BS EN 2591-214:2012

BSI Standards Publication

Aerospace series — Elements of electrical and optical connection — Test methods

Part 214: Lightning strike, current and voltage pulse

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee ACE/6, Aerospace avionic electrical and fibre optic technology.

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

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Luft- und Raumfahrt - Elektrische und optische Verbindungselemente - Prüverfahren - Teil 214: Blitzschlag, Strom- und Spannungsimpuls

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 2591-214:2012) 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of an identical text or by endorsement, at the latest by April 2013, and conflicting national standards shall be withdrawn at the latest by April 2013.

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1 Scope

This European Standard specifies a method of measuring the ability of an element of connection to withstand specified severities of simulated lightning strikes, both current pulse and voltage pulse.

It shall be used together with EN 2591-100.

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 2591-100, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 100: General*

EN 2591-101, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 101: Visual examination*

EN 2591-205, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 205: Housing (shell) electrical continuity*

EN 2591-206, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 206: Measurement of insulation resistance*

EN 2591-408, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 408: Mating and unmating forces*

3 Preparation of specimens

3.1 High current pulse test

Connectors shall be unwired, mated and fitted with their accessories. They shall be mounted as detailed in Figure 3. It is recommended that the accessory be fitted with the largest diameter braid allowable.

3.2 Voltage pulse test

Connectors shall be wired, mated and fitted with their accessories, they shall be tested as detailed in Figure 6.

Unless indicated in the technical specification, the following details shall be specified in the product standard:

— Mounting and wiring of the specimen, if different.

— Peak voltage for voltage pulse (V), if different.

— Peak current for current pulse (I), if different.

— Pre-conditioning.

— Final requirements.

— Number size and type of specimens.

4 Apparatus

A power generator capable of producing the current and/or the voltage as specified in the technical specification and characteristics of Figures 1 and 3 or Figures 2 and 5 depending on severity or product standard.

A measuring device shall be provided for the test to record current and voltage (see Figures 3 and 6 for set up).

5 Method

5.1 Pre-conditioning

The specimen shall be subjected to following tests, unless otherwise specified by the technical specification.

EN 2591-101 Visual examination

EN 2591-205 Housing (shell) electrical continuity

EN 2591-408 Mating and unmating forces

Therefore the mating forces shall be made at specified value in the product standard.

Resistance between receptacle and mounting plate shall be as low as possible and recorded before test.

5.2 Procedure

5.2.1 Current pulse

The current pulse amplitude shall be, as specified in the product standard, according to the following class:

A = 1 KA Waveform as Figure 1

B = 3 KA Waveform as Figure 2

C = 5 KA Waveform as Figure 2

D = 10 KA Waveform as Figure 2

E = 30 KA Waveform as Figure 1

F = 15 KA Waveform as Figure 1

Ten pulses are made on the same sample without any removing or unmating.

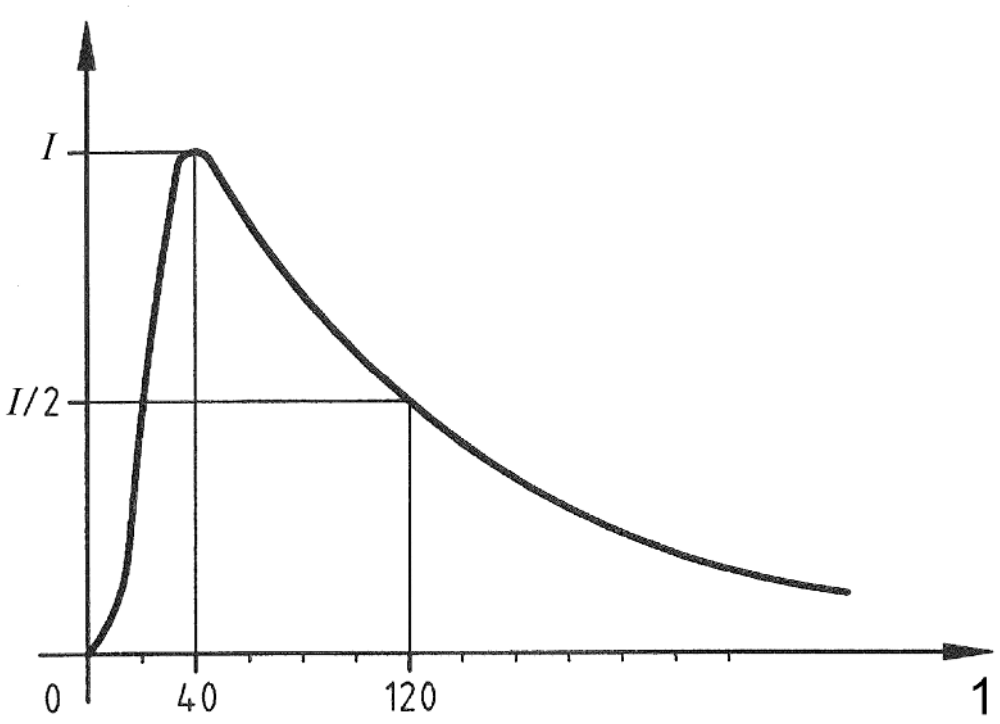
Minimum time between each pulse is 1 min.

