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部分代替

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# 数字电影 LED影厅 技术要求和测量方法

Digital cinema—LED screen—  
Technical requirements and test methods

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## 前 言

本文件按照GB/T 1.1—2020《标准化工作导则 第1部分：标准化文件的结构和起草规则》的规定起草。

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本文件由国家电影局归口。

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# 引 言

无。

# 数字电影#LED影厅#技术要求和测量方法



## 范围

本文件规定了数字电影LED影厅的技术要求及相应的测量方法。

本文件适用于数字电影LED影厅的运行维护、检测认证、质量监督、技术管理和相关设备的安装、调试、验收和维护。

## 2 规范性引用文件

下列文件对于本文件的应用是必不可少的。凡是注日期的引用文件，仅注日期的版本适用于本文件。凡是不注日期的引用文件，其最新版本（包括所有的修改单）适用于本文件。

GY/T 311—2017 电影院视听环境技术要求和测量方法

GY/T 312—2017 电影 录音控制室、室内影厅B环电声响应规范和测量

SJ/T 11141—2017 发光二极管（LED）显示屏通用规范

## 3 术语和定义

下列术语和定义适用于本文件。

ISO和IEC用于标准化的术语数据库地址如下：

—ISO在线浏览平台：位于<https://www.iso.org/obp>

—IEC Electropedia：位于<https://www.electropedia.org>

下列术语和定义适用于本文件。

### 3.1

**数字电影影厅**； **LED digital LED cinema**

采用数字电影技术，使用LED显示屏放映电影的影厅。

### 3.2

**显示屏**； **LED LED display screen**

以LED像素显示文字、图像及视频等信息的装置，通常包括LED屏体及显示控制系统等基本组成成分，也可包括辅助系统等，可采用一体式或分体式结构。

[定义：，第3.1条]

### 3.3

**像素**； **pixel**

LED显示屏的最小成像单元。 注：通常由红色、绿色、蓝色发光二极管组成，每个发光二极管可视为亚像素。

[定义：，第3.6条]

3.4

**电光转换函数** -; **electro-optic transfer function**

显示设备的输入编码值与光输出之间的函数关系。

3.5

**立体放映消光比** ; **stereoscopic extinction ratio**

左眼（右眼）图像亮度对串扰光和环境光的抗扰能力。

注1：左眼（右眼）图像亮度与串扰光和环境光的比，用：1方式表示。

4 缩略语

下列缩略语适用于本文件。

IMB 集成媒体模块（Integrated Media Block）

HDR 高动态范围（High Dynamic Range）

LED 发光二极管（Light-Emitting Diode）

SDR 标准动态范围（Standard Dynamic Range）

5 技术要求

数字电影LED影厅技术要求应符合表1的规定。

表1 — 数字电影LED影厅技术要求

序号	参数	要求				测量方法
1	中心亮度(cd/m <sup>2</sup> )	目标 <sup>a</sup>	标准值	审片室	影院	见条6. 4. 1
		A	48,0	±3,5	±10,2	
		B	24,0	±1,8	±5,1	
		C	15,5	±1,1	±3,3	
2	luminance difference ratio	shall not be more than 5 %				见 条6. 4. 2
3	side luminance uniformity	(should be): 75 % to 90 % of centre luminance				见 条6. 4. 3
4	centre white chromaticity	(should be): x = 0,314 ± 0,006, y = 0,351 ± 0,006				见 条6. 4. 4
<sup>a</sup> Filmmakers can prepare content that is optimized for any or each of the targets, and such content should always be clearly identified as to the intended playback luminance.						

6 测量方法

6.1 测量设备

6.1.1 亮度计

The spectroradiometer shall comply with the requirements specified in GY/T 311—2017, 第4.5.



#### 6.1.2 Photometer

Screen luminance shall be measured with a spot photometer having the spectral luminance response of the standard observer (photopic vision), as defined in SJ/T 11141—2017. The acceptance angle of the photometer shall be 2° or less. The lower limit of the measuring range shall be 0,01 cd/m<sup>2</sup> or better. The photometer response to luminance variation over time shall be to properly integrate any such variation occurring at frequencies at or above 24 Hz and display the arithmetic mean value.

#### 6.2 Signal of measurement

##### 6.2.1 White field signal

The digital code values of the white field signal is ( $X'=3\ 794$ ,  $Y'=3\ 960$ ,  $Z'=3\ 890$ ).

#### 6.3 Measurement conditions and measurement requirements

Measurement conditions shall meet the following requirements.

- a) All equipment shall be in normal operating status.
- b) Measurement shall be carried out after the light output of the digital projector stabilizes. Digital projector shall project white field signal through the stereoscopic equipment for 15 min.
- c) The light of the digital projector shall pass through the stereoscopic projection equipment.
- d) When measuring through the stereoscopic glasses they shall be placed in a horizontal state, as a viewer would wear them. No tilt from the horizontal axis is allowed.
- e) All signals shall be output to the digital projector by Media Block. The measurement shall cover all valid screen images.
- f) Measurement location in the auditorium shall comply with the requirements specified in SJ/T 11141—2017, 第4. 3.
- g) Measurement locations on the screen of Luminance, difference shall comply with the requirements specified in SJ/T 11141—2017, 第4. 2.
- h) For using dual stereoscopic cinema screenings, both of the digital projectors shall also be turned on and working normally.
- i) The measurement of the optical system of stereoscopic projection should be carried out within the range of the white colour chromaticity coordinates of the centre of the screen.

