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Low-voltage switchgear and controlgear – Fire risk analysis and risk reduction measures

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR – FIRE RISK ANALYSIS AND RISK REDUCTION MEASURES

FOREWORD

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IEC TR 63054, which is a technical report, has been prepared by subcommittee 121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
121A/115/DTR	121A/155/RVDTR

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

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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

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- replaced by a revised edition, or
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INTRODUCTION

As fire-ignition hazards are inherent with electricity, installation rules and product standards for electrical equipment are aimed at providing risk reduction measures and minimizing residual risk without compromising product safety and function.

Residual risk of low-voltage switchgear and controlgear compliant with IEC 60947 relevant publications is generally low and, when selected, installed and used according to manufacturer instruction and installation rules, do not ignite fire in normal operation or reasonably foreseeable fault conditions.

This document, in accordance to ISO/IEC Guide 51 and IEC Guide 116, describes the fire risk analysis of electrical equipment and risk reduction measures in IEC 60947 relevant publications. While intended to apply specifically to low voltage switchgear and controlgear, it is suggested that other product committees may find this information useful.

The fire hazards, namely the flame ignition mechanisms, relevant for low-voltage switchgear and controlgear are reviewed and discussed. The related risk reduction measures included in IEC 60947 relevant publications are subsequently reported for each of those mechanisms.

These measures are based on a system approach, not limited to construction materials requirements and include design rules and type testing to ensure equipment do not cause fires in normal operation or due to reasonably foreseeable faulty conditions.

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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR – FIRE RISK ANALYSIS AND RISK REDUCTION MEASURES

1 Scope

This document applies to the fire risk analysis of low-voltage switchgear and controlgear (hereinafter referred to as "equipment") referring to the IEC 60947 relevant publications, where the following applies:

– only the case where a fire originates (typically under fault or misuse conditions) within the equipment;
– only equipment installed in normal environments. Hazardous environments, for example in presence of combustible materials, is not to be considered;
– only the case of products selected, installed and used according to the manufacturer instructions and installation rules.

In addition, the following cases are not considered:

– faults addressed by IEC TR 61641;
– risks due to smoke emissions;
– double faults, i.e. multiple phenomenon, potentially combined.

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 Guide 116:2010, *Guidelines for safety related risk assessment and risk reduction for low voltage equipment*

IEC 60695-1-10:2015, *Fire hazard testing – Guidance for assessing the fire hazard of electrotechnical products – General guidelines*

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 60947-2, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 60947-3, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

IEC 60947-5-1, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 60947-6-1, *Low-voltage switchgear and controlgear – Part 6-1: Multiple function equipment – Transfer switching equipment*

IEC 60947-7-1:2009, *Low-voltage switchgear and controlgear – Part 7-1: Ancillary equipment – Terminal blocks for copper conductors*

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