

TECHNICAL REPORT



**Flexible displays –
Part 5-61: Overview of measurement and application scenarios of stretchable
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FLEXIBLE DISPLAYS –

Part 5-61: Overview of measurement and application scenarios of stretchable displays

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IEC TR 62715-5-61 has been prepared by IEC technical committee 110 Electronic displays. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
110/1647/DTR	110/1668/RVDTR

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 Technical Report 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. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

Future documents in this series will carry the new general title as cited above. Titles of existing documents in this series will be updated at the time of the next edition.

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

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FLEXIBLE DISPLAYS –

Part 5-61: Overview of measurement and application scenarios of stretchable displays

1 Scope

This part of IEC 62715, which is a Technical Report, provides an overview of stretchable display technologies and application scenarios for stretchable displays. This document introduces special considerations for development of measurement methods for stretchable displays.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

3.1

stretchable display device

flexible display panel and module whose surface area and shape can change when stretched

3.2

stretchable display

device to which a stretchable display panel or module is applied

3.3

stretchability

extent to which stretchable display device can be stretched

4 Stretchable devices technology

4.1 General

Various types of flexible displays have been introduced to the market [1] to [8]¹. They include foldable, rollable and slidable types. Recently, development of a new type of flexible display has been reported by academic societies as well as display industries. It is a stretchable display device. Unlike previous flexible display technologies, the size of the surface area can be changed. Furthermore, stretchable displays can have shapes with multi-curvatures in any direction. Thus, stretchable displays are often called freeform displays.

¹ Numbers in square brackets refer to the Bibliography.

4.2 Stretchable device structure

Figure 1 a) illustrates an example of the pixel structure of a stretchable display with island-bridge structure. The black square in the upper left corner of Figure 1 a) represents a single pixel. Figure 1 b) illustrates an enlarged image of the black square in Figure 1 a). A pixel consists of rigid and stretchable areas. In Figure 1 b) a pixel area is represented by four sub-areas. The upper left area represents the rigid area. It can be called a light emitting region because light emitting devices, for example light emitting diodes (LEDs) (including mini LED and micro LED) and organic light emitting diodes (OLEDs), are placed at the rigid area. This area usually remains unchanged during stretching. The remaining three sub-areas in Figure 1 b) can be stretched when external force is applied.

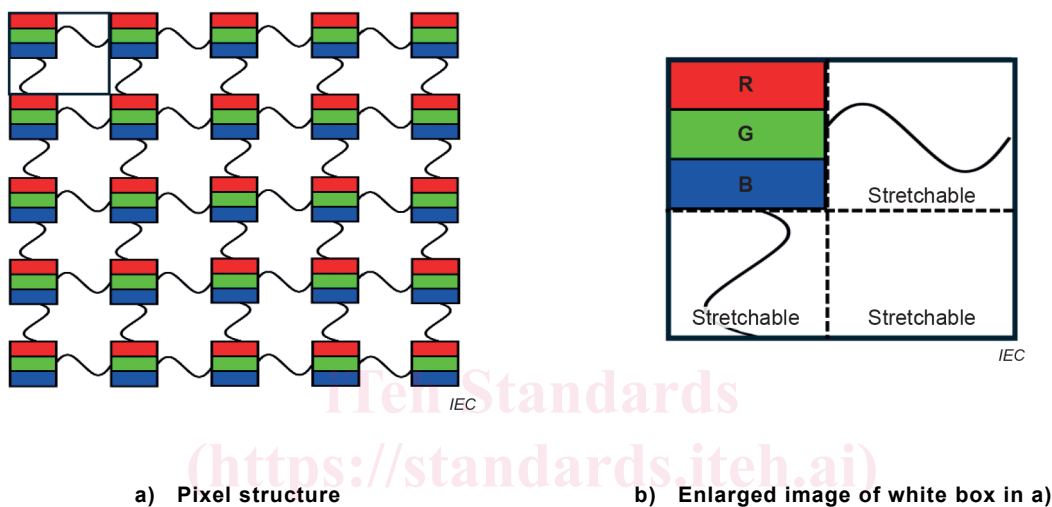


Figure 1 – Pixel structure of a stretchable display

4.3 Classification of stretching types

4.3.1 General

There are numerous ways to change the area and shape of a stretchable display. However, types of stretching can be grouped according to the stretching direction and shape.

4.3.2 One-axis stretching

A stretchable display device stretched in single axis is called a "one-axis stretching" display device. Figure 2 illustrates typical stretchable display devices in "one-axis stretching".

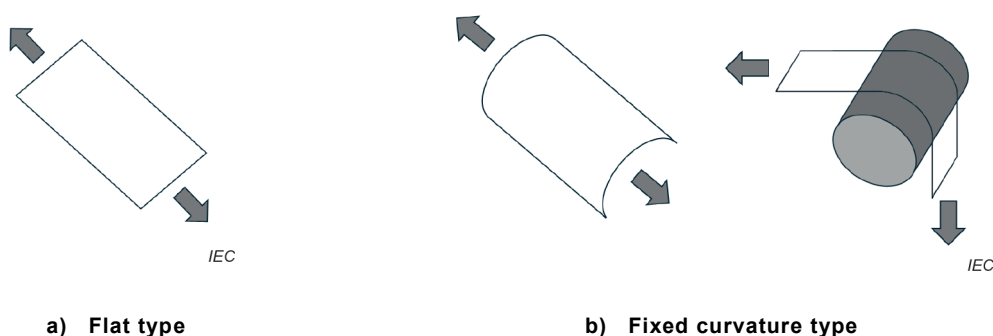


Figure 2 – One-axis stretching display device

4.3.3 Bi-axis stretching

A stretchable display device stretched by two axis is called a "bi-axis stretching" display device. Figure 3 illustrates the common style of a "bi-axis stretching" display device.

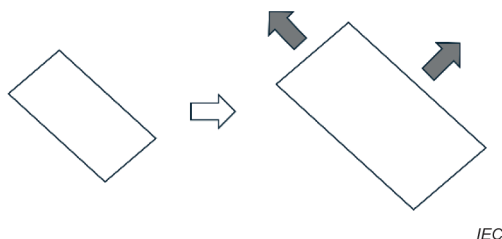
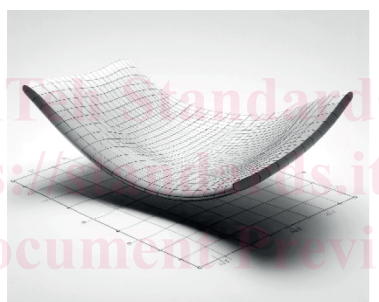


Figure 3 – Bi-axis stretching display device

4.3.4 Multi-curvature stretching

A stretchable display device stretched with more than one curvature is called a "multi-curvature stretching" display device. Figure 4 shows the common style of this kind of stretchable display device, which has two different curvatures.



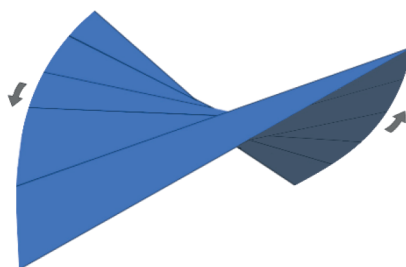
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Figure 4 – Multi-curvature stretching display device

4.3.5 Others

A stretchable display device could be twisted in any direction. Figure 5 shows an example of a twisting display device.



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Figure 5 – Twisting display device