

Edition 1.0 2025-04

# INTERNATIONAL STANDARD

Durability test methods for electronic displays – Part 3-2: Mechanical tests – Static stress

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ISBN 978-2-8327-0385-4

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

## CONTENTS

	FOREWORD4					
IN	TRODU	CTION	. 6			
1	Scop	e	. 7			
2	Norm	ative references	. 7			
3	Term	s and definitions	. 7			
4	Stand	dard measuring conditions	. 8			
	4.1	Standard environmental measuring conditions	. 8			
	4.2	Safety				
	4.3	Number of the specimen	. 8			
	4.4	Stress rate or strain rate	. 8			
	4.5	Test side of a display	. 8			
5	Two-	point bend	. 9			
	5.1	General	. 9			
	5.2	Apparatus	. 9			
	5.2.1	Overview	. 9			
	5.2.2	Face plates	. 9			
	5.2.3	Face plate loading apparatus				
	5.2.4	Base	. 9			
	5.2.5	Test procedure				
	5.2.6					
	5.3	Failure criteria				
6	Four-	point bend	11			
	6.1	General				
	6.2	Apparatus				
	6.2.1	Testing machine				
	6.2.2	•				
	6.2.3	'				
	6.3	Procedure				
	6.3.1	Test procedure				
	6.3.2	Stress measurement and calculation				
	6.4	Failure criteria				
7	Ring-	on-ring	14			
	7.1	General	14			
	7.2	Apparatus	15			
	7.2.1	Testing machine	15			
	7.2.2	Test fixture and setup	15			
	7.2.3	Loading rate	17			
	7.3	Procedure	17			
	7.3.1	Test procedure	17			
	7.3.2					
	7.4	Failure criteria				
8	Point	loading test	8			
	8.1	General	18			
	8.2	Apparatus	18			
	8.3	Test procedure				
	8.3.1	Static loading resistance	19			

8.3.2	Quasi-static failure load	19
8.3.3	Stress measurement and calculation	19
8.4 Fa	ailure criteria	20
Bibliography	/	21
Figure 1 – T	esting apparatus for two-point bend	10
Figure 2 – T	esting apparatus for four-point bend [4]	12
Figure 3 – S	pecimen configuration under four-point bending test [4]	13
Figure 4 – S	support assembly (side view, cross-section) [5]	15
Figure 5 – S	upport assembly (top view) [5]	16
Figure 6 – L	oad assembly (side view, cross-section) [5]	16
Figure 7 – L	oad assembly (bottom view) [5]	17
Figure 8 – S	chematic of quasi-static and static point loading test [4]	19

#### INTERNATIONAL ELECTROTECHNICAL COMMISSION

\_\_\_\_\_\_

#### **DURABILITY TEST METHODS FOR ELECTRONIC DISPLAYS –**

#### Part 3-2: Mechanical tests – Static stress

#### **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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 63211-3-2 has been prepared by IEC technical committee 110: Electronic displays. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
110/1743/FDIS	110/1761/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at <a href="https://www.iec.ch/members\_experts/refdocs">www.iec.ch/members\_experts/refdocs</a>. The main document types developed by IEC are described in greater detail at <a href="https://www.iec.ch/publications">www.iec.ch/publications</a>.

A list of all parts in the IEC 63211 series, published under the general title *Durability test methods for electronic displays*, can be found on the IEC website.

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

- · reconfirmed,
- · withdrawn, or
- revised.

#### INTRODUCTION

The purpose of this document is to provide mechanical testing procedures for durability evaluation of electronic displays and their components against static or quasi-static stress.

It is assumed that all tests – described in detail in individual test method standards – are performed by personnel skilled in the general art of mechanical property tests.

This document relates to the common durability test methods applicable in the field of electronic displays, which can overlap with some of the parts of existing IEC TC 110 documents that describe the durability test methods of individual technologies, such as LCD, OLED, PDP and others. This document is intended to be used as the reference document in future standards and in revisions of existing ones. The existing standards will be revised in their maintenance time to refer to this document to the largest extent possible.

#### **DURABILITY TEST METHODS FOR ELECTRONIC DISPLAYS -**

### Part 3-2: Mechanical tests - Static stress

#### 1 Scope

This part of IEC 63211 defines common test methods for the evaluation of the mechanical or functional durability of electronic displays and its components against static or quasi-static stress application. The testing methods and procedures are applicable for all the electronic display panels, modules and components.

#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 62368-1, Audio/video, information and communication technology equipment – Part 1: Safety requirements