.5 Location of a notch

A notch is required so that blind or vision impaired people may recognize a texture map on its paper. If a texture map is printed on a single side of the paper, a single notch shall be located, as shown in Figure 5, at an edge of the paper on which a texture map is printed. A notch shall have its diameter D of (5 ± 0,5) mm.

If a texture map is printed on both sides of a paper, double notches shall be located, as shown in Figure 6, at the same edge of the paper. The distance d between notches shall be (9 ± 1,0) mm.

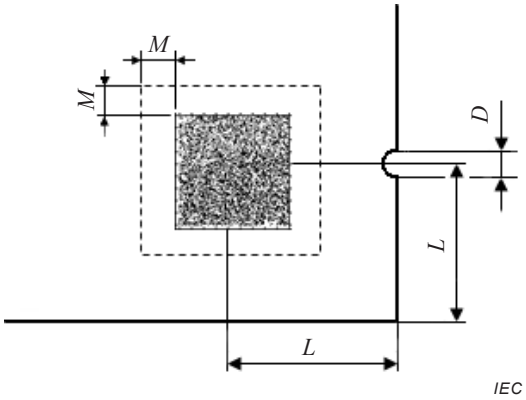

Figure 5 – Location of a single notch

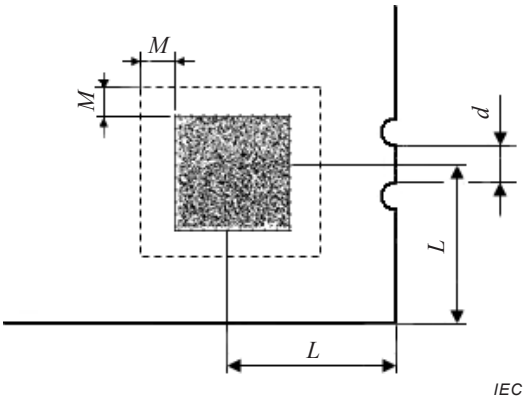

Figure 6 – Location of double notches

Annex A
(informative)

Examples of visible quality of a texture map

Visible quality of a texture map depends on the constitution of cells that will affect the

a) print contrast,
b) symmetry of cell pattern,
c) squareness,
d) size accuracy, and
e) tick mark identification,

Some examples of visible quality are shown in Figure A.1, Figure A.2, Figure A.3 and Figure A.4.

