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Components for low-voltage surge protection -
Part 333: Characteristic equations and life evaluation for metal oxide varistors (MOV)

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IEC TR 61643-333 has been prepared by subcommittee 37B: Components for low-voltage surge protection, of IEC technical committee 37: Surge arresters. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
37B/269/DTR	37B/272/RVDTR

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

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 61643 series, published under the general title *Components for low-voltage surge protection*, 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

INTRODUCTION

Since the invention of metal oxide varistors (MOV) which are also known as zinc oxide non-linear resistors, in 1968, MOV has become the key surge protection component with the widest use, largest production and mature technology. In addition, driven by the market demand and the efforts of researchers, production engineers and field application engineers, people have further deepened their understanding of it.

Although impulse life characteristic curve and life data under continuous working voltage stress have been given in current MOV product manuals and related technical data, they are only empirical and rough estimate. The life value of MOV (average value, median value and minimum value) is essentially a statistic, which needs to be dealt with by the theory of mathematical statistics.

Additionally, there is an increasing user's demands in recent years for the MOVs having estimated lifetime duration. The estimated value is evaluated and tested under continuous working voltage stress and impulse current stress. Although MOV manufacturers provide the service life characteristic curves under impulse current stresses, such curves are empirical. This is the reason why a theoretical approach is provided in this technical report.

1 Scope

This part of IEC 61643, which is a Technical Report, presents the *U-I/R-I* characteristic equations and the life evaluation method for MOVs, which are used for applications up to 1 000 V AC or 1 500 V DC in power line, or telecommunication, or signalling circuits. They are designed to protect apparatus or personnel, or both, from high transient voltages.

This document specifically addresses the zinc-oxide type of MOVs.

2 Normative references

There are no normative references in this document.

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