

INTERNATIONAL STANDARD

IEC 60903

Second edition
2002-08

Live working – Gloves of insulating material

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*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



Reference number
IEC 60903:2002(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

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International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE **XB**

For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LIVE WORKING–
GLOVES OF INSULATING MATERIAL

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
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International Standard IEC 60903 has been prepared by IEC technical committee 78: Live working.

This second edition:

- cancels and replaces the first edition of IEC 60903, published in 1988, covering insulating gloves (and mitts) which would normally be used in conjunction with leather protector gloves worn over the insulating gloves (and mitts) to provide mechanical protection;
- includes and cancels IEC 61942, first edition, published in 1997, covering gloves (and mitts) which combine in one unique glove the insulating properties of elastomer gloves and the mechanical properties of leather gloves. The result of the combination is defined as a composite glove;
- includes requirements and testing for a “long composite glove” which extends protection to most of the upper arm.

The text of this standard is based on the following documents:

FDIS	Report on voting
78/462A/FDIS	78/479/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until 2007. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

The contents of the corrigenda of February 2003 and January 2005 have been included in this copy.

Withdawn

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INTRODUCTION

In this document, the clauses on requirements and testing are reorganized in order to bring together the common requirements and tests, then to lay down separately those which are specific to insulating gloves for electrical protection normally worn under leather protector gloves as opposed to those specific to insulating gloves for combined electrical and mechanical protection. This arrangement meets the basic necessity that a same quality level of electrical insulation is achieved for all types of insulating gloves.

This document has been prepared according to the requirements of IEC 61477 where applicable.

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LIVE WORKING – GLOVES OF INSULATING MATERIAL

1 Scope

This International Standard is applicable to:

- insulating gloves and mitts which should normally be used in conjunction with leather protector gloves worn over the insulating gloves to provide mechanical protection;
- insulating gloves and mitts usable without over-gloves for mechanical protection.

Unless otherwise stated, the use of the term “glove” includes both gloves and mitts. The use of the term “insulating gloves” designates gloves providing electrical protection only. The use of the term “composite gloves” designates gloves providing electrical and mechanical protection.

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.

IEC 60050(151):2001, *International Electrotechnical Vocabulary (IEV) – Part 151: Electrical and magnetic devices*

IEC 60050(601):1985, *International Electrotechnical Vocabulary (IEV) – Chapter 601: Generation, transmission and distribution of electricity – General*

IEC 60050(651):1999, *International Electrotechnical Vocabulary (IEV) – Part 651: Live working*

IEC 60060-1:1989, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60060-2:1994, *High-voltage test techniques – Part 2: Measuring systems*

IEC 60212:1971, *Standard conditions for use prior to and during the testing of solid electrical insulating materials*

IEC 60417 (all parts), *Graphical symbol for use on equipment*

IEC 60743:2001, *Live working – Terminology for tools, equipment and devices*

IEC 61318:1994, *Live working – Guidelines for quality assurance plans*

IEC 61477:2001, *Live working - Minimum requirements for the utilization of tools, devices and equipment*

ISO 37:1994, *Rubber, vulcanized or thermoplastic – Determination of tensile stress-strain properties*

ISO 472:1999, *Plastics – Vocabulary*

ISO 2592:2000, *Determination of flash and fire points – Cleveland open cup method*

ISO 2859-1:1999, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 2977:1997, *Petroleum products and hydrocarbon solvents – Determination of aniline point and mixed aniline point*

ISO 3104:1994, *Petroleum products – Transparent and opaque liquids – Determination of kinematic viscosity and calculation of dynamic viscosity*

ISO 9000:2000, *Quality management systems – Fundamentals and vocabulary*

ISO 9001:2000, *Quality management systems – Requirements*

ISO 9004:2000, *Quality management systems – Guidelines for performance improvements*

3 Definitions

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

3.1 composite gloves

insulating gloves made with integrated mechanical protection
[IEV 651-07-11 modified and definition 8.3.1 of IEC 60743]

3.2 insulating gloves

gloves made of elastomer or plastic material, used for the protection of the worker against electrical hazards
[IEV 651-07-09 and definition 8.2.3 of IEC 60743]

3.3 long composite gloves

composite gloves used to extend the protection of the worker over the arms up to the armpits
[Definition 8.3.2 of IEC 60743]

3.4 mitt

glove with multiple fingers enclosed in one covering

3.5 bell cuff glove

glove with an enlarged shape from the wrist to the cuff in such a way as to facilitate pull-on over a thick garment

