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Responsible committee: PEL/78 Tools for live working

Interested committees:

Title: BS EN IEC 60903 Live working - Electrical insulating gloves

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: IEC 60903 ED4	
DATE OF CIRCULATION: 2025-05-02	CLOSING DATE FOR VOTING: 2025-07-25
SUPERSEDES DOCUMENTS: 78/1506A/RR	

IEC TC 78 : LIVE WORKING	
SECRETARIAT: France	SECRETARY: Mr Jonathan HIRTZ
OF INTEREST TO THE FOLLOWING COMMITTEES:	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED: Electricity transmission and distribution, Safety	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE: Live working - Electrical insulating gloves
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PROPOSED STABILITY DATE: 2027

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

Live working - Electrical insulating gloves –

FOREWORD

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IEC 60903 has been prepared by IEC technical committee 78: Live working. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- reinstating DC testing from the informative annex into the normative part of the document
- identifying three uses:- AC only use; DC only use; and AC/DC use
- specifying both proof and withstand electrical tests
- including the marking requirements for the different use
- introduction of visual inspection guide for inflation and lighting specification for visual inspection of gloves
- removal of the requirement of drying gloves after 16 hours moisture conditioning
- segregation of type tests ([type test](#)) and post production tests

The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

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

The language used for the development of this International Standard is English [change language if necessary].

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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 protective over-gloves (**protective over-glove**) 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 electrical insulating gloves (**electrical insulating glove**).

This document has been prepared according to the requirements of IEC 61477:2009 where applicable.

The product covered by this standard may have an impact on the environment during some or all stages of its life cycle. These impacts can range from slight to significant, be of short-term or long-term, and occur at the global, regional or local level.

Except for a disposal statement in the Instructions for use, this standard does not include requirements and test provisions for the manufacturers of the product, or recommendations to the users of the product for environmental improvement. However, all parties intervening in its design, manufacture, packaging, distribution, use, maintenance, repair, reuse, recovery and disposal are invited to take account of environmental considerations.

The following items were listed in the bibliography but not cited in the text. Please find a suitable place to cite them to justify their inclusion in the bibliography:

IEC 60050-604:1987 [1], *International Electrotechnical Vocabulary - Chapter 604: Generation, transmission and distribution of electricity - Operation*

IEC 60050 (all parts), *International Electrotechnical Vocabulary*(available at <http://www.electropedia.org>)**IEC 60050 (all parts) [2]**

Live working - Electrical insulating gloves –

1 Scope

This document is applicable to *electrical* insulating gloves ([electrical insulating glove](#)) and mitts ([mitt](#)) that provide protection of the worker against electric shock.

Products to this standard have limits of applicability according to their electrical classifications: Class 00; Class 0; Class 1; Class 2; Class 3; Class 4

Unless otherwise stated, the use of the term "glove" includes both gloves and mitts ([mitt](#)).

This document also covers electrical insulating gloves ([electrical insulating glove](#)) with additional integrated mechanical protection referred to in this document as "composite gloves ([composite glove](#))".

The products designed and manufactured according to this document contribute to the safety of the users provided they are used by skilled persons ([skilled person](#)), in accordance with safe methods of work and the instructions for use.

NOTE Electrical insulating gloves ([electrical insulating glove](#)) are normally to be used in conjunction with protective over-gloves ([protective over-glove](#)) to provide mechanical protection. Composite gloves ([composite glove](#)) are normally used without protective over-gloves ([protective over-glove](#)). Chemical and mechanical protection in this document refers to protection to the glove in case of unintended contact which might damage the glove not for personal protection against chemical and mechanical exposure. Arc flash protection is not included in this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60060-1:2010, *High-voltage test techniques - Part 1: General definitions and test requirements*

IEC 60060-2:2010, *High-voltage test techniques - Part 2: Measuring systems*

IEC 60212:2010, *Standard conditions for use prior to and during the testing of solid electrical insulating materials*

