



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

GB/T 15972.20-2021

**Specifications for optical fibre test methods - Part 20:
Measurement methods and test procedures for dimensions -
Fibre geometry**

Issued on: April 30, 2021

Implemented on: November 1, 2021

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms and definitions, symbols	1
4 Overview of measurement methods	3
5 Benchmark test method (RTM)	5
6 Device	5
7 Sample	6
8 Procedure	6
9 Calculation	6
10 Results	6
Appendix A (Normative Appendix) Method A---Specific requirements for the refractive near-field method	7
Appendix B (Normative Appendix) Method B---Specific requirements for the transmission near-field method	12
Appendix C (Normative Appendix) Edge Detection and Edge Table Structure	18
Appendix D (Normative Appendix) Ellipse Fitting and Filtering of Edge Table	22
Appendix E (informative appendix) Fitting the near-field data of the A1 fiber core using a power law model	24
Appendix F (informative appendix) Mapping test of A fiber core diameter	30
References	31

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 15972.2x consists of the following parts.

---Part 20.Measurement methods of dimensional parameters and test procedures for optical fiber geometric parameters;

---Part 21.Measurement methods of dimensional parameters and test procedures for coating geometric parameters;

--- Part 22.The measurement method of dimensional parameters and the length of the test procedure.

This part is Part 20 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 15972.20-2008 "Specification for optical fiber test methods Part 20.Measurement methods and tests of dimensional parameters

The main technical changes compared with GB/T 15972.20-2008 are as follows.

---Modified terms and definitions (see Chapter 3, Chapter 3 of the.2008 edition);

--- Added symbols (see Chapter 3, Chapter 3 of the.2008 edition);

---Modified method A refraction near-field method and method B transmission near-field method (see Chapter 4, Appendix A and Appendix B,.2008 edition

Chapter 4, Appendix A and Appendix C);

---Deleted the lateral interference method and the mechanical diameter method (see Chapter 4, Appendix B and Appendix D of the.2008 edition);

---Modified the benchmark test method, stipulated that the video gray scale method in method B is the benchmark test method (RTM) (see Chapter 5,.2008

Chapter 4 of the edition);

---Added graphical fitting procedures and calculation methods (see Appendix C, Appendix D and Appendix E);

---Added the mapping test of the core diameter of the Type A optical fiber (see Appendix F).

This part uses the redrafting method to modify and adopt IEC 60793-1-20.2014 "Optical Fiber Part 1-20.Measurement Methods and Test Procedures"

Order Optical Fiber Geometric Parameters".

This part has structural changes compared with IEC 60793-1-20.2014, and the content of Chapter 11 is merged into Chapter 10.

The technical differences between this part and IEC 60793-1-20.2014 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.

* Added reference to GB/T 15972.10;

* Removed IEC 60793-2-10, IEC 60793-2-20, IEC 60793-2-30, IEC 60793-2-40, IEC 60793-2-50

And IEC 60793-2-60.

This section has made the following editorial changes.

--- Modify the standard name to "Specification for Optical Fiber Test Methods Part 20.Measurement Methods and Test Procedures for Dimensional Parameters Optical Fiber Geometric parameters".

1 Scope

This part of GB/T 15972 specifies the test methods for measuring geometric parameters of uncoated optical fibers, including terms, definitions and symbols, and establishes

The general test procedures and technical requirements of measurement methods, benchmark test methods, devices, samples, procedures, calculations and results are described.

This section applies to class A multimode optical fiber, class B single mode optical fiber and class C single mode optical fiber.

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 15972.10 Optical fiber test method specification Part 10. General rules of measurement methods and test procedures (GB/T 15972.10-

2021, IEC 60793-1-1:2017, MOD)

IEC 61745 Optical fiber geometric parameter measurement device calibration end-face image analysis program (End-face image analysis procedure for the calibration of optical fibre geometry test sets)

3.1 Terms and definitions

The following terms and definitions apply to this document.

3.1.1

Reference point

Fixed coordinates in the scan plane.

Note. The selection of the reference point is arbitrary, such as the lower left corner of the video image or the rough center point of the optical fiber in the scanning device.

3.1.2

Center

The center of the cladding or core in the measurement plane relative to the reference point.

3.1.3

Diameter

The average value of the length of the line segment that connects two points on the circumference of the approximately circular cladding or core and passes through the center.

Note. The diameter is expressed in microns (μm).

3.1.4

Non-circularity

The difference between the maximum and minimum distance between the cladding (or core) boundary and the center of the cladding (or core) and the radius of the cladding (or core)

ratio.

Note. Out-of-roundness is indicated by a percent sign.