3.6**contour glove**

glove shaped at the upper part of the gauntlet in such a way as to facilitate the bending of the arm

3.7**curved glove**

glove on which the fingers are slightly bent in a position corresponding to the position the hand forms when while holding an object

3.8**lined glove**

glove with an inside lining of textile attached to the plastic or to the elastomer

3.9**elastomer**

generic term that includes rubber, latex and elastomeric compounds that may be natural or synthetic or a mixture or a combination of both

[Definition 2.4.3 of IEC 60743]

3.10**plastic**

material which contains, as an essential ingredient, a high polymer and which at some stage in its processing into finished products can be shaped by flow

NOTE 1 Elastomeric materials which are also shaped by flow, are not considered as plastics.

NOTE 2 In some countries, particularly in the United Kingdom, it is a permitted option to use the term "plastics" as the singular form as well as the plural form.

[ISO 472 and definition 2.4.4 of IEC 60743]

3.11**cuff**

open part of a glove above the gauntlet

3.12**cuff roll**

roll or reinforced edge of a glove at the cuff

3.13**fork**

part of glove at the junction of two fingers, or finger and thumb

3.14**gauntlet**

part of a glove from the wrist to the open part of the glove

3.15**palm**

part of glove covering the face of the central inside hand

3.16**wrist**

the narrowest part of the glove above the cuff

3.17**disruptive discharge**

passage of an arc following dielectric breakdown

NOTE 1 The term “sparkover” (in French “amorçage”) is used when a disruptive discharge occurs in a gaseous or liquid dielectric.

NOTE 2 The term “flashover” (in French “contournement”) is used when a disruptive discharge occurs at least partly along the surface of a solid dielectric surrounded by a gaseous or liquid medium.

NOTE 3 The term “puncture” (in French “perforation”) is used when a disruptive discharge occurs through a solid dielectric producing permanent damage.

[IEV 651-01-18 and definition 2.7.7 of IEC 60743, modified]

3.18**nominal voltage (of a system)**

suitable approximate value of voltage used to designate or identify a system

[IEV 601-01-21]

3.19**proof test voltage**

specified voltage that is applied to a device for the time defined under specified conditions to assure that the electrical strength of the insulation is above a specified value

3.20**withstand test voltage**

voltage that the device withstands without disruptive discharge, or other electric failure when voltage is applied under specified conditions

3.21**acceptance test**

contractual test to prove to the customer that the device meets certain conditions of its specification

[IEV 151-16-23, modified]

3.22**routine test**

test to which each individual device is subjected during or after manufacture to ascertain whether it complies with certain criteria

3.23**sampling test**

test on a number of devices taken at random from a batch

3.24**type test**

test on one or more devices made to a certain design to show that the design meets certain specifications

4 Classification

The gloves covered under this standard shall be designated as follows:

- by class, as class 00, class 0, class 1, class 2, class 3 and class 4;
- by special properties, by the addition of a suffix as shown in Table 1.

For composite gloves, only classes 00, 0 and 1 are available at the present time. At higher classes, additional data are needed. For long composite gloves, only classes 1, 2 and 3 are available at the present time.

Guidance as to temperature range at which gloves can be used is given in Annex E.

Table 1 – Special properties

Category	Resistant to
A	Acid
H	Oil
Z	Ozone
R	Acid, oil, ozone
C	Extremely low temperature

NOTE 1 Category R combines the characteristics of categories A, H and Z.
NOTE 2 Any combination of categories may be used.

5 General requirements

5.1 Physical requirements

5.1.1 Composition

All gloves may be lined or unlined, have an exterior covering, or not, for protection against chemical attack, or be specially compounded to reduce the effects of ozone.

Insulating gloves for electrical protection are usually made of elastomer.

Composite gloves are usually made of elastomer or plastic. In case of excessive wear or damage on the exterior of a composite glove made up of layers of different colours, the different colour layer underneath will appear.

5.1.2 Shape

The gloves shall be provided with a cuff. Gloves may be manufactured with or without cuff roll.

NOTE The shape of a glove is indicated in Figure 1a. The letter "h" in Figure 1a represents the curve of the finger in curved gloves. The shape of a mitt is indicated in Figure 2. The shape of a long composite glove is indicated in Figure 1b. The shape of a bell cuff glove is illustrated in Figure 1c.

5.1.3 Dimensions

Table 2 gives the standard lengths of gloves.