

# INTERNATIONAL STANDARD

Liquid crystal display devices –  
Part 20-1: Visual inspection – Monochrome liquid crystal display cells  
(excluding all active matrix liquid crystal display cells)

[IEC 61747-20-1:2015](https://standards.iteh.ai/catalog/standards/sist/58bb8c7-f14a-48d7-bfa4-1c674e62d6ef/iec-61747-20-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/58bb8c7-f14a-48d7-bfa4-1c674e62d6ef/iec-61747-20-1-2015>



**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2015 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

**About the IEC**

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

**About IEC publications**

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

**IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)**

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

**Electropedia - [www.electropedia.org](http://www.electropedia.org)**

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

**IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)**

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

**IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)**

More than 60 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

**IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)**

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

**IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)**

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [csc@iec.ch](mailto:csc@iec.ch).

IEC'S STANDARD PREVIEW  
(standards.ch)

1c674e62d6ef/iec-61747-20-1-2015

# INTERNATIONAL STANDARD

---

**Liquid crystal display devices –**  
**Part 20-1: Visual inspection – Monochrome liquid crystal display cells**  
**(excluding all active matrix liquid crystal display cells)**

[IEC 61747-20-1:2015](https://standards.iteh.ai/catalog/standards/sist/58bb8c7-f14a-48d7-bfa4-1c674e62d6ef/iec-61747-20-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/58bb8c7-f14a-48d7-bfa4-1c674e62d6ef/iec-61747-20-1-2015>

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 31.120

ISBN 978-2-8322-2256-0

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references .....	6
3 Terms, definitions and abbreviations .....	6
3.1 Terms and definitions.....	6
3.2 Abbreviations.....	6
4 Visual inspection method and criteria .....	6
4.1 Standard inspection conditions and methods .....	6
4.1.1 Ambient conditions .....	6
4.1.2 Inspection equipment and liquid crystal display cells .....	7
4.1.3 Inspector and limit sample for visual inspection .....	7
4.1.4 Inspection and record of result.....	7
4.2 Visual inspection of display.....	7
4.2.1 Display not activated .....	7
4.2.2 Display activated .....	9
4.2.3 Seal inspection .....	11
4.2.4 Contact pad area .....	12
4.2.5 Chipped material at the borders and edges of support plates of cells.....	13
Bibliography.....	14
 IEC 61747-20-1:2015 with its corrigia and amendments available at <a href="http://www.standardsite.org/standards/sist/58bf8c7-f14a-48d7-bfa4-1c674e62d6ef/iec-61747-20-1-2015">http://www.standardsite.org/standards/sist/58bf8c7-f14a-48d7-bfa4-1c674e62d6ef/iec-61747-20-1-2015</a>	
Figure 1 – Defects within the viewing area.....	8
Figure 2 – Deviations of dimensions and shape $e_1$ to $e_4$ .....	9
Figure 3 – Defects within segments .....	9
Figure 4 – Defects within the sealing area .....	11
Figure 5 – Defects of contact pad area .....	12
Figure 6 – Damage of a corner and an edge .....	13
Table 1 – Visual defects to be inspected.....	8
Table 2 – Properties of display area to be inspected.....	10
Table 3 – Defects of display area to be inspected .....	10
Table 4 – Defects of viewing area to be inspected .....	10
Table 5 – Defects of sealing area to be inspected.....	11
Table 6 – Visual defects of contact pad area to be inspected .....	12
Table 7 – Defects of pin to be inspected .....	13
Table 8 – Defects of lead to be inspected .....	13
Table 9 – Defects of support plate to be inspected.....	13

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## LIQUID CRYSTAL DISPLAY DEVICES –

**Part 20-1: Visual inspection – Monochrome liquid crystal display cells (excluding all active matrix liquid crystal display cells)**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61747-20-1 has been prepared by IEC technical committee 110: Electronic display devices.

This first edition cancels and replaces Clause 6 of the first edition of IEC 61747-5 published in 1998. This edition constitutes a technical revision.

