



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

**GB/T 15972.43-2021**

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**Specifications for optical fibre test methods - Part 43:  
Measurement methods and test procedures for transmission  
characteristics - Numerical aperture**

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## Foreword

GB/T 15972 "Specifications for Optical Fiber Test Methods" consists of several parts, and its expected structure and corresponding international standards are.

---Part 10.General principles of measurement methods and test procedures (corresponding to IEC 60793-1-1);

---Part 20~Part 29.Measurement methods and test procedures of dimensional parameters (corresponding to IEC 60793-1-20 to IEC 60793-

1-29);

---Part 30~Part 39.Measurement methods and test procedures of mechanical properties (corresponding to IEC 60793-1-30 to IEC 60793-

1-39);

---Part 40~Part 49.Measurement methods and test procedures of transmission characteristics (corresponding to IEC 60793-1-40 to IEC 60793-

1-49);

---Part 50~Part 59.Environmental performance measurement methods and test procedures (corresponding to IEC 60793-1-50 to IEC 60793-

1-59).

Among them, GB/T 15972.40~49 consists of the following parts.

- Part 40.Measurement methods and test procedures for transmission characteristics attenuation;
- Part 41.Measurement methods of transmission characteristics and test procedure bandwidth;
- Part 42.Measurement methods and test procedures for transmission characteristics. Wavelength dispersion;
- Part 43.Measurement methods of transmission characteristics and test procedures numerical aperture;
- Part 44.Measurement methods of transmission characteristics and test procedures cut-off wavelength;
- Part 45.Measurement methods and test procedures for transmission characteristics; Mode field diameter;
- Part 46.Transmission characteristics measurement methods and test procedures light transmittance changes;
- Part 47.Measurement methods and test procedures for transmission characteristics, macrobending loss;
- Part 48.Measurement methods and test procedures for transmission characteristics Polarization mode dispersion;
- Part 49.Differential modulus delay for measurement methods and test procedures of transmission characteristics.

This part is part 43 of GB/T 15972.

This section was drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces GB/T 15972.43-2008 "Specification for optical fiber test methods Part 43.Measurement of transmission characteristics and optical characteristics

Methods and Test Methods Numerical Aperture." Compared with GB/T 15972.43-2008, the main technical changes in this part are as follows.

- Modified the name of the standard;
- Added the technical requirements for A3 and A4 multimode fibers (see Chapter 1, 5.2.5, Appendix B);
- Added abbreviations and symbols (see Chapter 3);

--- Deleted the formula for calculating the theoretical numerical aperture using the relative refractive index difference (see Chapter 3 of the.2008 edition);

--- Deleted the far-field light intensity distribution method test device (see Figure 1 of the.2008 edition);

---Modified the requirements of the central wavelength of the light source (see 5.1.2, 4.2.2 of the.2008 edition);

---The effective size of the detector or the diameter of the pinhole in Method 1 is added (see 5.2.2.2); the straightness of the reproduction lens L2 is deleted

Diameter requirements (see 4.3.3.2 in the.2008 edition); delete the requirements for light detectors (see 4.3.4 in the.2008 edition); add method 3

Requirements for optical detectors (see 5.2.4.7); Method 3 is added to calculate the far-field intensity (see 8.4);

---Added method 4 inverse far-field method (see 5.2.5); added method 4 to calculate numerical aperture (NAff) (see 8.5);

---Modified the requirements of the sample length, and revised the typical sample length of  $2m \pm 0.2m$  to the requirements in the product specification (see 6.1,

### **5.1 of the.2008 edition);**

---The requirement of threshold percentage KNA is modified, and the threshold of 5% is modified to KNA. For details, please refer to the requirements in the product specification (see 8.2,.2008

Chapter 3 of the Year Edition);

---Added a typical legend for far-field numerical aperture testing (see Figure 6);

---Added the default values of the required parameters in the numerical aperture measurement (see Appendix A);

---Added the mapping relationship of the numerical aperture measured by different sample lengths (see Appendix B).

This part uses the redrafting method to modify and adopt IEC 60793-1-43.2015 "Optical Fiber Part 1-43.Measurement Methods and Test Procedures"

Ordinal Numerical Aperture Measurement.

Compared with international standards, the main structural changes of this part are as follows.

---According to the layout format and presentation requirements of my country's standards, part of the content of Chapter 1 in the IEC document is adjusted to Part 3 of this part

Chapter; merge the "Chapter 4 Benchmark Test Method" in the IEC document into the "Chapter 4 Method Overview" of this part; merge the IEC document

Amend Appendix A of this section to Appendix B of this section, and accordingly, modify Appendix B in the IEC file to Appendix A of this section.

The main technical differences between this part and IEC 60793-1-43:2015 and the reasons are as follows.

---Regarding normative reference documents, this section has made adjustments with technical differences to adapt to my country's technical conditions and adjustments.

The situation is collectively reflected in Chapter 2 "Normative Reference Documents", and the specific adjustments are as follows.

\* Replace IEC 60793-2-10 with GB/T 12357.1;

\* Replace IEC 60793-2-20 with GB/T 12357.2;

\* Replace IEC 60793-2-30 with GB/T 12357.3;

\* Replace IEC 60793-2-40 with GB/T 12357.4;

\* Replace IEC 60793-1-1 with GB/T 15972.10.

\* In the normative reference documents, because the IEC 60793-1-21 and IEC 60793-1-22 are not mentioned in the IEC standard text, it is corrected

IEC cited errors and deleted IEC 60793-1-21 and IEC 60793-1-22;

---Added abbreviations chapter;

---Corrected the incorrect reference of the formula for indirectly obtaining the far-field numerical aperture;

---Because the parameter requirements required for numerical aperture measurement in Appendix B of the IEC document are only for reference, the specific values are in the relevant product specifications

Therefore, the appendix was revised from a normative appendix to an informative appendix, and the length of the numerical aperture sample in the appendix was corrected.

Claim.

This section has made the following editorial changes;

--- Modify the standard name to "Specification for Optical Fiber Test Methods Part 43.Measurement Methods and Test Procedure Values for Transmission Characteristics Aperture".