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Liquid crystal display devices –
Part 20-3: Visual inspection – Active matrix colour liquid crystal display modules
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LIQUID CRYSTAL DISPLAY DEVICES –

**Part 20-3: Visual inspection – Active matrix colour
liquid crystal display modules**

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International Standard IEC 61747-20-3 has been prepared by IEC technical committee 110: Electronic display devices.

This first edition cancels and replaces the first edition of IEC 61747-5-2 published in 2011. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) document numbering was changed to align with the new numbering of IEC 61747.

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

FDIS	Report on voting
110/725/FDIS	110/740/RVD

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.

A list of all parts of the IEC 61747 series, under the general title *Liquid crystal display devices*, can be found on the IEC website.

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- withdrawn,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.

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

This part of IEC 61747 facilitates the visual inspection of the image defect of LCD modules by human eyes subjectively. Visual inspection is performed at specified conditions and criteria. The objective measurement method of visual image defects with an instrument will be studied and standardized.

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LIQUID CRYSTAL DISPLAY DEVICES –

Part 20-3: Visual inspection – Active matrix colour liquid crystal display modules

1 Scope

This part of IEC 61747 gives the details of the quality assessment procedures and provides general rules for visual inspection of the active area of transmissive type active matrix colour liquid crystal display modules by the human eye. Furthermore, this standard includes defect definitions and the method for visual defect inspection.

NOTE 1 Mura is excluded from this standard because it was not clearly specified at the time this standard was developed.

NOTE 2 Restrictions on defect types, number, and sizes are specified in the quality contract (customer acceptance specification and incoming inspection specification).

2 Normative references

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 61747-10-2:2014, *Liquid crystal display devices – Part 10-2: Environmental, endurance and mechanical test methods – Environmental and endurance*

3 Terms, definitions and abbreviations

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

3.1 General

3.1.1

visual inspection

method of checking display defects with the human eye

Note 1 to entry: The limitation on display defects depends on supplier and customer. Therefore a limit sample, with well-defined observation and operational conditions, can be used as a reference for the defect level.

3.2

defect

any observable abnormal phenomenon appearing in the active display area

EXAMPLE Figure 1 shows a classification of defects into two categories. The first category is classified as defects with a clear boundary, and the second category is classified as defects with an unclear boundary. The latter category is not yet well defined, and hence difficult to evaluate. For this reason, defects in the second category are excluded from this standard.

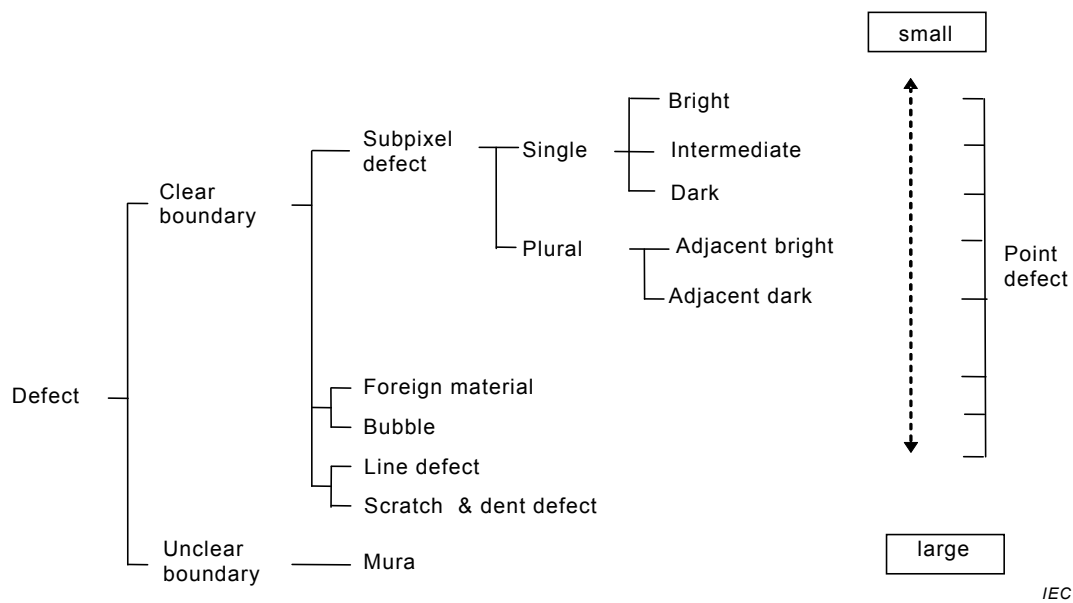


Figure 1 – Classification of defects by visual inspection

3.2.1

subpixel defect

defect in the smallest pixel element when it appears in a state different from the intended one