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

- a) The editorial modifications were done in accordance with the ISO/IEC Directives, Part 2, Ed. 6.0:2011.
- b) The document number was changed to align with the new numbering structure of the IEC 61747 series.

NOTE It is intended that the other clauses of IEC 61747-5:1998 will be replaced by new parts in the IEC 61747 series. The details of the intended changes are given in Annex D of IEC 61747-30-1:2012.

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

CDV	Report on voting
110/522/CDV	110/558A/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.

A list of all parts in the IEC 61747 series, published 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.

ITEH STANDARD PREVIEW  
(standards.iteh.ai)

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

<https://standards.iteh.ai/catalog/standards/sist/58bb8c7-f14a-48d7-bfa4-1c674e62d6ef/iec-61747-20-1-2015>

## INTRODUCTION

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

## **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

[IEC 61747-20-1:2015](https://standards.iteh.ai/catalog/standards/sist/58bf8c7-f14a-48d7-bfa4-1c674e62d6ef/iec-61747-20-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/58bf8c7-f14a-48d7-bfa4-1c674e62d6ef/iec-61747-20-1-2015>

## LIQUID CRYSTAL DISPLAY DEVICES –

### Part 20-1: Visual inspection – Monochrome liquid crystal display cells (excluding all active matrix liquid crystal display cells)

#### 1 Scope

This part of IEC 61747 gives the details of testing and provides general rules for visual inspection of the non-active and active area of monochrome liquid crystal display cells by the human eye, if necessary, through an optical microscope. Furthermore this standard includes defect definitions and the methods for visual defect inspection.

NOTE 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 61747-1-2:2014, *Liquid crystal display devices – Part 1-2: Generic – Terminology and letter symbols*

<https://standards.iteh.ai/catalog/standards/sist/58b987-942487bf467467d67a-61747-20-1-2015>

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

##### 3.1 Terms and definitions

For the purposes of this document, the terms, definitions and letter symbols given in IEC 61747-1-2 and IEC 61747-10-2 apply.

##### 3.2 Abbreviations

DUT Device under test

#### 4 Visual inspection method and criteria

##### 4.1 Standard inspection conditions and methods

###### 4.1.1 Ambient conditions

###### 4.1.1.1 Temperature

All visual inspection shall be carried out under specified temperature. Refer to IEC 61747-10-2:2014, Clause 4.

###### 4.1.1.2 Humidity

All visual inspection shall be carried-out under specified humidity. Refer to IEC 61747-10-2:2014, Clause 4.



#### 4.1.1.3 Illuminance

All visual inspection shall be carried out under illumination levels as specified in the detail specification. The illumination level shall be adjusted in such a way that it allows for an accurate visual inspection.

#### 4.1.2 Inspection equipment and liquid crystal display cells

The DUT will be installed on a rotatable fixture to enable changes in the horizontal and vertical viewing direction range. Alternatively, the inspector moves around and the DUT is fixed.

Turn on the direct current power supply and pattern generator and warm up for stabilization. Supply the driving voltage and pattern to the DUT. The warm-up time of the DUT shall be sufficiently long to obtain a stable signal, necessary for the visual inspection.

#### 4.1.3 Inspector and limit sample for visual inspection

The inspector shall have a (corrected-to) normal vision, a normal colour vision and shall be periodically trained with specified limit samples in order to accurately carry out the visual examination.

#### 4.1.4 Inspection and record of result

The inspector shall carry out the visual inspection based on the specified procedure and record the results on recording sheets with the specified inspection conditions.

### 4.2 Visual inspection of display

#### 4.2.1 Display not activated

IEC 61747-20-1:2015

<https://standards.iteh.ai/catalog/standards/sist/58bbf8c7-f14a-48d7-bfa4-ec1111111111>

##### 4.2.1.1 Test conditions to be specified in the detail specification

The test conditions to be specified in the detail specification are:

The test conditions of the visual inspection shall be described for the following conditions:

- the viewing direction range;
- the illumination from above or through the device (depending on the application);
- the duration;
- the viewing distance.

##### 4.2.1.2 Procedure

Devices shall be inspected for the following visual defects in Table 1.