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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Laser display devices - Part 5-4: Optical measuring methods of
colour speckle**
(English Translation)

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Reference

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting:

This document is part 5-4 of GB/T 43590 "Laser display devices": GB/T 43590 has published the following parts:

- Part 1-2: Terms and text symbols;
- Part 5-1: Test methods for optical performance of laser front projection displays;
- Part 5-2: Optical measurement method for speckle contrast;
- Part 5-3: Laser projection display (screen) image quality test method;
- Part 5-4: Optical test method for colored speckle:

This document is modified to adopt IEC 62906-5-4:2018 "Laser display devices Part 5-4: Optical test method for colored speckle":

Compared with IEC 62906-5-4:2018, this document has the following structural adjustments:

- Move the calculation method of colored speckle in Chapter 5 of IEC 62906-5-4:2018 to the appendix as "Appendix B (Informative)";
- Chapter 5 corresponds to Chapter 6 of IEC 62906-5-4:2018;
- Chapter 6 corresponds to Chapter 7 of IEC 62906-5-4:2018;
- Appendix C corresponds to Appendix B of IEC 62906-5-4:2018;

--- Appendix D corresponds to Appendix C of IEC 62906-5-4:2018:

The technical differences between this document and IEC 62906-5-4:2018 and their reasons are as follows:

---Replaced IEC 62906-1-2 with the normative reference GB/T 43590.102 to adapt to my country's technical conditions and increase operability Acting nature:

--- Replaced IEC 62906-5-2:2016 with the normative reference GB/T 43590.502 to adapt to my country's technical conditions, and added Operability:

---Replace one X filter in the measurement method with two filters, Xb filter and Xr filter:

In the application, a single X-ray filter is difficult to achieve the two peaks of the X-ray curve in the visual matching function, and it can be better to divide it into two filters:

The matching of the visual matching function is realized accurately, and the measurement result of the X component is obtained by adding Xb and Xr (see 5.2):

---Change the rotating XYZ filter in Figure 26 of IEC 62906-5-4:2018 to be placed in front of the aperture as in Figure 1:

The position of the image sensor between the lens and the image sensor will cause additional chromatic aberration and reduce the measurement accuracy (see 5.2):

--- Added content to eliminate the grid effect between pixels of the measured image: Grid is a common phenomenon that affects the measurement results:

The results should be dealt with [see 5.2f):

---Added a method to calculate speckle by further calculating the tristimulus values after obtaining the spectrum using a spectral device:

Testing of standard equipment is the basic approach and may achieve accurate testing (see 5.2):

---Change the screen tilt to face the LMD horizontally during speckle measurement to avoid the inaccurate focus problem caused by the tilted screen:

High test accuracy [see 5.3a), 5:4a):

---The test distance is set to 2 to 4 times the screen height, because the result of the speckle test is the result is related to the test distance and the test conditions need to be unified [see 5.3b) and 5:4b):

--- Added the exposure time of the test image acquisition should be the same as the visual retention time of the human eye, that is, 0:05s~0:2s, because the test is reported it is necessary to simulate the viewing conditions of the human eye and to clarify this [see 5.3f), 5:4f):

---Added requirements for LMD, requiring LMD to provide a focus evaluation function:
Because the speckle test is very important for the accuracy of focus:

Very sensitive, the use of evaluation functions can improve the accuracy of focus, thereby improving the measurement accuracy and consistency [see 5.2c), 5:3e), 5:4e)]:

--- Adjust the calculation method of colored speckle in Chapter 5 of IEC 62906-5-4:2018 to informative Appendix B to adapt to my country's technical requirements Technical conditions and increase operability (see Appendix B):

The following editorial changes were made to this document:

--- The contents of the technical corrigendum of IEC 62906-5-4:2018/COR1.2022 have been incorporated: The outer margins of the clauses involved are the positions are marked with double vertical lines (||):

Introduction

The new display industry is a strategic, basic and leading industry for national economic and social development: Laser display devices are new display the core components of the technology: In order to meet the production, manufacturing, inspection and import and export trade needs of laser display device products in my country, the laser display Device series standard: GB/T 43590 is intended to consist of the following parts:

--- Part 1-2: Terminology and text symbols: The purpose is to establish the preferred terms, definitions and symbol:

--- Part 5-1: Test method for optical performance of laser front projection display: The purpose is to establish the laser light source or containing laser light source Test method for optical performance of mixed light source front projector displays:

--- Part 5-2: Optical measurement method for speckle contrast: The purpose is to establish the optical properties of laser light sources and mixed light containing laser light sources:

A method for measuring the monochromatic speckle contrast of laser display devices with laser sources:

--- Part 5-3: Laser projection display (screen) image quality test method: The purpose is to establish the laser projector and screen combination Test method for full-frame laser projection display (screen) image quality:

--- Part 5-4: Optical test method for colored speckle: The purpose is to establish the optical measurement method for colored speckle of laser display devices:

method:

--- Part 5-6: Test methods for optical performance of projection screens: The purpose is to establish the laser projection display screen based on the photometric characteristics Test