IEC 60417:2025, *Graphical symbols for use on equipment - 12-month subscription to regularly updated online database comprising all graphical symbols published in IEC 60417*

IEC 61318:2021, *Live working - Methods for assessment of defects and verification of performance applicable to tools, devices and equipment*

IEC 61477:2009, *Live working - Minimum requirements for the utilization of tools, devices and equipment*

ISO 37:2024, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 1817:2024, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 2997:2017, *Petroleum and related products — Determination of flash and fire points — Cleveland open cup method*

ISO 13997:2024, *Protective clothing — Mechanical properties — Determination of resistance to cutting by sharp objects*

ISO 21420:2020, *Protective gloves — General requirements and test methods*

ISO 23529:2016, *Rubber - General procedures for preparing and conditioning test pieces for physical test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61318:2021 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

bell cuff glove

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

3.2

composite glove

electrical insulating glove (**electrical insulating glove**) made with additional integrated mechanical protection of the glove

[SOURCE: IEC 60050-651:2014 [3], 651-23-03 and IEC 60743:2013 [4], 8.2.1, modified - The definition clarifies that the mechanical protection is an additional one]

3.3

contour glove

glove shaped at the upper part of the gauntlet (**gauntlet**) in such a way as to facilitate the bending of the arm and intended for gloves that extend to or above the elbow

3.4

cuff

open part of a glove

3.5

cuff roll

roll or reinforced edge of a glove at the cuff (**cuff**)

3.6

disruptive discharge

passage of an electric arc following electric breakdown

Note 1 to entry: Depending on the amount of energy contained in the discharge, it will be described as a discharge of low or high energy, based on the maximum current, and the amount of damage to the insulating material.

Note 2 to entry: The term "flashover" (in French "contournement") is used when a disruptive discharge (**disruptive discharge**) occurs at least partly along the surface of a solid dielectric surrounded by a gaseous or liquid medium.

Note 3 to entry: The term "puncture" (in French "perforation") is used when a disruptive discharge (**disruptive discharge**) occurs through a solid dielectric producing permanent damage.

[SOURCE: IEC 60050-212:2010 [5], 212-11-46 modified by adding two notes to entry.]

3.7

elastomer

macromolecular material which returns rapidly to its initial dimensions and shape after substantial deformation by a weak stress and release of the stress

Note 1 to entry: The definition applies under room temperature test conditions.

[SOURCE: ISO 472:2013 [6], 2.327]

3.8**electrical insulating glove**

glove made of elastomer ([elastomer](#)), used for the protection of the worker against electric shock

[SOURCE: [IEC 60050-651:2014](#) [3], 651-23-02 and [IEC 60743:2013](#) [4], 8.1.3, modified - The definition is in line with the composition requirements of the standard for the type of insulating material. The note 1 to entry has been deleted]

3.9**fork**

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

3.10**formally trained and qualified person**

competent person possessing the appropriate practical and theoretical knowledge and having adequate skill and experience to enable the person to perform the required periodic testing, interpret the resultant information and from that information determine that the electrical insulating glove ([electrical insulating glove](#)) is safe to use, and report the importance of any defect found or suspected in relation to the safety and continued use of the electrical insulating glove ([electrical insulating glove](#))

3.11**gauntlet**

part of a glove from the wrist ([wrist](#)) to the open part of the glove

3.12**lined glove**

glove with an inside lining of textile attached to the elastomer ([elastomer](#))

3.13**long glove**

electrical insulating glove ([electrical insulating glove](#)) used to extend the protection to the upper arm

Note 1 to entry: The length of the glove does not include protection up to the armpit.