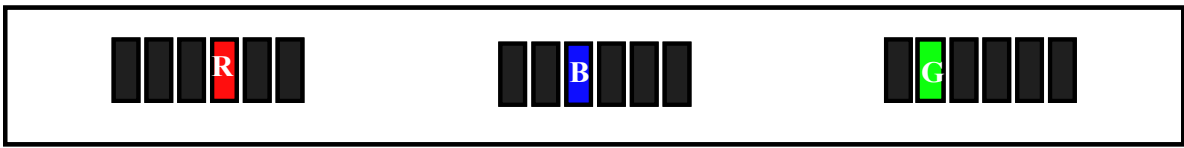
EXAMPLE Bright subpixels appear on a dark pattern, and dark subpixels appear on a bright pattern.

3.2.2

bright subpixel defect

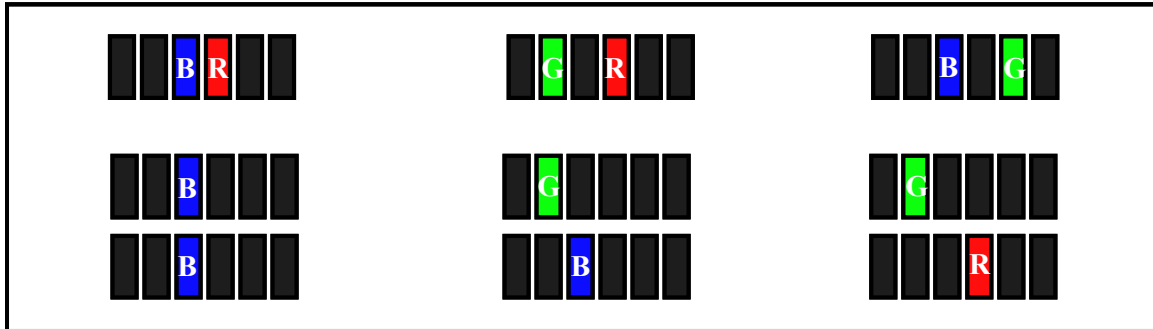
defect which appears bright on the screen when a dark pattern is displayed

EXAMPLE Figure 2 a) shows a single subpixel bright defect of red, green, and blue respectively. Figure 2 b) shows two adjacent bright subpixel defects connected or disconnected in a horizontal and/or vertical one-pixel area. Figure 2 c) shows three adjacent bright subpixel defects connected in three horizontal and/or vertical subpixel areas.



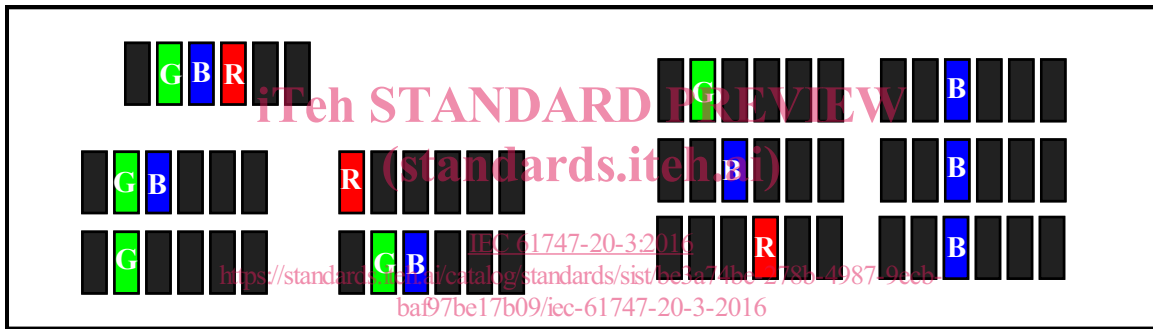
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Figure 2 a) – Examples of one bright subpixel defect



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Figure 2 b) – Examples of two adjacent bright subpixel defects



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Figure 2 c) –Examples of three adjacent bright subpixel defects