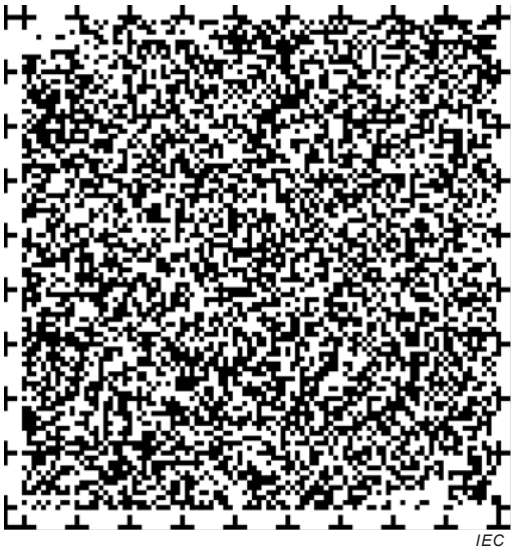

Figure A.1 – Texture map with high printing quality

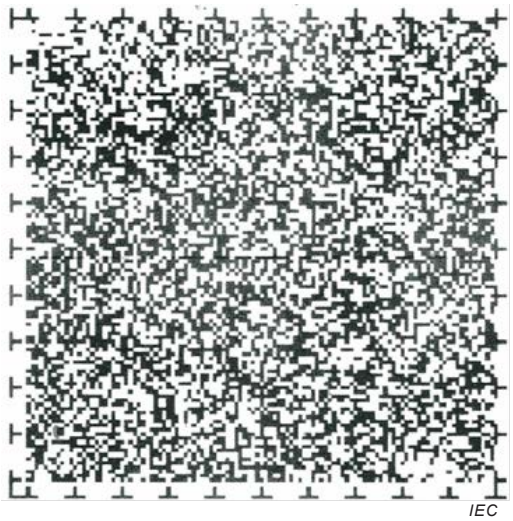

Figure A.2 – Texture map including low contrast cells and non-square cells

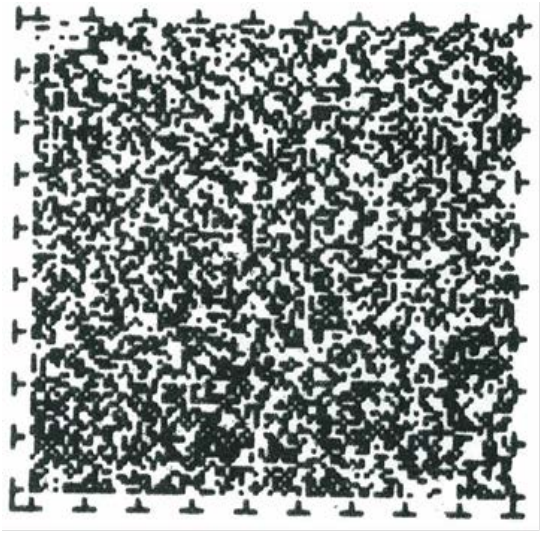

Figure A.3 – Texture map with low sharpness

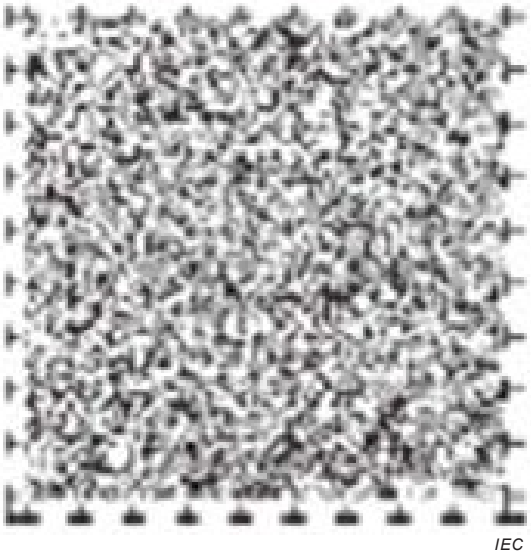

Figure A.4 – Texture map processed by non-preserving data compression

Annex B
(informative)

Creating process of printed matter including a texture map

A typical flow of creating process of printed matter including a texture map is shown in Figure B.1.

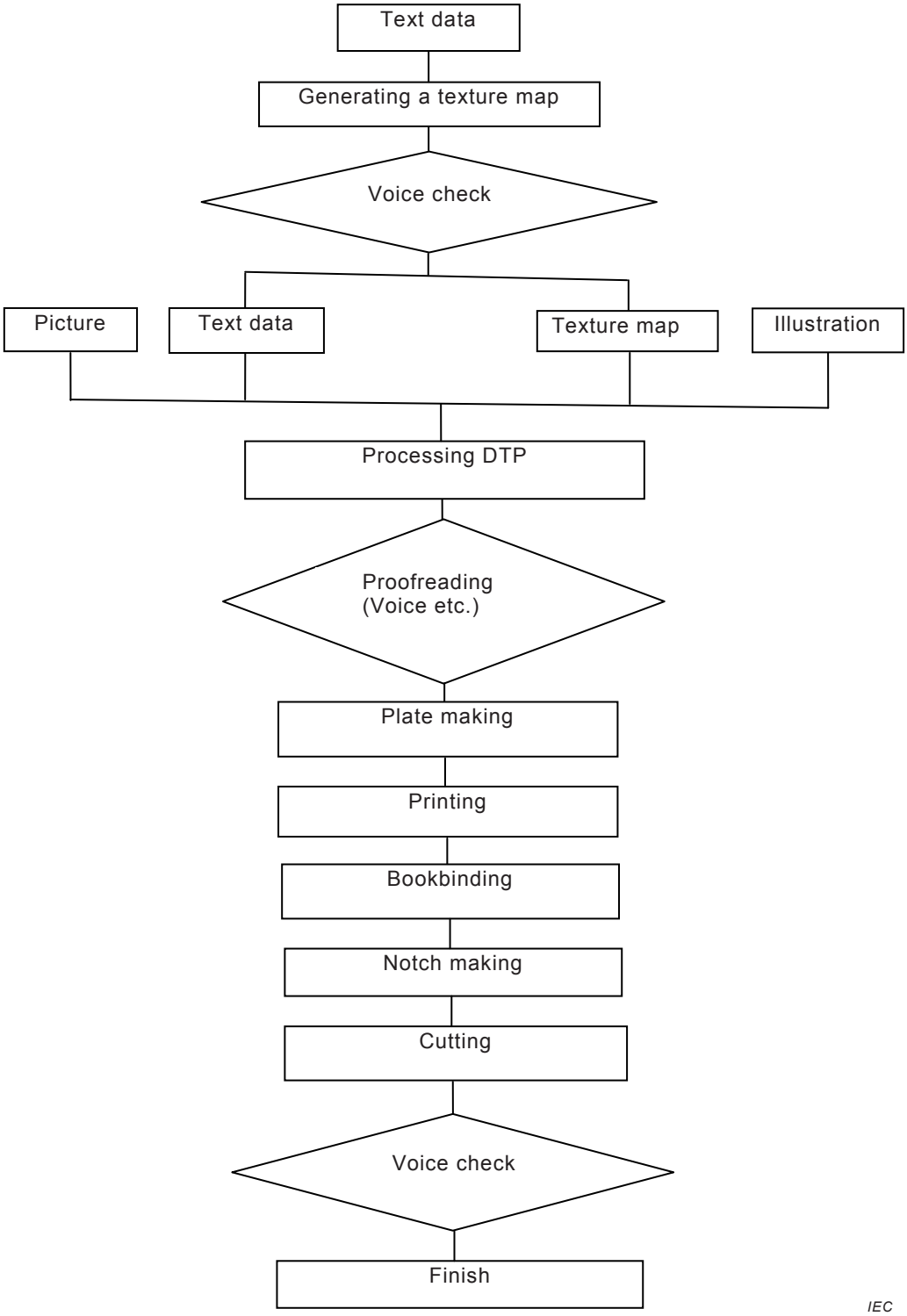

Figure B.1 – Creating process of printed matter including a texture map

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