#### 6.4 The measurement of the optical system of stereoscopic projection

##### 6.4.1 Centre luminance

Measurement procedures.

- a) Open the photometer and make it work normally.
- b) Set the digital projector as the stereoscopic projection mode and use the stereoscopic projection equipment.

- c) The white field signal is simultaneously displayed in the left and right eyes.
- d) Using the photometer to measure and record the left-eye white field centre luminance,  $L_{lw}L_{-}(lw)$ , and the right-eye white field centre luminance,  $L_{rw}L_{-}(rw)$ , through the left-eye lens and the right-eye lens of the stereo glasses.
- e) Calculate and record the centre luminance,  $LL$ , according to 公式 (1) :

$$L = \frac{L_{lw} + L_{rw}}{2} \quad L = \frac{L_{-}(lw) + L_{-}(rw)}{2} \quad (1)$$

式中

式中

$LL$

— is the centre luminance;

$L_{lw}L_{-}(lw)$

— is the centre luminance of the white field of the left-eye when the left and right eyes simultaneously display the white field signal;

$L_{rw}L_{-}(rw)$

— is the centre luminance of the white field of the right-eye when the left and right eyes simultaneously display the white field signal.

#### 6.4.2 Luminance difference ratio

Measurement procedures.

- a) Refer to the measurement method of centre luminance, record the left-eye white field centre luminance  $L_{lw}L_{-}(lw)$  and the right-eye white field centre luminance  $L_{rw}L_{-}(lw)$ .
- b) Calculate and record the luminance difference ratio  $L_dL_{-}(d)$  according to 公式 (2) :

$$L_d = \frac{|L_{lw} - L_{rw}|}{(L_{lw} + L_{rw})/2} \times 100\% \quad L_{-}(d) = \frac{|L_{-}(lw) - L_{-}(rw)|}{((L_{-}(lw) + L_{-}(rw))/2)} \times 100\% \quad (2)$$

式中

式中

$L_dL_{-}(d)$

— is the luminance difference ratio;

$L_{lw}L_{-}(lw)$

— is the centre luminance of the white field of the left-eye when the left and right eyes simultaneously display the white field signal;

$L_{rw}L_{-}(rw)$

— is the centre luminance of the white field of the right-eye when the left and right eyes simultaneously display the white field signal.

#### 6.4.3 Side luminance uniformity

Measurement procedures.

- a) Open the photometer and make it work normally.
- b) Set the digital projector as the stereoscopic projection mode and use the stereoscopic projection equipment.

- c) The white field signal is simultaneously displayed in the left and right eyes.
- d) Measure the luminance,  $L_{lw}L_{(lw)}$ , of white field in the centre of screen and the luminance,  $L_{ls}L_{(ls)}$ , of white field of four sides by using photometer through stereoscopic glasses of left-eye.
- e) Measure the luminance,  $L_{rw}L_{(rw)}$ , of white field in the centre of screen and the luminance,  $L_{rs}L_{(rs)}$ , of white field of four sides by using photometer through stereoscopic glasses of right-eye.
- f) Calculate and record the side luminance uniformity,  $U_lU_{(l)}$  of the upper, lower, left and right edges of the white field of the left-eye according to 公式 (3) :

$$U_l = \frac{L_{ls}}{L_{lw}} \times 100\% \quad U_{(l)} = \frac{L_{(ls)}}{L_{(lw)}} \times 100\% \quad (3)$$

式中

式中

$U_lU_{(l)}$

— is the left-eye side luminance uniformity;

$L_{lw}L_{(lw)}$

— is the centre luminance of the white field of the left-eye when the left and right eyes simultaneously display the white field signal;

$L_{ls}L_{(ls)}$

— is the left-eye luminance of white field of four sides when the left and right eyes simultaneously display the white field signal.

- g) calculate and record the side luminance uniformity  $U_rU_{(r)}$  of the upper, lower, left and right sides of the white field of the right-eye according to 公式 (4) :

$$U_r = \frac{L_{rs}}{L_{rw}} \times 100\% \quad U_{(r)} = \frac{L_{(rs)}}{L_{(rw)}} \times 100\% \quad (4)$$

式中

式中

$U_rU_{(r)}$

— is the right-eye side luminance uniformity;

$L_{rw}L_{(rw)}$

— is the centre luminance of the white field of the right-eye when the left and right eyes simultaneously display the white field signal;

$L_{rs}L_{(rs)}$

— is the right-eye luminance of white field of four sides when the left and right eyes simultaneously display the white field signal.

#### 6.4.4 Centre white chromaticity

Measurement procedures.

- a) Open the spectroradiometer and make it work normally.
- b) Set the digital projector as the stereoscopic projection mode and use the stereoscopic projection equipment.
- c) The white field signal is simultaneously displayed in the left and right eyes.

- d) Using the spectroradiometer to measure and record the centre white chromaticity through the left-eye lens and the right-eye lens of the stereo glasses.

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