

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Low-voltage switchgear and controlgear –
Part 9-1: Active arc-fault mitigation systems – Arc quenching devices**

**Appareillage à basse tension –
Partie 9-1: Systèmes actifs de limitation des défauts d'arc – Dispositifs
d'extinction d'arc**



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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 9-1: Active arc-fault mitigation systems –
Arc quenching devices

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International Standard IEC 60947-9-1 has been prepared by subcommittee SC121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
121A/254/FDIS	121A/266/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60947 series, published under the general title *Low-voltage switchgear and controlgear*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

The effects of arc-faults inside an enclosure are more and more taken into consideration, both from user safety and time-to-repair points of view. Protection against the effects of internal arc-faults can be achieved through passive components (containment) or through active components, also known as "active arc-fault mitigation systems".

Active arc-fault mitigation systems generally use internal arc-fault control devices (IACDs), based on the effects of the arc (light, pressure, current or voltage harmonics, etc.), and an actuator to eliminate the arc-fault.

This actuator can be an upstream circuit-breaker, which is tripped to interrupt the fault current, or an arc quenching device that will transfer the fault to a dedicated low-impedance circuit, before the short-circuit current is interrupted by the upstream short-circuit protective device (SCPD).

The purpose of this document is to set the requirements for arc quenching devices, so that the necessary safety is ensured and their performance can be fairly assessed.

Special requirements for environmental withstand (e.g. ambient temperature, damp heat, shock, vibrations) are included, considering the high impact of a malfunction, either unwanted operation (creation of a short-circuit) or failure to operate.

Requirements for internal arc-fault control devices are under development and will be published as IEC 60947-9-2¹.

Requirements for integration of internal arc-fault mitigation systems in power switchgear and controlgear assemblies are under development and will be published as IEC TS 63107².

¹ Under preparation. Stage at the time of publication: IEC/ACD 60947-9-2:2018.

² Under preparation. Stage at the time of publication: IEC/PCC 63107:2018.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 9-1: Active arc-fault mitigation systems – Arc quenching devices

1 Scope

This part of IEC 60947 covers low-voltage arc quenching devices, hereinafter referred to as AQDs, which are intended to eliminate arc-faults in low-voltage assemblies (typically low-voltage switchgear and controlgear assemblies in accordance with the IEC 61439 series), by creating a lower impedance current path, to cause the arcing current to transfer to the new current path. This new current path is maintained until a short-circuit protection device (SCPD) interrupts the short-circuit current.

AQDs are installed in low-voltage assemblies, connected to the main circuit, preferably as close as possible to all primary power sources.

Their rated voltage does not exceed 1 000 V AC or 1 500 V DC.

This document does not cover:

- sensors intended to detect arc-faults;
- devices intended to trigger the functioning of the arc quenching device;
- devices intended to interrupt arc-fault current;
- special requirements for AQDs for use in explosive atmospheres (e.g. ATEX).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60417, *Graphical symbols for use on equipment* (available at <http://www.graphical-symbols.info/equipment>)

IEC 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-1:2007/AMD1:2010

IEC 60947-1:2007/AMD2:2014

IEC 61439 (all parts), *Low-voltage switchgear and controlgear assemblies*

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*

CISPR 11:2015/AMD1:2016