

ICS 29.060.20

CCS K 13



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

GB/T 19216.3-2021

**Circuit integrity test for electric cables or optical fiber cables under fire conditions - Part
3: Test method for fire with shock at a temperature of at least 830°C for cables of rated
voltage up to and including 0.6/1 kV tested in a metal enclosure**

在火焰条件下电缆或光缆的线路完整性试验 第3部分：火焰温度不低于830 °C的
供火并施加冲击振动，额定电压0.6/1 kV及以下电缆穿在金属管中进行的试验方
法

(English Translation)

Issued on: May 21, 2021

Implemented on: December 1, 2021

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

Table of Contents

Foreword
Introduction
1 Scope
2 Normative references
3 Terms and definitions
4 Test environment
5 Test equipment
6 Sample (power cable and control cable with rated voltage 0.6/1kV and below)
7 Test procedure (power cable and control cable with rated voltage 0.6/1kV and below)
8 Performance requirements (power cables and control cables with rated voltage 0.6/1kV and below)
9 Repeat the test procedure
10 Test report (power cable and control cable with rated voltage 0.6/1kV and below)
Appendix A (Normative) Verification Procedure for Heat Source
Reference

1 Scope

This document describes the test to maintain the integrity of the circuit when the fire-resistant cable is put in a metal pipe and is subjected to flame and shock vibration under specified conditions.

This document applies to cables with a rated voltage of 0.6/1kV and below, including metal conductor data and telecommunications with a rated voltage below 80V Electric cables and optical cables.

This document applies to test cables with an outer diameter less than or equal to 20mm.

This document describes the test failure points, continuity check devices, and test points of power cables and control cables with a rated voltage of 0.6/1kV and below.

Detailed information of the test samples, test procedures and test reports. The metal conductor data and the test failure point and continuity of telecommunications cables and optical cables are not given.

Detailed information about the test equipment, test samples, test procedures and test reports.

Although the scope of application is limited to cables with a rated voltage of 0.6/1kV and below, when the manufacturer and the buyer agree, and are equipped with suitable After the fuse, it can also be applied to cables with a rated voltage of 1.8/3(3.3)kV and below.

It is not assumed that cables successfully evaluated by this method can also pass the requirements of GB/T 19216.1-2021 or GB/T 19216.2-2021. Correct Tests for either of these two standards must be carried out separately. According to Chapter 11 of GB/T 19216.1-2021 or GB/T 19216.2-2021 According to Chapter 11, this additional performance can be identified by marking.

Appendix A gives the verification method of the burner and control system used in the test.

Caution. The tests in this document may involve the use of dangerous voltages and temperatures. Appropriate precautions should be taken to prevent possible Risks of electric shock, burning, fire and explosion, as well as any harmful gases that may be produced.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations Only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to This document.

GB/T 19216.1-2021 Cable or optical cable line integrity test under flame conditions Part 1: The flame temperature is not lower than Test method for cables with external diameter exceeding 20mm with a rated voltage of 0.6/1kV and below by supplying fire at 830°C and applying shock and vibration (IEC 60331-1:2018, IDT)

GB/T 19216.2-2021 Cable or optical cable line integrity test under flame conditions Part 2: The flame temperature is not lower than Test method for cables with an external diameter of not more than 20mm after supplying fire at 830°C and applying shock and vibration, rated voltage 0.6/1kV and below (IEC 60331-2:2018, IDT)

IEC 60269-3 Low-voltage fuses Part 3: Supplementary requirements for fuses used by unskilled personnel (mainly used for household and class (Fuses for similar purposes) Examples

IEC 60584-1 Thermocouple Part 1: Thermoelectromotive force specifications and tolerances (Thermocouples-Part 1: EMF specifications and tolerances)

3 Terms and definitions

The following terms and definitions apply to this document. of standardized fuse systems A to F (Low-voltage fuses-Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications)-Examples of standardized systems of fuses A to F]

3.1 Circuit integrity

The ability to operate continuously in a specified state when burning under a specified fire source and time.

3.2 Draught-free environment

A space where the test results will not be significantly affected by the local air velocity.

4 Test environment

The test should be carried out in a suitable box with a minimum volume of 20m³ in an air-free environment.

Any harmful gas facilities. There should be sufficient ventilation to maintain the flame during the test. The position of the air inlet and exhaust chimney should be verified. Keep the burner flame stable during the process and test. If necessary, use a windscreen to protect the burner from any airflow.

In order to observe the condition of the cable during the test, an observation window can be installed on the wall of the box. Exhaust smoke should pass through a chimney at least 1m away from the burner. Natural ventilation is achieved. A damper can be used to adjust the ventilation conditions.

Note: Experience shows that a "3m cube" cabinet similar to GB/T 17651.1 is suitable.

At the beginning of each test, the box and the test device should be kept between 10°C and 40°C.

In the process of verification and cable test, the ventilation and barrier conditions in the box should be the same.

5.1 Test device

The test device shall consist of the following parts.

- a) A metal pipe penetrating the test specimen, consisting of a straight circular cross-section stainless steel pipe as described in 5.2;
- b) A test ladder frame for installing metal pipes, including a steel frame fixed on a rigid support as described in 5.3;
- c) Heat source, horizontally installed belt burner as described in 5.4;
- d) The shock and vibration generating device described in 5.5;
- e) The test wall is equipped with the thermocouple used to verify the heat source described in Appendix A;

- f) The continuity check device described in 5.7;
- g) The fuse described in 5.8.

The general layout of the test device is shown in Figure 1, Figure 2, Figure 3 and Figure 4.

5.6 Location of heat source

The burner should be placed in the test box, and the burner's spray surface should be at least 200mm away from the box floor or any mounting plate, and the distance from any box The body wall is at least 500mm.

Taking the centerline of the metal tube as the reference, the burner should be positioned at the horizontal distance between the burner surface and the centerline of the metal tube as $(H \pm 2)$ mm, the vertical distance between the centerline of the burner and the centerline of the metal tube is $(V \pm 2)$ mm, as shown in Figure 4.

During the test, the H and V values to determine the correct position of the burner should be equal to the H'and V'values determined by the verification procedure in Appendix A.

During the test, the burner should be firmly fixed on the bracket to prevent relative displacement with the sample.

5.7 Continuity check device (power cable and control cable with rated voltage 0.6/1kV and below) During the test, the current used for continuity check should flow through all conductors of the cable, and the current should be changed by a three-phase star connection.

The transformer or single-phase transformer (group) is provided. The transformer should have sufficient capacity to maintain the test voltage when the maximum allowable leakage current is reached.

Note 1: When determining the rated power of the transformer, pay attention to the characteristics of the fuse.

This current should be obtained by connecting an appropriate load and indicating device (such as a bulb) to each conductor or group of conductors at the other end of the sample.

Note 2: Under the test voltage, the current passing through each conductor or group of conductors is preferably 0.25A.

5.8 Fuse

The fuse used in the test procedure in Chapter 7 shall be DII type 2A in accordance with IEC 60269-3 fuse system A to D. A circuit breaker with equivalent characteristics can be used instead.

When using a circuit breaker, the equivalent characteristics should be verified in