[SOURCE: [IEC 60743:2013](#) [4], 8.1.5, modified - The whole document is about insulating glove protecting against electric shock so that does not need to be repeated in the term and its definition. The note 1 to entry has been added to clarify the type of protection offered]

3.14**mitt**

glove with multiple fingers enclosed in one covering

3.15**nominal voltage of a system**

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

[SOURCE: [IEC 60050-601:1985](#) [7], 601-01-21]

3.16**palm**

part of glove covering the face of the central inside hand

3.17**proof test voltage**

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

3.18**protective over-glove**

glove installed over the electrical insulating glove ([electrical insulating glove](#)) in order to provide it with mechanical protection

3.19**routine test**

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

3.20**sampling test**

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

3.21**skilled person****qualified person US**

<electricity> person with relevant education, training, knowledge and experience to enable him or her to perceive risks and to avoid danger which electricity can create

[SOURCE: [IEC 60050-651:2014](#) [3], 651-26-11]

3.22**type test**

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

3.23**withstand test voltage**

voltage that the glove withstands without disruptive discharge ([disruptive discharge](#)) when voltage is applied under specified conditions

3.24**wrist**

narrowest part of the glove between the cuff ([cuff](#)) and the hand

4 Requirements**4.1 General**

The following requirements have been prepared in order that the products covered by this standard are designed and manufactured to give electrical protection to the hand of the worker when performing live working or electrical work. This subclause introduces requirements about classification, composition, dimension, thickness, workmanship and finish, mechanical, climatic and environment, electrical, marking, packaging and instruction for use of insulating gloves.

4.2 Classification

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

- by electrical class, as class 00, class 0, class 1, class 2, class 3 and class 4;
- by electrical use, as AC only; or DC only; and/or AC/DC
- by special properties, by the addition of a suffix to the class of the glove as shown as categories in [Table 1](#).

Guidance as to temperature range at which gloves can be used is given in [Annex A](#).

Table 1 – Special properties

Category	Resistant to
A	Acid

H	Oil
Z	Ozone
R	Acid, oil, ozone
C	Extremely low temperature
F	Leakage current
P or other lettre	Surface damage (e.g., Composite glove (composite glove))
NOTE 1 Category R combines the characteristics of categories A, H and Z.	
NOTE 2 Category F is for long gloves (long glove) only.	
NOTE 3 Category P is to enhance the material properties to reduce surface damage of the glove	
NOTE 4 Any combination of categories may be used.	

4.3 Physical requirements

4.3.1 Composition

All gloves may be lined or unlined. They may have an exterior covering and may be specially compounded to reduce the effects of chemical attack. If gloves have an exterior covering, it shall be of a contrasting colour to assist in visual inspection.

Gloves are made of elastomer ([elastomer](#)).

Gloves may be manufactured with or without cuff roll ([cuff roll](#)).

4.3.2 Dimensions

4.3.2.1 Standard Length

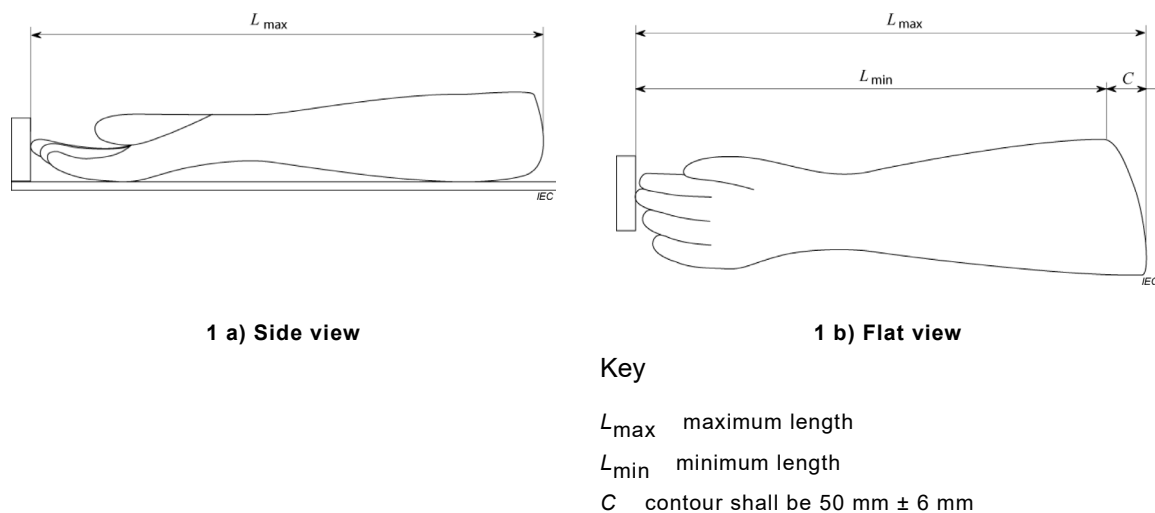
In addition to ISO 21420:2020 gloves, for electrical properties shall have the standard lengths specified in [Table 2](#)

