

BS EN 16350:2014



BSI Standards Publication

# Protective gloves — Electrostatic properties

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**National foreword**

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The UK participation in its preparation was entrusted to Technical Committee PH/3/8, Protective gloves.

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

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ISBN 978 0 580 76679 4

ICS 13.340.40

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 May 2014.

**Amendments issued since publication**

Date	Text affected
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EUROPEAN STANDARD

**EN 16350**

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2014

ICS 13.340.40

English Version

**Protective gloves - Electrostatic properties**

Gants de protection - Propriétés électrostatiques

Schutzhandschuhe - Elektrostatische Eigenschaften

This European Standard was approved by CEN on 20 March 2014.

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## **Foreword**

This document (EN 16350:2014) 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of an identical text or by endorsement, at the latest by October 2014 and conflicting national standards shall be withdrawn at the latest by October 2014.

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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, see informative Annex ZA, which is an integral part of this document.

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## 1 Scope

This European Standard provides additional requirements for protective gloves that are worn in areas where flammable or explosive areas exist or might be present (see IEC 60079-32-1). It specifies a test method and requirements for performance, marking and information for electrostatic dissipative protective gloves to minimize explosion risks.

This European Standard does not cover:

- protection of electronic devices;
- protection against mains voltages;
- insulative protective gloves for live working (EN 60903);
- protective gloves for welders (EN 12477).

The requirements may not be sufficient in oxygen enriched flammable atmospheres.

This European Standard should be used with the specific standards applicable to the risks for which the glove is designed.

NOTE The electrostatic dissipative protective gloves are effective only if the wearer is earthed through a resistance lower than  $10^8 \Omega$ .

## 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 420, *Protective gloves — General requirements and test methods*

EN 1149-2:1997, *Protective clothing — Electrostatic properties — Part 2: Test method for measurement of the electrical resistance through a material (vertical resistance)*

EN 61340-2-3, *Electrostatics — Part 2-3: Methods of test for determining the resistance and resistivity of solid planar materials used to avoid electrostatic charge accumulation (IEC 61340-2-3)*

## 3 Terms and definitions

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

### 3.1

#### **oxygen-enriched flammable atmosphere**

atmosphere in which the oxygen content exceeds 21,5 % volume fraction of air

Note 1 to entry: Minimum ignition energy values are commonly specified for mixtures with air containing normal levels of oxygen, i.e. (21,0 ± 0,5) % volume fraction.

Note 2 to entry: In normal industrial situations, it is unlikely that people will be working in an oxygen-enriched atmosphere.

[SOURCE: SUCAM of JWG electrostatic risk management for PPE]

**3.2**  
**vertical resistance**  
**RV**

electrical resistance through a material in Ohms, as determined by using specified electrodes

[SOURCE: EN 1149-2:1997, definition 3.1]

**3.3**  
**to earth**

connect a conductor to the main body of the earth to ensure that it is at earth potential

[SOURCE: SUCAM of JWG electrostatic risk management for PPE]

## **4 Requirements**

### **4.1 General**

The protective glove shall comply with the general requirements of EN 420 and the requirements of the relevant specific standards if applicable.

### **4.2 Electrostatic requirements**

#### **4.2.1 Material requirements**

**4.2.1.1** The vertical resistance shall be determined according to the test method described in Clause 5.

**4.2.1.2** For electrostatic dissipative protective gloves, each individual measurement shall fulfil the requirement:

Vertical resistance:  $R_v < 1,0 \times 10^8 \Omega$ .

#### **4.2.2 Design requirements**

**4.2.2.1** Protective gloves shall be produced without electrically conductive connections (e.g. by metal rivets).

**4.2.2.2** External thin attachments, such as labels or reflective stripes shall be permanently attached around all edges.

