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IEEE Guide for the Application of Surge-Protective Components in Surge-Protective Devices and Equipment Ports—Overview

IEEE Power and Energy Society

Sponsored by the
Surge Protective Devices Committee

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Abstract: Surge-protective components (SPCs) used in power and telecom surge-protective devices (SPDs) and equipment ports are covered in the C62.42 guide series. This Overview part covers protective functions, both non-linear and linear; component technologies and characteristics; common circuit designs used in SPDs and equipment ports; and information on the impulse (surge) generators used to test SPCs. Additional parts of C62.42 on specific SPC technologies provide details on component construction, characteristics and ratings, and application examples.

Keywords: components, electrical protection, equipment ports, IEEE C62.42.0™, mitigation, overcurrent, overvoltage, power, surge, surge-protective devices, telecommunication

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Introduction

This introduction is not part of IEEE Std C62.42.0™-2016, IEEE Guide for the Application of Surge-Protective Components in Surge-Protective Devices and Equipment Ports—Overview.

External electrical events, such as lightning, can couple into a system by the mechanisms of direct coupling, electric fields, magnetic fields, and electromagnetic fields. Depending on the coupling mechanism, the coupling level can be reduced by the use of equipotential bonding, isolation, and shielding. Once the surge is in the system it can be further mitigated by the use of surge-protective components in surge-protective devices and the equipment ports.

The surge appearing in the system may be a voltage wave or a current wave or both. At a given location the surge may be common-mode or differential-mode or a combination of both. The choice of protection configuration and components will depend on the type of expected surge and the system parameters. Surge-protection component functions are either non-linear limiting or linear attenuating. Both types of protective functions can be used together to achieve the optimum surge mitigation. For example, an isolation transformer could be used to provide a galvanic break and common-mode voltage surge mitigation together with non-linear voltage limiters connected across the transformer windings to provide differential-mode voltage surge mitigation.

Clause 3 of this document describes the different terms used in protection engineering. Clause 4 describes the mitigation function types. Clause 5 outlines available protection component technologies and characteristics. Clause 6 provides some examples of protection configurations and their protection components.

Component surge performance is evaluated by testing with a specified impulse generator. Informative Annex B, Annex C, and Annex D describe the various types of impulse generators, their interaction with surge-protective components, and the resultant component electrical stress levels.

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IEEE Guide for the Application of Surge-Protective Components in Surge-Protective Devices and Equipment Ports—Overview

1. Scope

The IEEE C62.42™ guide series covers surge-protective components (SPCs) used in power and telecom surge-protective devices (SPDs) and equipment ports. This overview covers the following:

— Protective functions both non-linear and linear
— Component technologies and characteristics
— Common circuit designs used in SPDs and equipment ports
— Information on the impulse (surge) generators used to test SPCs

Additional parts of IEEE C62.42™ on specific SPC technologies provide details on the following:

— Component construction
— Characteristics and ratings
— Application examples