



# TECHNICAL SPECIFICATION



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**Basic qualification of DC-link film capacitors for automotive use – General requirements, test conditions and tests**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**BASIC QUALIFICATION OF DC-LINK FILM  
CAPACITORS FOR AUTOMOTIVE USE –  
GENERAL REQUIREMENTS, TEST CONDITIONS AND TESTS**

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IEC TS 63337 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment. It is a Technical Specification.

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

Draft	Report on voting
40/3093/DTS	40/3117/RVDTS

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 Specification 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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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## INTRODUCTION

This Technical Specification is based on a publication of the "ZVEI/ECPE Film Capacitors Core Group" working group with representatives from vehicle, device and capacitor manufacturers. It is adopted to the electrical specifications valid for electrically propelled vehicles – voltage class B systems, as given in ISO 21498-1.

Because AEC-Q200 is not applicable for the capacitors considered here, this document defines a set of tests to ensure the basic suitability of the capacitor for application as a DC-link capacitor in HV applications or in the intermediate circuit of the 48 V on-board electrical system.

This Technical Specification makes no claim to completeness. Automotive manufacturers and device manufacturers are free to request additional state-of-the-art tests at any time. It is also important to understand that a basic qualification as described in this document cannot replace a comprehensive technology qualification being performed in advance of product development.

As the individual manufacturers can make changes, only the company standards of the respective manufacturers created on the basis of this Technical Specification apply.

# BASIC QUALIFICATION OF DC-LINK FILM CAPACITORS FOR AUTOMOTIVE USE – GENERAL REQUIREMENTS, TEST CONDITIONS AND TESTS

## 1 Scope

This document provides requirements, test conditions and tests to validate characteristics including the service life of customized DC-link film capacitors for use in motor vehicle components.

Standard DC-link capacitors qualified according to other IEC standards or AEC-Q200 are excluded from the scope of this document.

The requirements, test conditions and tests listed in this document apply to customized film capacitors developed for use in motor vehicle power electronics for the application as a DC-link capacitor in HV applications or in the intermediate circuit of the 48 V on-board electrical system.

These qualification requirements can be expanded or adapted for the application of technologically innovative designs, if necessary. The content and scope of supplements is therefore to be specified and documented in coordination between the responsible parties prior to sourcing.

Power electronics in the motor vehicle need to be tested in accordance with the environmental qualification standards of the vehicle manufacturers.

The tests in this document do not replace the tests specified in the Component Requirement Specifications for complete vehicle components or additional or deviating further requirements, test conditions and tests described therein.

This document contains no tests to validate the thermal interface between capacitors, power electronics and the cooling system on the component level.

## 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 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-64, *Environmental testing – Part 2-64: Tests – Test Fh: Vibration, broadband random and guidance*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60384-1:2021, *Fixed capacitors for use in electronic equipment – Part 1: Generic specification*

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60695-2-12, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 61071:2017, *Capacitors for power electronics*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO 21498-1:2021, *Electrically propelled road vehicles – Electrical specifications and tests for voltage class B systems and components – Part 1: Voltage sub-classes and characteristics*