



IEEE Standard Test Methods for Low-Voltage Gas-Tube Surge-Protective Device Components

IEEE Power Engineering Society

Sponsored by the
Surge Protective Devices Committee

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of the
IEEE Power Engineering Society**

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Abstract: This standard applies to gas-tube surge-protective devices for application on systems with voltages, 1000 V rms or 1200 V dc.

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Introduction

This introduction is not part of IEEE Std C62.31-2006, IEEE Standard Test Methods for Low-Voltage Gas-Tube Surge-Protective Device Components.

This standard applies to gas discharge-tubes for over-voltage protection applications on systems with operating voltages equal to or less than 1000 V rms or 1200 V dc. These protective devices are designed for limiting the voltages on balanced or unbalanced communication and on power circuits. This standard contains a series of standard test-methods for determining the electrical characteristics of these gas discharge-tube devices components.

Gas discharge tubes are used to provide over-voltage protection in electrical circuits. When the device's breakdown voltage is exceeded, its normal high impedance state changes to a low impedance state to allow conduction of the surge discharge current. After the device conducts the surge discharge current, it interrupts the flow of system follow current and returns to its high impedance state. In the event of continuing current not representing normal system conditions, the device continues to provide a low impedance path until an external bypass mechanism activates, the source of undesirable current is de-energized, or a coordinated protective current element operates. This standards test criteria and definitions provide a common engineering language beneficial to user and manufacturer of gas-tube surge-protective devices components.

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IEEE Standard Test Methods for Low-Voltage Gas-Tube Surge-Protective Device Components

1. Scope

This standard applies to gas-tube surge-protective device components for application on systems with voltages less than or equal to 1000 V rms or 1200 V dc. These protective devices are designed to limit voltage surges on balanced or unbalanced communication circuits and on power circuits operating from direct current (dc) to 420 Hz. This standard contains a series of standard test criteria for determining the electrical characteristics of gas-tube surge-protective devices.

The tests in this standard are intended as design tests as defined in *The Authoritative Dictionary of IEEE Standard Terms* [B1]¹ and provide a means of comparison among various gas-tube surge-protective device components.²

Gas-tube devices are used to provide over-voltage protection in electrical circuits. When the breakdown voltage of the gas tube is exceeded, the normal high-impedance state of the tube changes to a low-impedance state to allow the gas tube to conduct the surge discharge current. After the tube conducts the surge discharge current, it interrupts the flow of power follow current and returns to its high-impedance state.

This standard's test criteria and definitions provide a common engineering language that is beneficial to the user and manufacturer of gas-tube surge-protective devices.

CAUTION

Due to the voltage and energy levels employed in the majority of tests contained herein, all measurements should be considered dangerous and appropriate caution should be taken in their performance.

2. Definitions

For the purposes of this document, the following terms and definitions apply. *The Authoritative Dictionary of IEEE Standard Terms* [B1] should be referenced for terms not defined in this clause.

2.1 arc current: The current that flows after breakdown when the circuit impedance allows a current that exceeds the glow-to-arc transition current. *Syn:* **arc mode current.**

¹The numbers in brackets correspond to those of the bibliography in Annex A.

²In this standard, the term *gas tube* or *gas-tube surge-protective device component* is used when the definition of gas-tube surge arrester (see Clause 2) is intended, and the term *protector* is used when the definition of surge protector (see Clause 2) is intended. When a test applies to both protectors and surge-protective device components, the term *device* or *gas-tube device* is used alone. For the purpose of this standard, all connections to a device are by means of the terminals.