Table 2 – Standard lengths of gloves

Class	Standard length mm ^a				
	280	360	-	-	-
00	280	360	-	-	-
0	280	360	410	460	-
1	-	360	410	460	800 ^b
2	-	360	410	460	800 ^b
3	-	360	410	460	800 ^b
4	-	-	410	460	800 ^b
^a The tolerance in length shall be ± 15 mm for any class, except for long gloves (3.13) where tolerance shall be ± 20 mm. ^b Long gloves (long glove).					

For contour-cuff ([cuff](#)) gloves, the difference between the maximum and minimum lengths (see [Figure 1](#)) shall be $50 \text{ mm} \pm 6 \text{ mm}$ except for long gloves ([long glove](#)) where this difference shall be $100 \text{ mm} \pm 12 \text{ mm}$.

NOTE There are different shapes of gloves on the market including bell cuff gloves ([bell cuff glove](#)), contour gloves ([contour glove](#)) and gauntlets ([gauntlet](#)).

**Figure 1 – Contour of glove****4.3.2.2 Size**

Size shall be the interior circumference of the glove measured on a line parallel to the finger crotches and passing through the thumb crotch.

The method of determining this dimension shall be to measure the outside width, W , at this line with the hand of the glove in a flattened state, then to subtract twice the median glove thickness, T , in the hand, and multiply this difference by a factor of 2.

$$S = 2(W - 2T) \quad (1)$$

where

S = interior circumference of the glove;

W = outside width; and

T = median glove thickness.

Corresponding sizes from hand circumferences are:

178 mm (size 7), 191 mm (size 7.5), 203 mm (size 8), 216 mm (size 8.5), 229 mm (size 9), 241 mm (size 9.5), 254 mm (size 10), 267 mm (size 10.5), 279 mm (size 11), 292 mm (size 11.5) and 305 mm (size 12).

The tolerance in size shall be ± 13 mm.

4.3.2.3 Thickness

The minimum thickness shall be determined only by the ability to pass the dielectric tests defined in 5.6.

The maximum thickness measured on the flat surface of a glove shall be as given in Table 3 in order to obtain the appropriate flexibility.

Table 3 – Maximum thickness of the gloves

Class	Thickness mm	
	Gloves	Composite gloves (composite glove)
00	0,50	1,8
0	1,00	2,3
1	1,50	2,8
2	2,30	3,3
3	2,90	3,6
4	3,60	4,2

Long gloves (long glove) may require additional thickness which shall not exceed 0,6 mm.

Gloves of categories A, H, Z and R may require additional thickness which shall not exceed 0,6 mm.

4.3.3 Workmanship and finish

Gloves shall be free on both inner and outer surfaces from harmful physical irregularities that can be detected by thorough test and inspection.