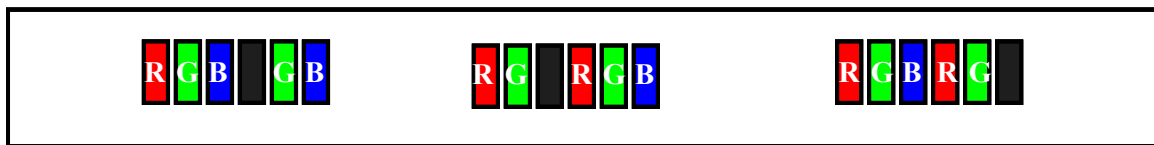
Figure 2 – Examples of bright subpixel and adjacent subpixel defects in case of an RGB primary colour display

3.2.3

dark subpixel defect

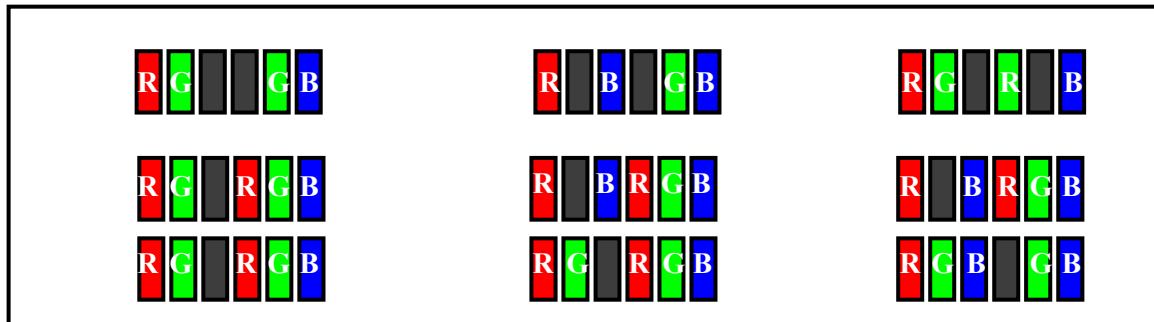
defect which appears dark on the screen when a bright pattern is displayed

EXAMPLE Figure 3 a) shows a single subpixel defect of the dark-type of red, green, blue, respectively. Figure 3 b) shows two adjacent dark subpixel defects connected or disconnected in a horizontal and/or vertical one-pixel area. Figure 3 c) shows three adjacent dark subpixel defects connected in three horizontal and/or vertical subpixel areas.



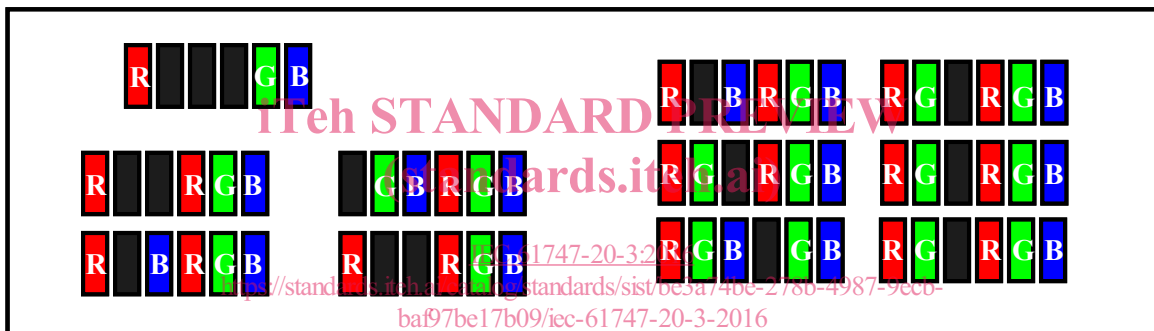
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Figure 3 a) – One dark subpixel defect



IEC

Figure 3 b) – Two adjacent dark subpixel defects



IEC

Figure 3 c) – Three adjacent dark subpixel defects

Figure 3 – Examples of dark subpixel and adjacent subpixel defects in case of RGB primary colour display

3.2.4

intermediate subpixel defect

defect which appears with an intermediate luminance level on the screen when a bright or dark pattern is displayed

3.2.5

cluster subpixel defect

at least two subpixel defects in a specified area or within a specified distance with many subpixel defects

EXAMPLE Figure 4 a) and Figure 4 b) show an example of bright and dark cluster subpixel defects in which the minimum distance between the defects is specified. “ d_h ” and “ d_v ” stand for horizontal and vertical minimum distance.