Final measurements.

EN 2591-101 Visual examination

EN 2591-205 Housing (shell) electrical continuity, as specified in product standard

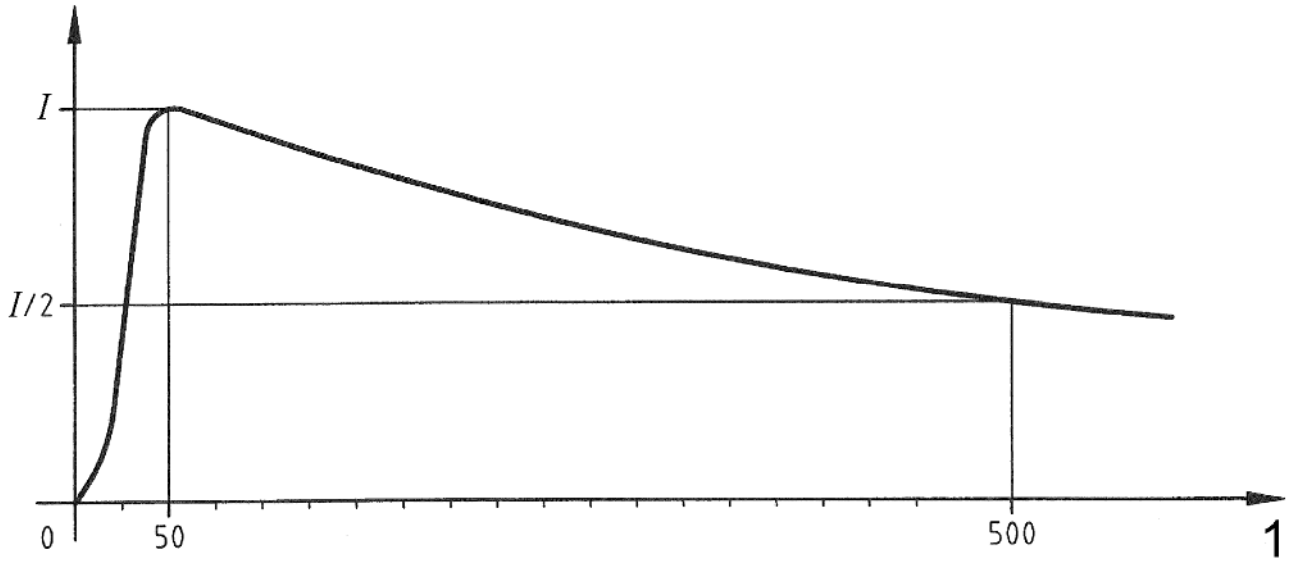
EN 2591-408 Mating and unmating forces, as specified in product standard



Key

1 Times (μs)

Figure 1 — Typical lightning current pulse form (waveform 1)



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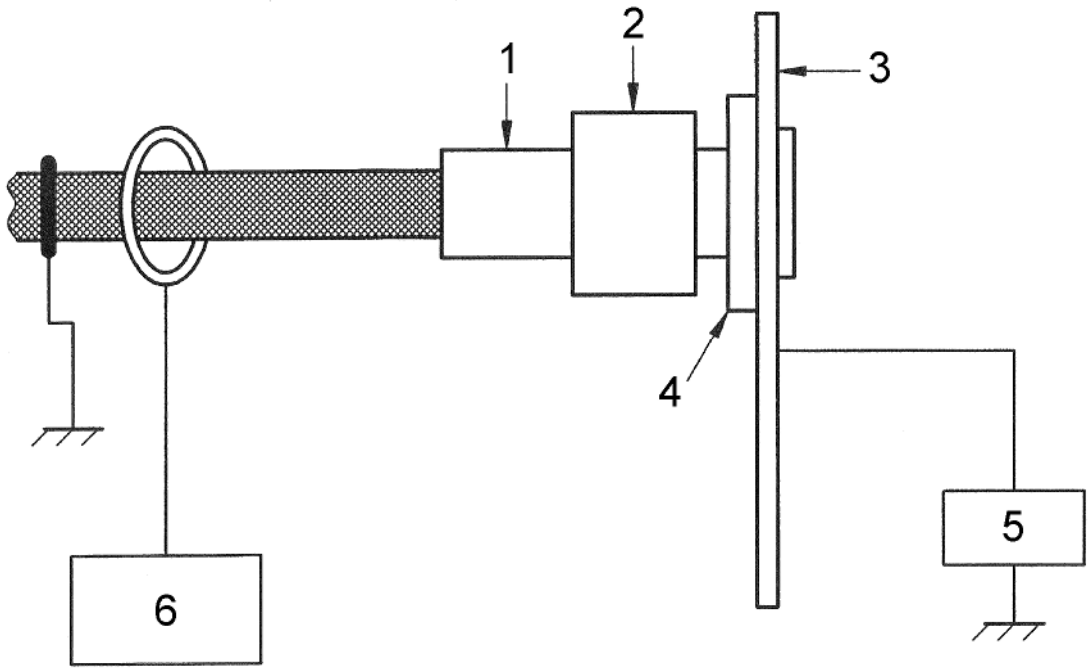
1 Times (μs)

