

# INTERNATIONAL STANDARD



**Flexible display devices –  
Part 2: Essential ratings and characteristics**

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IEC 62715-2:2022

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## FLEXIBLE DISPLAY DEVICES –

## Part 2: Essential ratings and characteristics

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

Draft	Report on voting
110/1401/CDV	110/1462/RVC

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 [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A list of all parts in the IEC 62715 series, published under the general title *Flexible display devices*, can be found on the IEC website.

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## FLEXIBLE DISPLAY DEVICES –

### Part 2: Essential ratings and characteristics

#### 1 Scope

This part of IEC 62715 specifies the essential ratings and characteristics of flexible display modules.

#### 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 62715-1-1, *Flexible display devices – Part 1-1: Terminology and letter symbols*

IEC 62715-5-1, *Flexible display devices – Part 5-1: Measuring methods of optical performance*

IEC 62715-6-1, *Flexible display devices – Part 6-1: Mechanical test methods – Deformation tests*

IEC 62715-6-3, *Flexible display devices – Part 6-3: Mechanical test methods – Impact and hardness tests*

IEC 62679-3-1, *Electronic paper displays – Part 3-1: Optical measuring methods*

#### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in 62715-1-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 4 Flexible display modules

##### 4.1 Types of flexible display modules

Based on the display technology, the flexible display modules include the following types:

- flexible OLED modules,
- flexible LCD modules,
- other flexible modules.

Based on the mechanical form, the flexible display modules include the following types:

- bending modules,
- foldable modules,

- rollable modules,
- other flexible modules.

## 4.2 Principles and structure

The flexible display modules consist of display panels, electronic circuits, cover glass or film and usually bezels.

## 4.3 Modes of operation

### 4.3.1 Addressing mode of operation

The addressing mode of operation consists of, for example, passive matrix, active matrix.

### 4.3.2 Optical mode of operation

The optical mode of operation consists of:

- illumination mode: for example top-emitting, bottom-emitting for flexible OLED, transmissive, transflective for flexible LCD, electronic paper,
- number of colours,
- number of grey levels.

## 4.4 Details of outline

### 4.4.1 Material and mechanical description

The material and mechanical description of flexible displays is as follows:

- substrate material: for example glass, plastic
- structure material: for example plastic, metal.

### 4.4.2 Method of connection

Connector, flex cable or connection pins, etc.

### 4.4.3 Outline drawing and dimensions

The outline drawing and dimensions consist of:

- overall dimensions,
- bezel dimensions,
- active display area and display centre,
- flexible region.

### 4.4.4 Pin layout or assignment

Type of connectors.

## 4.5 Limiting values (absolute maximum rating system) over the operating temperature range, unless otherwise stated

The following limiting values should be specified in Table 1.



**Table 1 – Limiting values of flexible display modules**

Subclause	Characteristics	Symbol	Requirements		Unit
			Min.	Max.	
4.5.1	Operating temperature	$T_{op}$	Min.	Max.	°C
4.5.2	Operating humidity	$H_{op}$		Max.	%
4.5.3	Storage temperature	$T_{stg}$	Min.	Max.	°C
4.5.4	Storage humidity	$H_{stg}$		Max.	%
4.5.5	Supply voltages				V
	Supply voltage for logic drive	$V_{DD} - V_{SS}$	Min.	Max.	
	Supply voltage(s) for module	$V_{MDL}$	Min.	Max.	
4.5.6	Input signal voltages	$V_{IN}$	Min.	Max.	V

#### 4.6 Electrical and optical characteristics

The following characteristics should be specified in Table 2.

**Table 2 – Electrical and optical characteristics of flexible display modules**

Subclause	Characteristics	Condition at $T_{op} = 25\text{ °C}$ unless otherwise specified	Symbol	Requirements		Unit	Reference
				Min.	Max.		
4.6.1	Supply voltages						
	Supply voltage for logic drive		$V_{DD} - V_{SS}$	Min.	Max.	V	
	Supply voltage(s) for module		$V_{MDL}$	Min.	Max.		
4.6.2	Input signal voltages		$V_{IN}$	Min.	Max.		
	High level input signal voltage		$V_{INH}$	Min.	Max.		
	Low level input signal voltage		$V_{INL}$	Min.	Max.	V	
	Input analogue video signals (where appropriate)		$V_{VID}$	Min.	Max.		
4.6.3	Operating frequency (where appropriate)		$f_{op}$			Hz	
	Frame frequency		$f_{FRM}$	Min.	Max.		
4.6.4	Supply currents	Conditions chosen to achieve maximum supply current, for example operating supply voltage, display pattern, as appropriate.	$I_{tot}$ or $I_{DD}$ or $I_{EE}$		Max.	mA	
4.6.5	High level input signal current (where appropriate)		$I_{INH}$		Max.	mA	
4.6.6	Low level input signal current (where appropriate)		$I_{INL}$		Max.	mA	
4.6.7	Dark-room contrast ratio	Specified measuring method and conditions	$DRCR$	Min.		-	IEC 62715-5-1

Subclause	Characteristics	Condition at $T_{op} = 25\text{ °C}$ unless otherwise specified	Symbol	Requirements		Unit	Reference
				Min.	Max.		
4.6.8	Ambient contrast ratio	Specified measuring method and conditions	$ACR$	Min.		-	IEC 62715-5-1
4.6.9	Luminance (where appropriate)	Specified measuring method and conditions	$L$	Min.		cd/m <sup>2</sup>	IEC 62715-5-1
	Luminance uniformity (where appropriate)		$L_{uni}$	Min.		-	
	Colour uniformity (where appropriate)		$\Delta u'V'$		Max.		
4.6.10	Viewing angle range	Specified definition of viewing direction and specified contrast ratio	$\theta_V$ and $\theta_H$	Min.	Max.	°	IEC 62715-5-1
4.6.11	Lifetime (for flexible OLED)	Specified measuring method and conditions	$T_{50}$	Min.		h	IEC 62341-5-3 [1] <sup>1</sup>
4.6.12	Power consumption	Specified measuring method and conditions	$P$		Max.	W	
4.6.13	Transmittance (where appropriate)	Specified measuring method and conditions	$T$	Min.		%	
4.6.14	Reflectance (where appropriate)	Specified measuring method and conditions	$R$		Max.	%	
4.6.15	Chromaticity of white ( $x, y$ ) (where appropriate)		$x_W, y_W$	a	a	-	IEC 62715-5-1
	Chromaticity of red ( $x, y$ ) (where appropriate)		$x_R, y_R$	a	a		
	Chromaticity of blue ( $x, y$ ) (where appropriate)		$x_B, y_B$	a	a		
	Chromaticity of green ( $x, y$ ) (where appropriate)		$x_G, y_G$	a	a		
4.6.16	Image sticking (where appropriate, for flexible OLED and electronic paper)	Specified measuring method and conditions	IS		Max.	-	IEC 62341-5-3 IEC 62679-3-1

<sup>a</sup> Items of value (i.e., minimum, maximum, typical or average) are determined in a detail specification.

#### 4.7 Mechanical characteristics

The following characteristics should be specified in Table 3. If the item is not applicable to the display, it should be stated in the report that it is not applicable

<sup>1</sup> Numbers in square brackets refer to the Bibliography.