**4.2.2.3** Adjustment systems such as hook and loop systems shall not be used.

## **5 Test methods**

### **5.1 Preparation of test specimens**

Testing shall be conducted on unused gloves. If care instructions are provided, the test shall be performed also after the recommended number of cleaning cycles.

### **5.2 Specimens**

**5.2.1** One specimen sized 10 cm x 10 cm shall be taken from each palm of 5 different gloves of the same type.

**5.2.2** If this size of specimen is not possible, then a smaller specimen suitable for the adjusted test apparatus specified in 5.4.2 shall be used. It shall be mentioned in the test report.

**5.2.3** The specimens shall be free of any seam.

**5.2.4** Multiple layers which are unbonded to each other shall be tested together.

**5.2.5** If palm, back of the hand or cuff consist of different materials or material combinations, five specimens shall be taken of each.

**5.2.6** The specimens shall be handled only at the edges.

### **5.3 Conditioning and testing atmosphere**

The electrostatic properties may vary with the moisture content of the material. The specimens shall be conditioned prior to testing for at least 48h. The conditioning atmosphere shall be the same as the test atmosphere.

The testing atmosphere for the determination of the vertical resistance shall be:

- Air temperature:  $(23 \pm 1)$  °C;
- Relative humidity:  $(25 \pm 5)$  %.

### **5.4 Test apparatus**

**5.4.1** The test apparatus shall comply with EN 1149-2:1997, Clause 5.

**5.4.2** A smaller test apparatus shall be used to test smaller size specimens, as specified in EN 61340-2-3. If a smaller test apparatus is used, it shall be mentioned in the test report.

NOTE Inter laboratory tests have showed good correlation between both methods of EN 1149-2:1997 and EN 61340-2-3.

### **5.5 Test procedure**

The test shall be carried out according to EN 1149-2:1997, Clause 7.

If a smaller test apparatus as specified in 5.4.2 is used, then the test shall be carried out according to EN 61340-2-3.

Should the specimens consist of multiple layers which are unbonded, all layers shall be tested together.

### **5.6 Expression of results**

Each test result determined on the palm and on materials or material combinations as described in 5.2.5 is expressed as a vertical resistance  $R_v$ , in Ohm.

### **5.7 Test report**

In the test report reference shall be made to this European Standard and the following shall be reported:

- a) Description of the material tested and dimensions of the test specimen as required in 5.2.2;
- b) Test atmosphere;
- c) Test apparatus used as required in 5.4.2;
- d) All five single measurements for each material or material combination;



- e) Any variation from this European Standard;
- f) Date of test.

## **6 Marking**

Marking shall be according to EN 420.

## **7 Information supplied by the manufacturer**

The information supplied by the manufacturer shall be according to EN 420 and the specific protective glove standards.

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

- reference to this standard;
- test results and testing conditions relative to vertical resistance testing;
- Warning: the person wearing the electrostatic dissipative protective gloves shall be properly earthed e.g. by wearing adequate footwear;
- Warning: Electrostatic dissipative protective gloves shall not be unpacked, opened, adjusted or removed whilst in flammable or explosive atmospheres or while handling flammable or explosive substances;
- Warning: The electrostatic properties of the protective gloves might be adversely affected by ageing, wear, contamination and damage, and might not be sufficient for oxygen enriched flammable atmospheres where additional assessments are necessary.

## 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 Union 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 2.6 of Annex II of that Directive and associated EFTA regulations.

**Table ZA.1 — Correspondence between this European Standard and Directive 89/686/EEC**

Clause(s)/sub-clause(s) of this EN	Essential Requirements (ERs) of Directive 89/686/EEC, Annex II	Qualifying remarks/Notes
4.2.1	2.6 PPE for use in explosive atmospheres	
7	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 12477, *Protective gloves for welders*
- [2] EN 60903, *Live working — Gloves of insulating material (IEC 60903)*
- [3] IEC/TS 60079-32-1, *Explosive atmospheres — Part 32-1: Electrostatic hazards, guidance*





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