

Protective clothing — Electrostatic properties —

Part 5: Material performance and design requirements

ICS 13.340.10

National foreword

This British Standard is the UK implementation of EN 1149-5:2008.

The UK participation in its preparation was entrusted to Technical Committee PH/3, Protective clothing.

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

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Partie 5: Exigences de performance des matériaux et de
conception

Schutzkleidung - Elektrostatische Eigenschaften - Teil 5:
Leistungsanforderungen an Material und
Konstruktionsanforderungen

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Foreword

This document (EN 1149-5:2008) has been prepared by Technical Committee CEN/TC 162 "Protective clothing including hand and arm protection and lifejackets", 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of an identical text or by endorsement, at the latest by July 2008, and conflicting national standards shall be withdrawn at the latest by July 2008.

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.

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

Introduction

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

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

- Part 1: Test method for measurement of surface resistivity;
- Part 2: Test method for measurement of the electrical resistance through a material (vertical resistance);
- Part 3: Test methods for measurement of charge decay;
- Part 4: Garment test (under development);
- Part 5: Material performance and design requirements.

A complete garment test is under study. As long as such a test is not available, it may not be possible to perform a full assessment of the electrostatic properties of protective clothing. This set of standards reflects the current state of knowledge.

1 Scope

This European Standard specifies material and design requirements for electrostatic dissipative protective clothing, used as part of a total earthed system, to avoid incendiary discharges. The requirements may not be sufficient in oxygen enriched flammable atmospheres. This European Standard is not applicable for protection against mains voltages.

2 Normative references

The following referenced documents are indispensable for the application 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.

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

EN 1149-1:2006, *Protective clothing — Electrostatic properties — Part 1: Test method for measurement of surface resistivity*

EN 1149-3:2004, *Protective clothing — Electrostatic properties — Part 3: Test methods for measurement of charge decay*

ISO 7000:2004, *Graphical symbols for use on equipment — Index and synopsis*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 340:2003, EN 1149-1:2006, EN 1149-3:2004 and the following apply.

3.1

material

coated or laminated fabrics, woven, non-woven, knitwear of which the clothing is made

4 Requirements

4.1 General

Electrostatic dissipative protective clothing shall comply with EN 340.

4.2 Electrostatic requirements

4.2.1 Material requirements

An electrostatic dissipative material shall meet at least one of the following requirements:

- $t_{50} < 4$ s or $S > 0,2$ tested according to EN 1149-3:2004, test method 2 (induction charging), or
- a surface resistance of less than or equal to $2,5 \times 10^9 \Omega$, on at least one surface, tested according to EN 1149-1.

For a material containing conductive threads in a stripe or grid pattern the spacing of the conductive threads in one direction shall not exceed 10 mm in any part of the garment.

4.2.2 Design requirements

Electrostatic dissipative protective clothing shall be able to permanently cover all non-complying materials during normal use (inclusive bending and movements). If the electrostatic dissipative protective clothing comprises multiple layers, e.g. liner, insulation, outer, the outermost material shall meet the material requirements.

Electrostatic dissipative protective clothing shall provide proper fitting with sizing according to EN 340 and allow full body movement with all closures fastened according to manufacturer's instructions.

Thin non-dissipative attachments, such as labels, reflective stripes, shall be permanently attached. This shall be done in such a way that separation between the attached elements and the clothing material is avoided.

Conductive parts (zippers, buttons etc.) are permitted provided they are fully covered by the outermost material when in use.

5 Marking

Marking shall be according to EN 340 and shall include the graphical symbol in accordance with Figure 1.



Figure 1 — Graphical symbol ISO 7000-2415 - Protection against static electricity

6 Information supplied by the manufacturer

The information supplied by the manufacturer shall be according to the specific protective clothing standard respectively to EN 340.

In addition, the following warning notices and instructions shall be provided:

- the person wearing the electrostatic dissipative protective clothing shall be properly earthed. The resistance between the person and the earth shall be less than $10^8 \Omega$, e.g. by wearing adequate footwear;
- electrostatic dissipative protective clothing shall not be open or removed whilst in presence of flammable or explosive atmospheres or while handling flammable or explosive substances;
- an instruction on how the garment shall be correctly fastened and worn;
- electrostatic dissipative protective clothing shall not be used in oxygen enriched atmospheres without prior approval of the responsible safety engineer;
- the electrostatic dissipative performance of the electrostatic dissipative protective clothing can be affected by wear and tear, laundering and possible contamination;
- electrostatic dissipative protective clothing shall permanently cover all non-complying materials during normal use (including bending and movements).

Annex A (informative)

Explanation

The human body has a low enough volume resistivity to act as a conductor and – if insulated from earth – it can accumulate electrostatic charge. The charge can be produced by contact electrification, for example by walking across an insulating floor, or by touching charged equipment or materials. It can also arise by induction due to charge on the clothing or adjacent charged objects. A dangerous consequence of the electrostatic potential on charged personnel is that it can be high enough to cause hazardous spark discharges. The control of undesirable static electricity on people is necessary in areas where flammable or explosive atmospheres exist or might be present. In such cases people have to be earthed either directly or through conducting footwear (see EN ISO 20345).

In the case where the wearing of electrostatic dissipative protective clothing has been identified as necessary by risk assessment, clothing complying with the requirements of this European Standard can be suitable. These requirements can be necessary in addition to requirements of protective clothing basically designed for other hazards (e.g. chemicals or fire). Therefore this European Standard should be used in such a way that the requirements supplement those of the specific protective clothing standard.

The material and design requirements as specified in this European Standard apply only to electrostatic dissipative protective clothing worn by persons that are earthed through a resistance lower than $10^8 \Omega$ (e.g. by wearing appropriate footwear such as safety shoes specified in EN ISO 20345:2004, or by any other suitable means). The requirements of this standard are not intended to be applied for static dissipative gloves. For these gloves, the electrical resistance through the material is an important property.

The basis for the material and design requirements presented in this European Standard, was obtained through research funded by the European Commission. The research work comprised ignition testing in hydrogen atmospheres. This research has shown that method 1 of EN 1149-3:2004 is not suited to discriminate between safe and unsafe fabrics. Method 2 has been proven by extensive research to accurately predict incendiary behaviour of fabrics.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 89/686/EEC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 89/686/EEC.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 89/686/EEC on the approximation of the laws of the Member States relating to personal protective equipment

Clause(s)/subclause(s) of this EN	Essential Requirements (ERs) of Directive 89/686/EEC	
4.2	2.6	PPE for use in explosive atmospheres
5	2.12	PPE bearing one or more identification or recognition marks directly or indirectly relating to health and safety
6	1.4	Information supplied by the manufacturer

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

- [1] EN ISO 20345:2004, *Personal protective equipment — Safety footwear (ISO 20345:2004)*

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