

ICS 33.180.10
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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 15972.47-2021

**Specifications for optical fibre test method - Part 47:
Measurement methods and test procedures for transmission
characteristics - Macrobending loss**

(English Translation)

Issued on: May 21, 2021

Implemented on: December 1, 2021

**Issued by: State Administration of Market Supervision and
Administration**

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Foreword

The plan of GB/T 15972 "Specifications for Optical Fiber Test Methods" consists of the following parts.

- Part 10~Part 19: General principles of measurement methods and test procedures;
- Part 20~Part 29: Measurement methods and test procedures of dimensional parameters;
- Part 30~Part 39: Measurement methods and test procedures of mechanical properties;
- Part 40~Part 49: Measurement methods and test procedures for transmission characteristics;
- Part 50 ~ Part 59: Environmental performance measurement methods and test procedures.

Among them, GB/T 15972.4x 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 47 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 15972.47-2008 "Specification for optical fiber test methods Part 47: Measurement of transmission characteristics and optical characteristics Methods and Test Procedures for Macro-bending Loss. Compared with GB/T 15972.47-2008, the main technical changes in this part are as follows.

---Modified the measurement methods of class B single-mode fiber and class A1 multi-mode fiber, and changed the original method A---transmission power monitoring method to the original method.

Method B-truncation method, modified to method A-fiber winding method (see Chapter 4, 5.1, 6.1.1 and 7.1, Chapter 5 of the 2008 edition);

---Added method B---quarter circle bending method (applicable to A3 and A4 multimode fibers) (see Chapter 4, 5.2, 6.1.2 and 7.2);

---The calculation formula of macrobending loss has been added (see Chapter 8);

---Revised the provisions of the results (see Chapter 9, Chapter 7 of the 2008 edition);

---The light source characteristic requirement for A1 multimode fiber measurement has been added (see Appendix B).

This part uses the redrafting method to modify and adopt IEC 60793-1-47:2017 "Optical Fiber Part 1-47.Measurement Methods and Test Procedures Macro bending loss.

Compared with IEC 60793-1-47:2017, this part has many structural adjustments. Appendix A lists this part and IEC 60793-1-47:2017 chapter number comparison list.

The technical differences between this part and IEC 60793-1-47:2017 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", with specific adjustments as follows.

- Replace IEC 60793-2-10 with non-equivalent adopting international standard GB/T 12357.1 (see 5.1, 6.1.1 and 7.1.3);
- Deleted IEC 60793-1 (all parts), IEC 60793-1-1:2017 and IEC 60793-2;
- Added reference to GB/T 9771 (all parts) (see 5.1, 6.1.1 and 7.1.2);
- Added reference to GB/T 12357.3 and GB/T 12357.4 (see 5.2);
- Added reference to GB/T 14733.12 (see Chapter 3);
- Added references to GB/T 15972.40-2008 and GB/T 15972.46-2008 (see Chapter 4, Chapter 5 and Chapter 7 chapter).

--- Amend the title of Chapter 6 "Sample" to "Sample and Sample Preparation";

--- Modify the bending radius range required by the access network operating conditions in 7.1.2 from "7.5mm to 15mm" to "5mm to 15mm";

--- Deleted Appendix A and Appendix B in the original text of the international standard, and used Chapter 4, Chapter 5 and Chapter 7 as references respectively GB/T 15972.40-2008 Appendix A and GB/T 15972.46-2008 Appendix A replaced;

--- Delete the requirements for the injection device of the A2 multimode fiber in 5.3.2.4;

---Correct "2.5838" in Figure B.1 to "0.5838".

This section has made the following editorial changes.

--- Modify the standard name to "Specifications for Optical Fiber Test Methods Part 47: Measurement Methods and Test Procedures for Transmission Characteristics loss";

---In accordance with the requirements of GB/T 1.1-2009, the chapter of scope is standardized;

--- Correct the formula (C.1) " $\gamma = A\alpha\lambda$ " to " $\gamma = A\alpha\lambda$ ";

--- Correct the formula (C.2) " $\ln[\gamma] = \alpha\lambda \ln A$ " to " $\ln[\gamma] = \alpha\lambda$ ".

1 Scope

This part of GB/T 15972 specifies an overview of the method of measuring optical fiber macrobending loss, equipment, sample and sample preparation, procedures, calculations and the technical requirements of the result.

This part is suitable for measuring the macrobending loss of type B single-mode fiber at 1550nm or 1625nm wavelength.

Macrobending loss at 850nm or 1300nm wavelength, and A3 and A4 multimode fiber at 650nm, 850nm or 1300nm wave Long macrobending loss.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated reference documents, the latest version (including all amendments) is applicable to this document.

GB/T 9771 (all parts) Single-mode optical fiber for communication GB/T 12357.1 Multimode Optical Fiber for Communication Part 1: Characteristics of Type A1 Multimode Optical Fiber (GB/T 12357.1-2015, IEC 60793-2-10:2011, NEQ) GB/T 12357.3 Multimode Optical Fiber for Communication Part 3: Characteristics of Type A3 Multimode Optical Fiber (GB/T 12357.3-2004, IEC 60793-2-30.:2002, MOD) GB/T 12357.4 Multimode Optical Fiber for Communication Part 4: Characteristics of Type A4 Multimode Optical Fiber (GB/T 12357.4-2016, IEC 60793-2-40:2009, NEQ) GB/T 14733.12 Telecommunications Terminology Optical Fiber Communication (GB/T 14733.12-2008, IEC 60050(731)..1991, IDT) GB/T 15972.40-2008 Optical fiber test method specification Part 40: Transmission characteristics and optical characteristics measurement methods and tests Program attenuation (IEC 60793-1-40:2001, MOD) GB/T 15972.46-2008 Optical fiber test method specification Part 46: Transmission characteristics and optical characteristics measurement methods and tests Program light transmittance change (IEC 60793-1-46:2001, MOD) IEC 61280-1-4 Fiber Optic Communication Subsystem Test Procedure Part 1-4.General Communication Subsystem Light Source Encircled Flux Test Method (Fibre-opticcommunicationsubsystemtestprocedures-Part 1-4.Generalcommunicationsubsys-tems-Lightsourceencircledfluxmeasurementmethod) IEC 61280-4-1 Fiber Optic Communication Subsystem Test Procedure Part 4-1.Multimode