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Protective gloves for pesticide operators and re-entry workers — Performance requirements

Gant de protection pour les opérateurs manipulant des pesticides et les travailleurs de rentrée — Exigences de performances

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Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Classification and testing requirements ... **3**
4.1 General ... 3
4.2 Performance requirements ... 3
4.2.1 Penetration ... 3
4.2.2 Permeation ... 4
4.2.3 Glove design requirement ... 5
4.2.4 Mechanical requirements ... 5
5 Sampling ... **5**
5.1 Sampling for permeation ... 5
5.2 Sampling for penetration ... 6
6 Marking ... **6**
6.1 General ... 6
6.2 Specific marking for protective gloves for pesticide operators and re-entry workers ... 6
7 Information supplied by the manufacturer ... **7**
Annex A (informative) **Risk assessment — PPE to mitigate risk** ... **9**
Annex B (normative) **Surrogate test chemical** ... **10**
Bibliography ... **12**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 13, *Protective clothing*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document addresses the performance requirements for gloves worn by operators handling liquid pesticide products as well as gloves worn by re-entry workers. It includes requirements for chemical resistant gloves that provide protection to the whole hand as well as gloves used for certain re-entry activities for which partial protection in the palm-side of the hand is sufficient.

This document classifies gloves into two categories: gloves that provide chemical protection to the whole hand and gloves that provide protection only to the fingertips and palm-side of the hand (suitable for certain re-entry tasks). Gloves that provide protection to the whole hand include two performance levels (G1 and G2) and a single performance level (GR) for gloves suitable for certain re-entry tasks. A brief description of the two categories is given below:

Chemical resistant gloves:

Material as well as whole glove testing is required for gloves classified as G1 and G2. In addition to tests conducted for chemical resistant glove, these gloves are also tested with a pesticide surrogate. Since the active ingredient of pesticides is typically a chemical with low vapour pressure and/or low solubility in collection media, EN 16523-1:2015 cannot be used to measure permeation of active ingredient in most pesticide products. Therefore, ISO 19918 is used to measure cumulative permeation with the pesticide surrogate. G1 gloves provide lower level of protection than G2 gloves.

— G1 gloves are suitable when the potential risk is relatively low. These gloves are not suitable for use with concentrated pesticide formulations and/or for scenarios where mechanical risks exist. G1 gloves are typically single use gloves.

— G2 gloves are suitable when the potential risk is higher. These gloves are suitable for use with diluted as well as concentrated pesticides. G2 gloves also meet the minimum mechanical resistance requirements and are therefore suitable for activities that require gloves with minimum mechanical strength.

Chemical resistant gloves with partial protection:

GR gloves provide protection only to the palm-side of the hand for a re-entry worker who is in contact with dry and partially dry pesticide residues that remain on the plant surface after pesticide application. This glove category is suitable only for re-entry activities where it has been determined that protection provided to the fingertips and palm-side of the hand is sufficient. They cannot be used in place of G1 and G2 gloves that protect the whole hand. GR gloves also have mechanical properties that are required for several re-entry tasks. Breathable material in the back of the hand provides comfort.

Registration of pesticide products, such as insecticides, herbicides, and fungicides, involves the assessment of operator and re-entry worker exposures and risks, which determines the need for PPE (including gloves) required for risk mitigation. See Annex A for information on risk assessment and use of PPE (including gloves) for risk mitigation. Protection should correspond to the identified risks in order to avoid a loss of comfort due to overprotection. Actual field trials are used to determine the operator risk while handling concentrates during mixing/loading, and applying diluted pesticides under different scenarios, as well as risks to re-entry workers exposed to dry, partially dry and wet residues. Since protective clothing can be contaminated in various ways, laboratory test methods used in the document rate materials and gloves rather than simulate the various field conditions. Laboratory tests are often accelerated tests and therefore laboratory data cannot be used for direct comparison with field data.

This document is intended for glove manufacturers, pesticide product manufacturers, trainers, regulators, and other individuals or organizations that make decisions regarding PPE for protection against pesticide products.

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Protective gloves for pesticide operators and re-entry workers — Performance requirements

1 Scope

This document establishes minimum performance, classification, and labelling requirements for gloves worn by operators and re-entry workers handling pesticide products to protect the hands or hands and forearms against contact with those products. Gloves covered by this document include gloves made with elastomeric and polymeric materials in the areas that provide protection.

This document does not address protection against fumigants.

This document needs to be used in conjunction with ISO 21420.

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.

ISO 374-1, *Protective gloves against dangerous chemicals and micro-organisms — Part 1: Terminology and performance requirements for chemical risks*

ISO 19918, *Protective clothing — Protection against chemicals — Measurement of cumulative permeation of chemicals with low vapour pressure through materials*

ISO 21420:—[1)], *Protective gloves — General requirements and test methods*

ISO 23388:2018, *Protective gloves against mechanical risks*

EN 374-2:2014[2)], *Protective gloves against dangerous chemicals and micro-organisms — Part 2: Determination of resistance to penetration*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
active ingredient
component of a pesticide formulation, which is an active substance present in sufficient quantity that relates to an intended phytosanitarian purpose

1) To be published. Stage at the time of publication ISO/FDIS 21420:2019.

2) Once published, EN 374-2:2014 will be replaced with ISO 374-2 which is under preparation. Stage at the time of publication ISO/DIS 374-2:2018.

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3.2
decontamination
removal of a contaminant or contaminants from the surface or matrix, or both, of chemical protective materials to the extent necessary for its next intended use

Note 1 to entry: For this document, materials are limited to those used for chemical resistant gloves.

3.3
degradation
deleterious change in one or more mechanical properties of a material due to contact with a chemical or heat

Note 1 to entry: Indications of degradation may include flaking, swelling, disintegration, embrittlement, discoloration, dimensional change, appearance, hardening, softening, etc.

3.4
fumigant
pesticide in the form of gas

3.5
penetration
process by which a chemical moves through porous materials, seams, pinholes, or other imperfections in a material on a non-molecular level

3.6
permeation
process by which a chemical moves through a material on a molecular level, involving

— sorption of the molecules of the chemical into the contacted (outside) surface of a material,

— diffusion of the absorbed molecules in the material, and

— desorption of the molecules from the opposite (inner) surface of the material

3.7
pesticide
substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest or weeds

Note 1 to entry: Pesticides (plant protection products) approved for use in one country may not be approved in another country.

3.8
pesticide operator
person handling pesticides in agricultural settings, green spaces, roadsides, etc.

Note 1 to entry: Handling includes tasks such as mixing, loading, transferring, or applying pesticides; cleaning, adjusting, or repairing the parts of mixing, loading, or application equipment that may contain pesticide residues; assisting with the application of pesticides; and disposing of pesticides or pesticide containers.

Note 2 to entry: Farm, forest, nursery, and greenhouse are examples of agricultural settings.

3.10
re-entry worker
person who can be in contact with a partially or fully dried pesticide product, as part of their work/employment, in an area that has previously been treated

3.11
test chemical
liquid that is used to challenge the specimen of glove material

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