

Protective clothing — Electrostatic properties —

Part 3: Test methods for measurement of charge decay

The European Standard EN 1149-3:2004 has the status of a
British Standard

ICS 13.340.10

National foreword

This British Standard is the official English language version of EN 1149-3:2004.

The UK participation in its preparation was entrusted by Technical Committee PH/3, Protective clothing, to Subcommittee PH/3/1, Clothing for protection against general hazards, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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de la charge

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Prüfverfahren für die Messung des Ladungsabbaus

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Foreword

This document (EN 1149-3:2004) has been prepared by Technical Committee CEN/TC 162 "Protective clothing including hand and arm protection and life jackets", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by October 2004, and conflicting national standards shall be withdrawn at the latest by October 2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

Annex A is informative.

EN 1149 consists of the following parts, under the general title "Protective clothing – Electrostatic properties":

¾ Part 1: Surface resistivity (Test methods and requirements)

¾ Part 2: Test method for measurement of the electrical resistance through a material (vertical resistance)

¾ Part 3: Test methods for measurement of charge decay

¾ Part 4¹⁾: Garment tests

¾ Part 5¹⁾: Performance requirements

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

¹⁾ In course of preparation.

Introduction

This European Standard is part of a series of test methods and requirements for electrostatic properties of protective clothing. Different parts are necessary, because of the various fields of application and diverse nature of garment materials.

Two test methods are described for measuring the rate of dissipation of electrostatic charge of garment materials, i.e. the charge decay. In both cases, charge is monitored by observation of the electrostatic field it generates and this is done using non-contacting field measuring instruments. The principal difference between the methods is the technique used to generate the electrostatic charge. Triboelectric charging relies on the charge generated as two materials come into contact, rub together and subsequently separate. Induction charging involves an electrode placed beneath the test surface and is raised to a defined potential. Induced charge on the test material influences the net field that is observed by a field-measuring probe positioned above the test surface.

1 Scope

This European Standard specifies methods for measuring the dissipation of electrostatic charge from the surface of materials for garments. The test methods are applicable to all materials, including homogeneous materials and inhomogeneous materials with surface conducting fibres and core conducting fibres.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 340:2003, *Protective clothing — General requirements*.

EN 1149-1:1995, *Protective clothing — Electrostatic properties — Part 1: Surface resistivity (test methods and requirements)*.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions of EN 340:2003 and EN 1149-1:1995 together with the following apply.

3.1

surface conducting fibre

fibre in which the conducting component is exposed at the surface. Depending on the cross-section of the fibre, all or only part of its surface may be conducting

3.2

core conducting fibre

fibre in which the conducting component is completely encapsulated in non-conducting material

3.3

charge decay

migration of charge across or through a material leading to a reduction of charge density or surface potential at the point where the charge was deposited

3.4

Electric field strength

3.4.1

test method 1

E_0 - maximum electric field strength after triboelectric charging (kV/m);

E_{30} - electric field strength 30 s after E_0 (kV/m)

3.4.2

test method 2

$E_{\max}$ - electric field strength indicated on the recording device with no test specimen present (kV/m);

E_R - maximum electric field strength indicated on the recording device with the test specimen in the measuring position

3.5

half decay time t_{50}

the time taken for the indicated field strength to decay to $E_{\max}/2$ (s)

3.6

shielding factor S

relationship between $E_{\max}$ and E_R calculated as:

$$S = 1 - \frac{E_R}{E_{\max}}$$

4 Test methods

4.1 Sample preparation and conditioning applicable for both test methods

4.1.1 Pre-treatment

The test sample shall be pre-treated according to the specific clothing standard or otherwise shall undergo five cycles of cleaning according to EN 340.

NOTE Pre-treatment is not required for garments not intended to be cleaned in use (e.g. for single use garments).

4.1.2 Atmosphere for conditioning and testing

Unless otherwise specified, the test specimens shall be conditioned for at least 24 hours in an atmosphere of (23 ± 1) °C and (25 ± 5) % relative humidity. Testing shall be performed in the same atmosphere.

4.2 Triboelectric charging (test method 1)

4.2.1 Principle

Test materials are charged by rubbing against cylindrical rods mounted on a vertically running slider. The electrical field strength from the charge generated on the test material is observed and recorded using an electrostatic fieldmeter connected to a graphical recording device.