Figure 2 — Typical lightning current pulse form (waveform 2)



Key

1 Accessory
2 Plug
3 Mounting - Plate
4 Wall mounted receptacle
5 Power generator
6 Current measurement probe

Figure 3 — Typical arrangement for free plug/wall mount receptacle

5.2.2 Voltage pulse

The test shall be performed on contacts and between contacts and shell for both mated and unmated connectors. It is not necessary to test every combination which this could produce. For contact to contact test, only two adjacent contacts that are closest together shall be tested. If there is no difference in the contact spacing, any selection is acceptable.

The voltage signal amplitude shall be, as specified in the product standard, according to the following class:

A = 800 V Waveform as Figure 4

B = 1 600 V Waveform as Figure 4

C = 2 000 V Waveform as Figure 5

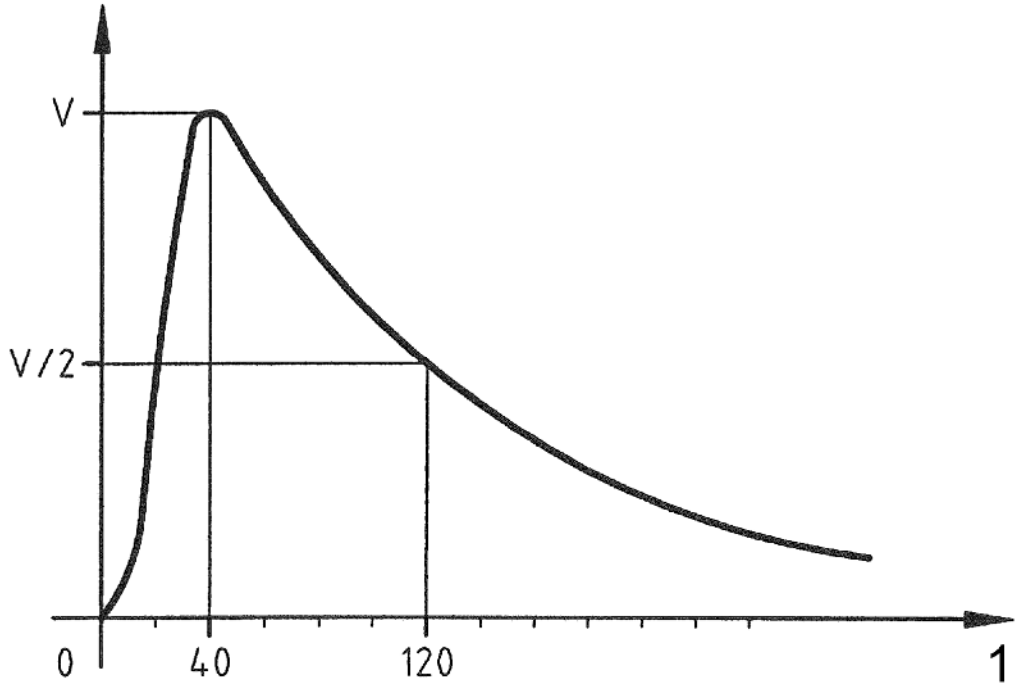
D = 3 200 V Waveform as Figure 4

Ten pulses are made on the same sample, no mating is permissible when connectors are tested in the mated conditions, without any removing or unmating.

Minimum time between each pulse is 1 min.

Final measurements.