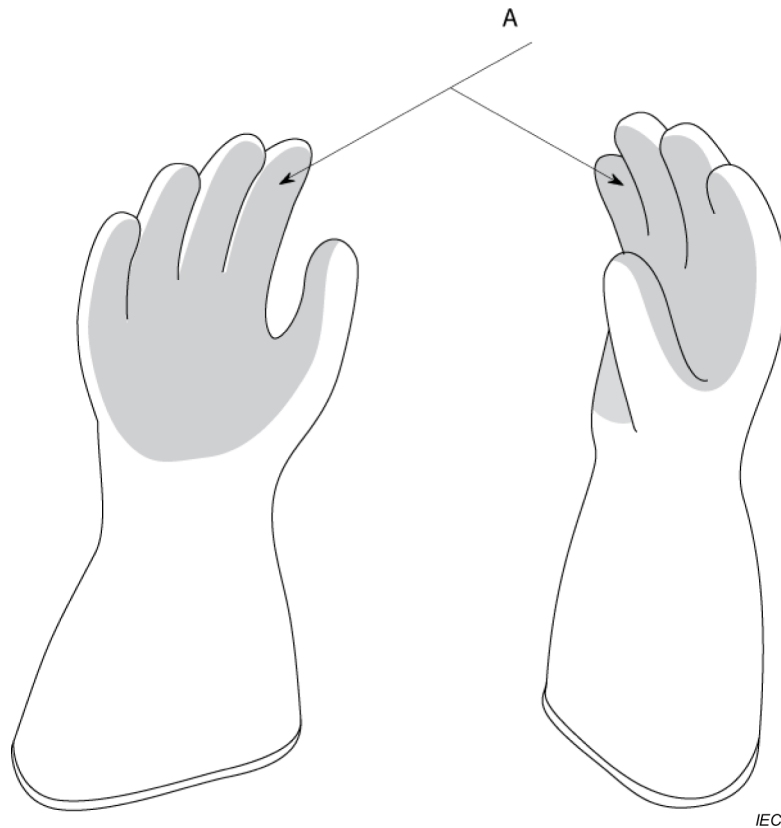
Harmful physical irregularities shall be defined as any feature that disrupts the uniform, smooth surface contour, such as pinholes, cracks, blisters, cuts, conductive embedded foreign matter, creases, pinch marks, voids (entrapped air), prominent ripples and prominent mould marks.

Non-harmful physical irregularities shall be defined as surface irregularities present on the inner and outer surfaces of the glove due to imperfections on moulds and inherent difficulties in the manufacturing process. These irregularities may appear as mould marks that look like cuts even though they are actually a raised ridge of material, indentations, protuberances, embedded foreign matter, or colour splashes that are acceptable provided that:

- the indentations, protuberance or mould marks tend to blend into a smooth slope upon stretching of the material;
- foreign material remains in place when the glove is folded and stretched with the material surrounding it;
- colour splashes are no larger than 1 mm in any direction on the inner surface of the working area.

The working area is defined as all finger and thumb forks (fork), the palm (palm) and the palm (palm) side of the fingers and thumb (see Figure 2).

Palm (palm) and finger surfaces designed to improve the grip shall not be considered as irregularities.



Key

A working area (shaded)

Figure 2 – Illustration of the working area

4.4 Mechanical, climatic and environmental requirements

Gloves shall withstand the mechanical, climatic and environmental stresses specified in this standard.

Gloves with one or more special categories (see [Table 1](#)) shall support any stresses in the related categories.

4.5 Electrical requirements

Gloves shall be capable of withstanding the corresponding electrical stresses according to its electrical classification and electrical use in [4.2](#).

Tests shall include type test ([type test](#)), sampling test ([sampling test](#)) and routine test ([routine test](#)).

Type test ([type test](#)) and sampling test ([sampling test](#)) on gloves for AC use require the gloves to pass an AC proof and withstand test according to its electrical classification.

Type test ([type test](#)) and sampling tests ([sampling test](#)) on gloves for DC use require the gloves to pass a DC proof and withstand test according to its electrical classification

Type test ([type test](#)) and sampling tests ([sampling test](#)) on gloves for AC/DC use require the gloves to pass both an AC and DC proof and withstand test

Gloves for AC use shall, in addition, pass an AC proof test after being conditioned for moisture absorption.