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

GB/T 9771.1-2008

**Single-mode optical fibres for telecommunication -- Part 1:
Characteristics of a dispersion unshifted single-mode optical
fibre**

(English Translation)

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Foreword

GB/T 9771 Single-mode Optical Fibers for Telecommunication is divided into the following parts.

- Part 1.Characteristics of a Dispersion Unshifted Single-mode Optical Fiber;
- Part 2.Characteristics of a Cut-off Wavelength Shifted Single-mode Optical Fiber;
- Part 3.Characteristics of an Extended Wavelength Band Dispersion Unshifted Single-mode Optical Fiber;
- Part 4.Characteristics of a Dispersion-shifted Single-mode Optical Fiber;
- Part 5.Characteristics of a Non-zero Dispersion Shifted Single-mode Optical Fiber;
- Part 6.Characteristics of a Fiber with Non-zero Dispersion for Wideband Optical Transport;
- Part 7.Characteristics of a Bending Loss Insensitive Single-mode Optical Fiber for the Access Network.

This Part is the first part of GB/T 9771.The geometric characteristics, optical characteristics and transmission characteristics of optical fiber take the technical indicators of G.652.Class-A and G.652.Class-B optical fiber in ITU-T G.652.2005 Characteristics of a Single-mode Optical Fiber and Cable (English version) as a reference. The mechanical property and environmental performance of optical fiber

take the stipulation of Class-B1.1 optical fiber in IEC 60793-2-50.2007 (Version 3.0, 86A/1164/CDV draft) Optical Fibers - Part 2-50.Product Specifications - Sectional Specification for Class B Single-mode Fibers (English version) as a reference.

This Part serves as a replacement of GB/T 9771.1-2000 The Series of Single-mode Optical Fibers for Telecommunication - Part 1.Characteristics of a Dispersion Unshifted Single-mode Optical Fiber. In the revision, other advanced foreign standards are also taken as a reference; the specific domestic situation is also combined in the revision.

In comparison with GB/T 9771.1-2000, there are several main changes as follows.

---The title of the standard is modified from "The Series of Single-mode Optical Fibers for Telecommunication - Part 1.Characteristics of a Dispersion Unshifted Single-mode Optical Fiber" into "Single-mode Optical Fibers for Telecommunication - Part 1.Characteristics of a Dispersion Unshifted Single-mode Optical Fiber";

Single-mode Optical Fibers for Telecommunication -
Part 1.Characteristics of a Dispersion Unshifted
Single-mode Optical Fiber

1 Scope

This Part of GB/T 9771 specifies the geometric characteristics, optical characteristics, transmission characteristics, and mechanical property and environment performance requirements of Class-B1.1 dispersion unshifted single-mode optical fiber; the measurement method for the characteristics of optical fiber. The zero-dispersion wavelength of this class of optical fiber is around 1,310 nm. It can be adopted in 1,310 nm wavelength region and 1,550 nm wavelength region.

This Part is applicable to Class-B1.1 dispersion unshifted single-mode optical fiber used in telecommunication cable and other information transmission equipment.

2 Normative References

Through the reference in this Part of GB/T 9771, the clauses in the following documents become clauses of this Part. In terms of references with a specific date, all the subsequent modification lists (excluding the corrected content) or revised editions are not applicable to this Part. However, all parties that reach an agreement in accordance with this Part are encouraged to explore the possibility of adopting the latest version of these documents. In terms of references without a specific date, the latest version is applicable to this Part.

GB/T 15972 (all parts) Specifications for Optical Fiber Test Methods [IEC 60793-1 (all parts), Optical Fibers - Part 1.Measurement Methods and Test Procedures, MOD]

GB/T 18900-2002 Test Methods for Polarization Mode Dispersion of Single-mode Optical Fibers

ITU-T G.650.1.2004 Definitions and Test Methods for Linear, Deterministic Attributes of Single-mode Fiber and Cable

ITU-T G.650.2.2007 Definitions and Test Methods for Statistical and Non-linear Related Attributes of Single-mode Fiber and Cable

ITU-T G.652.2005 Characteristics of a Single-mode Optical Fiber and Cable

IEC/TR 61282-3.2006 Fiber Optic Communication System Design Guides - Part 3. Calculation of Link Polarization Mode Dispersion

IEC 62048.2001 Optical Fibers - Reliability - Power Law Theory

3 Terms and Definitions

Relevant terms and definitions, which are determined in GB/T 15972, ITU-T G. 650.1.

4 Abbreviations

The following abbreviations are applicable to this Part.

DWDM. Dense Wavelength Division Multiplexing

FWM. Four-wave Mixing

PMD. Polarization Mode Dispersion

PMDQ. Link Polarization Mode Dispersion

WDM. Wavelength Division Multiplexing

5.1.1 Technical indicator of dimension parameters

Dimension parameter requirement of Class-B1.1 single-mode optical fiber shall comply with the stipulation in Table 1.

- a) Cut-off wavelength of cable. $\lambda_{\text{dacc}} \leq 1,260 \text{ nm}$;
- b) Cut-off wavelength of optical fiber. λ_{dac} not stipulated;
- c) Cut-off wavelength of jumper cable. $\lambda_{\text{dacj}} \leq 1,250 \text{ nm}$ (in terms of jumper cable whose length is 2 m ~ 20 m).

NOTE 1: the relations among the measured value of λ_{dac} , λ_{dacc} and λ_{dacj} are related with the

structure and measurement conditions of optical fiber and optical cable.

Under general circumstances, $\lambda_{\text{dacc}} < \lambda_{\text{dacj}} < \lambda_{\text{dac}}$.

NOTE 2: in terms of the cut-off wavelength of optical fiber used in special application occasion, it is stipulated that λ_{dac} shall be not more than 1,250 nm. Such special application occasion refers to the applicable of the shortest optical cable with the maximum bending radius. For example, in jumper cable whose length is less than 2 m, the cut-off wavelength λ_{dac} of optical fiber should be not more than 1,250 nm.

NOTE 3: in terms of certain specific submarine optical cable, other values of λ_{dacc} may be requested.

5.2.2 Macro-bending loss

Under the radius of 30 mm, wind optical fiber for 100 loops in loose winding. The macro-bending loss of Class-A optical fiber (in Table 4) measured in 1,550 nm shall not exceed 0.1 dB; micro-bending loss of Class-B optical fiber (in Table 4) measured in 1,625 nm shall not exceed 0.1 dB.

NOTE 1: if due to practical reasons, less than 100 loops are selected for 30 mm bending