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Aerospace series — Cables, electrical, aircraft use — Test methods

Part 307: Corona extinction voltage

National foreword

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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European Foreword

This document (EN 3475-307:2015) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2015, and conflicting national standards shall be withdrawn at the latest by December 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 3475-307:2010.

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Introduction

For an electrical cable, the presence of partial discharges effects at operating voltage may result in a significant reduction of service life.

Some insulation materials are more susceptible to such discharge damage than others.

Evidence of partial discharges during operation signifies for example:

— the insulation thickness is insufficient for the applied voltage;

— the quality of the insulation is inadequate possibly due to excessive size or quantities of internal cavities or voids;

— an overstress is present, resulting in a local reduction of the cable insulation properties.

Significant parameters may influence PDIV [*] and PDEV [*] such as pressure, temperature, humidity, previous electrification, input signal characteristics (sine wave, voltage rate, ...). Attention shall be given to installation conditions in A/C, for example excessive bending or surface wrinkling of insulation shall be avoided.

Up to few tens of kHz frequency can be considered as non-significant parameter.

[*] See definition, Clause 3.

1 Scope

This European Standard defines methods to cover the detection and measurement of partial discharge (corona) under an applied test voltage, including the determination of partial discharges (corona) inception and extinction voltages as the test voltage is raised and lowered, of electrical cables for aircraft use.

It shall be used together with EN 3475-100.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 2235, *Aerospace series — Single and multicore electrical cables, screened and jacketed*

EN 3475-100, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 100: General*

EN 60270, *High-voltage test techniques — Partial discharge measurements*

ASTM D 1868, *Standard Test method for Detection and Measurement of Partial Discharge (Corona) Pulses in Evaluation of Insulation Systems* [1)]

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
Partial Discharge Inception Voltage
PDIV
lowest voltage at which continuous (Steady state with a minimum of 1 detected Partial Discharge per second for 10 s minimum) partial discharges occur as the applied voltage is increased

3.2
Partial Discharge Extinction Voltage
PDEV
highest voltage at which partial discharges no longer occur as the applied voltage is decreased from the inception voltage described before

NOTE 1 to entry More precise information on the partial discharge phenomenon, such as definition, can be found in ASTM D 1868-07 or in EN 60270.

4 Applicability

This test method is suitable for coaxial cables, high voltage cables and for thin wall insulated cables. Methodologies are proposed to cover: coaxial cables (Method A), wires used in altitude (Method B).

1) Published by: ASTM National (US) American Society for Testing and Materials http://www.astm.org/.