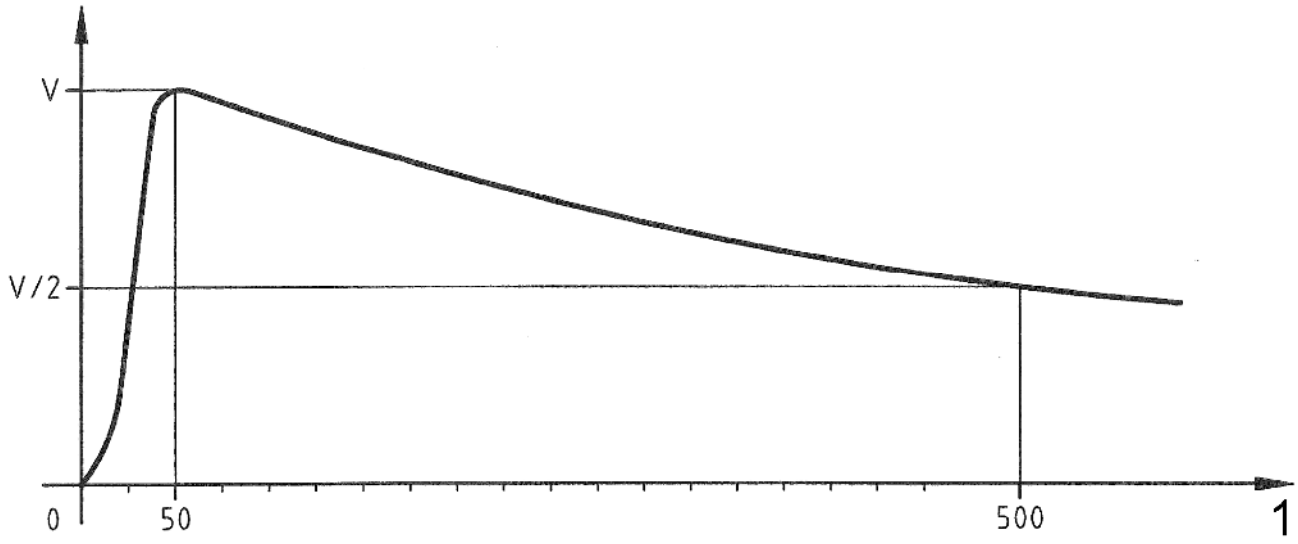
EN 2591-101	Visual examination
EN 2591-205	Housing (shell) electrical continuity, as specified in product standard
EN 2591-408	Mating and unmating forces, as specified in product standard
EN 2591-206	Measurement of insulation resistance, as specified in product standard



Key

1 Times (μs)

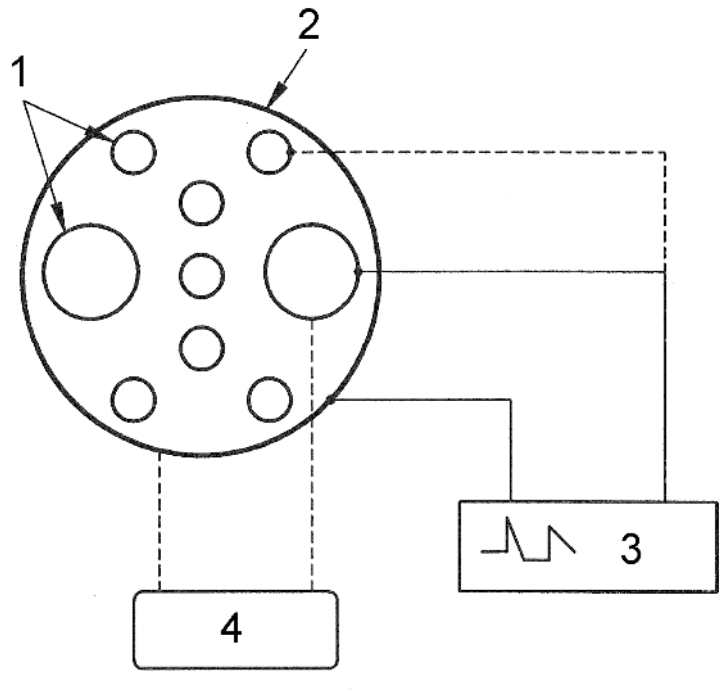
Figure 4 — Typical lightning voltage pulse (waveform 1)



Key

1 Times (μs)

Figure 5 — Typical lightning voltage pulse (waveform 2)



Key

1 Connector – Contacts
2 Connector shell
3 Power generator
4 Fall detector

Figure 6 — Typical test arrangement for testing between contact and shell

6 Requirements

Unless otherwise stated in the technical specification the specimens shall meet the following

EN 2591-101	Visual examination
EN 2591-205	Housing (shell) electrical continuity
EN 2591-408	Mating and unmating forces
EN 2591-206	Measurement of insulation resistance

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