

ICS 33.180.01
CCS M 33

YD

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

YD/T 2152-2010

**The requirement of reliability and test methods for optical fiber
connectors**

(English Translation)

Issued on: December 29, 2010

Implemented on: January 1, 2011

Issued by: Ministry of Industry and Information Technology of PRC

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1 Scope

This standard specifies the relevant terms and definitions, classifications, test items, product life test item requirements, structure and material reliability test item requirements, etc., of optical fiber connectors; it also specifies the test conditions, test methods, evaluation criteria for each reliability requirement.

This standard applies to all types and models of fiber optic connectors.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard; however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 2421-1999 Environmental testing for electric and electronic products - Part 1:

General and guidance

YD/T 1198-2002 Technical requirement of ferrule for optical fiber connector

YD/T 1272 (all parts) Optical fiber connector

IEC 61300-3-23-1998 Fibre optic interconnecting devices and passive components

- Basic test and measurement procedures - Part 3-23: Examination and measurements -
Fibre position relative to ferrule endface

3 Terms and definitions

The following terms and definitions apply to this standard.

3.1

Optical fiber connected

The ends of one or more optical fibers are secured to a ferrule, then the ends of the clean, free of obvious flaws and scratches; the geometry of the end face meets the technical requirements of the corresponding products.

4.2.5 Mutual pressure when the ferrules are butted

The ferrule shall have an axial range of motion of 0.2 mm, when assembled into the connector. When the ferrules of the two connectors are butted, the pressure ferrule shall be 7.8 ~ 11.8 N or 5 ~ 6 N, within the specified axial movable range. The former is suitable for $\Phi 2.5$ mm pins; the latter is suitable for $\Phi 1.25$ mm pins. This pressure makes the ends of any two optical fibers, in one-to-one correspondence on the ferrule, completely press and fit together, to eliminate the air gap, between the two optical fiber's end faces.

4.2.6 Locking force of connectors and adapters

When the fiber optic connector and the adapter are in a normal and fully locked state, the requirements for the tensile strength of the locking part are as follows: the screw- tightening type is greater than 26.4 N; the plug-in type is greater than 19.6 N.

4.2.7 Fixing of tail fiber optic cable of fiber optic connector

For the optical fiber connector, which is used for optical cable connection, it shall consider the fixing of the optical cable head end, at the tail of the connector. This fixation can neither affect the normal axial movement range of the ferrule, but also bear a certain tensile force. When the tail optical cable bears a normal tension of not less than 9.8 N, the ferrule cannot be pulled back, to ensure the normal operation of the connector.

4.3 Materials

4.3.1

When the connector structure is made of metal material, it is required to be bright and smooth in appearance, resistant to acid and alkali corrosion, not rusted, cracked or corroded after various performance tests.

4.3.2

When the connector structure is made of non-metallic materials, it is required to have a fine and smooth appearance, anti-fungal, flame-retardant, not deformed, cracked, or wrinkled

after various tests.

4.3.3

Optical fibers and cables are required to meet the relevant performance indicators, technical parameters, environmental protection requirements. The coating materials and sheath materials of optical fibers and cables are required to be smooth, soft, flame-retardant, not apparently wrinkled or cracked after such tests as high temperature, low temperature, cyclic high and low temperature, constant damp heat.

4.4 Test items of optical fiber connector

The test items of the optical fiber connector are as required in Table 1.

- a) The appearance of the sample is consistent with the corresponding design and manufacturing requirements; the processing quality meets the requirements of the relevant technical documents;
- b) The appearance must be smooth, clean, free of oil stains and burrs, no scars and cracks, have bright color and good consistency. The combination of parts and components must be tight and flat; the insertion and extraction of the connector and the adapter must be smooth and light; the clips must be strong, elastic, inserted and removed normally;
- c) The appearance of the optical cable is smooth and bright, without impurities or damage; it has clear printing; the color conforms to the product requirements.

5.3.2.1 End face inspection

Remove the dust cap, which covers the front end of the ferrule, without any wiping cleaning. Directly observe the cleaning condition of the end face, under a 100X microscope. It is required that there shall be no obvious oil stains and stains; no obvious impurities, chipping, scratches can be seen in the ceramic part. Observe the central fiber end face, under a 200X or 400X microscope; it requires that it does not have obvious white spots (chipping), black spots (dirt), shadows (internal cracks); scratches cannot pass through the light-transmitting part of the optical fiber. when observed with a light filter, the outgoing spot is normal. See Appendix A, for specific requirements.

5.3.2.2 End face geometry measurement

The end face interferometer can directly measure the spherical radius of the end face, the deviation of the spherical vertex from the center of the ferrule, the concave/protruding degree of the central fiber, the angle (APC type connector), etc. See

Appendix A, for specific requirements.

5.3.3 Elasticity test of ferrule

- a) Measure the protruding length of the ferrule, which shall meet the structural design requirements;
- b) The pressure on the ferrule meets the technical requirements of related products.

5.3.4 Fixing inspection of tail fiber optic cable

For the optical fiber connector, which is assembled at the head end of the optical fiber cable with sheath and Kevlar aramid, the tail of the connector must be designed with a sheath and Kevlar aramid fixing method. Otherwise, the fiber optic connector will not work properly.

5.3.5.1 Conditioning of samples before test

After cleaning each connector sample and adapter sample, according to the requirements of Article 5.2.1, combine them into the required pigtail type or jumper type test sample. After standing at room temperature for 2 hours, respectively measure the insertion loss and return loss of each component, as the original values before the test.

5.3.5.2 High temperature aging

- a) Test conditions

Temperature: +85 °C;

Duration: 168 h;

For ordinary requirements, it does not require online recording of test data. For the stricter requirement, it requires recording the test data at intervals.

- b) Procedure

1) Ordinary requirements

- Place the specimen in a constant temperature oven, which has an accuracy of ± 2 °C, at a temperature of 85 °C; maintain a constant temperature for 168 h. After the test, lower the temperature to room temperature, at a specified rate; after staying for 2 hours, test and record the insertion loss and return loss.

2) Stricter requirements

- Place the specimen in a constant temperature oven, which has an accuracy of ± 2 °C. Connect a light source and an optical power meter, to both ends of the specimen, as shown in Figure 3. Increase temperature at the specified time, until +85 °C. Maintain the constant temperature for 168 h. For stricter requirements, the constant temperature time can be based on the product use requirements; the test time can be extended to 500 h, 1000 h, 2000 h. After the test, lower the temperature to room temperature, at the specified rate.