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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.

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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 Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.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	Comment (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.	



DRAFT International Standard

ISO/DIS 27065

Protective clothing — Performance requirements for protective garments worn by operators applying pesticides and for re-entry workers

Habillement de protection — Exigences de performance pour les vêtements de protection portés par les opérateurs appliquant des pesticides et pour les travailleurs de rentrée

ICS: 13.340.10

This document is circulated as received from the committee secretariat.

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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 [or Project Committee] ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 13, *Protective clothing*.

This third edition cancels and replaces the second edition (ISO 27065:2017), which has been technically revised.

The main changes are as follows:

- 1 Introduction has been revised;
- 2.0 Normative references have been updated;
- 3 Terms and definitions have been updated;
- 5.2 Conditioning has been revised;
- 5, Deterioration of repellency by cleaning has been added;
- 6.5 Material resistance to permeation requirements has been revised;
- 6.6 Material tearing strength requirement and standard for testing woven fabrics have been changed;
- 7.3 Seam resistance to permeation requirement has been revised;
- 9.2 Text for placement of the pictogram has been revised;
- 9.3 Marking for partial body garments have been added;
- Annex F and G have been revised.

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.

Introduction

This document addresses the performance requirements for protective clothing worn by operators handling liquid pesticide products as well as protective clothing worn by re-entry workers. It includes requirements for protective garments (e.g. shirts, jackets, trousers, and coveralls) and partial body protective garments (e.g. aprons, smocks, protective sleeves, hoods/caps, and material placed below knapsack/backpack sprayers). Requirements for protective clothing, including partial body, constructed with multiple layers or materials are also included in this document.

This document classifies protective clothing, including partial body, into three performance levels. A brief description for the three levels is given below.

Level C1 protective clothing, including partial body, is suitable when the potential risk is relatively low. Level C1 protective clothing can be used as the base protective clothing with additional protective garments worn based on risk assessment. See [Annex F](#) for additional information on risk assessment and use of PPE for risk mitigation.

Level C2 protective clothing, including partial body, is suitable when it has been determined that the protection required is higher than that provided by Level C1 protective clothing. Level C2 protective clothing typically provides a balance between comfort and protection. It can be used as the base protective clothing in place of C1. with additional C3 partial body protective garments based on risk assessment.

Level C3 protective clothing, including partial body, is suitable for use when it has been determined that additional protection is required based on risk assessment (including requirements based on GHS hazard categories.) Precautionary measures such as short duration for use are necessary for Level C3 suits/coveralls that may cause heat build-up resulting in heat exhaustion/stress. Level C3 protective clothing, including partial body, is suitable for use with diluted as well as concentrated pesticides.

Personal Protective Equipment (PPE) is often used for risk mitigation. See [Annex F](#) for information on risk assessment and use of PPE for risk mitigation. Since protective clothing can be contaminated in various ways (e.g. fine spray, contact with wet surface, contact with pesticide product sprayed under pressure, contact between the protective clothing and a contaminated surface), laboratory test methods used in the standard rate materials and garments rather than simulate the various field conditions.

ISO 16602 focuses on industrial chemicals, whereas this document focuses on protection against pesticides that are frequently applied in aqueous solutions. Penetration, permeation, and repellency tests in ISO 16602 are typically done with neat chemicals not used in pesticide application. In this document, penetration, permeation, and repellency tests are conducted with a mixture. The test chemical selected for testing is a pesticide surrogate that is representative of a best-known worst-case scenario for chemical ingress. Testing for penetration is conducted with diluted formulation. For permeation, the standard provides a provision for testing with diluted formulation. In addition, it allows for testing with additional pesticide products, if required, based on risk assessment conducted for the required pesticide product.

This document is intended for fabric and protective clothing manufacturers and pesticide product manufacturers, as well as trainers, regulators, and other individuals or organizations that make decisions regarding protective clothing for protection against pesticide products.

Protective clothing — Performance requirements for protective garments worn by operators applying pesticides and for re-entry workers

1 Scope

This document establishes minimum performance, classification, and marking requirements for protective clothing worn by operators handling pesticide products as well as re-entry workers. For the purpose of this document, the term pesticide applies to insecticides, herbicides, fungicides, and other substances applied in liquid form that are intended to prevent, destroy, repel, or reduce any pest or weeds in agricultural settings, green spaces, roadsides, etc. It does not include biocidal products used for agricultural and non-agricultural settings.

Pesticide handling includes mixing and loading, application, and other activities such as cleaning contaminated equipment and containers. Concentrated pesticides are typically handled during mixing and loading. Protective garments covered by this document include, but are not limited to, shirts, jackets, trousers, coveralls, aprons, protective sleeves, caps/hats and other headwear (excluding hard hats made of rigid materials, e.g. hats worn by construction workers), and accessories used under knapsack/backpack sprayers.

This document does not address items used for the protection of the respiratory tract, hands, and feet. This document does not address protection against fumigants.

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 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 9073-4, *Nonwovens — Test methods — Part 4: Determination of tear resistance by the trapezoid procedure*

ISO 13688:2013, *Protective clothing — General requirements*

ISO 13934-1, *Textiles — Tensile properties of fabrics — Part 1: Determination of maximum force and elongation at maximum force using the strip method*

ISO 13935-2, *Textiles — Seam tensile properties of fabrics and made-up textile articles — Part 2: Determination of maximum force to seam rupture using the grab method*

ISO 13996, *Protective clothing — Mechanical properties — Determination of resistance to puncture*

ISO 17491-4:2024, *Protective clothing — Test methods for clothing providing protection against chemicals — Part 4: Determination of resistance to penetration by a spray of liquid (spray test)*

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

ISO 22608:2021, *Protective clothing — Protection against liquid chemicals — Measurement of repellency, retention, and penetration of liquid pesticide formulations through protective clothing materials*

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:

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

3.1 analytical technique

procedure whereby the concentration of the chemical is determined quantitatively

Note 1 to entry: These techniques are often specific to individual chemical and collection medium combinations. Applicable techniques include, but are not limited to, flame ionization, photo ionization, electro-chemical, ultraviolet and infrared spectrophotometry, gas and liquid chromatography, and colourimetry.

3.2 cleaning

process by which a garment is made again serviceable and/or hygienically wearable by removing any dirt or contamination

[SOURCE: ISO 11610:2023, 4.6.16]

3.3 cumulative permeation mass

total amount of chemical that permeates during a specified time since the start of the test

[SOURCE: ISO 11610:2023, 7.5.15]

3.4 fumigant

pesticide in the form of gas

3.5 limited-use chemical protective garment

chemical protective garment for limited duration of use, i.e. to be worn until hygienic cleaning becomes necessary or chemical contamination has occurred and disposal is required

Note 1 to entry: This includes protective clothing for single use and for limited re-use, according to the information supplied by the manufacturer.

[SOURCE: ISO 11610:2023, 7.2.8, Note 2 to entry added]

3.6 partial body protective clothing

protective clothing that does not provide full-body coverage

Note 1 to entry: Partial body protective clothing may be used separately or in combination with other protective clothing to increase the protection level of specific parts of the body. Examples applicable to this document include items such as aprons, overshoes, sleeve protectors, material placed below knapsack/backpack sprayers, and smocks.

3.7 penetration

<protection against chemicals> process by which a chemical moves through pores, apertures or other openings in a material or finished garment on a non-molecular level

[SOURCE: ISO 11610:2023, 7.5.21]

3.8

permeation

process by which a chemical moves through a protective clothing material on a molecular level

Note 1 to entry: The permeation involves sorption of the molecules of the chemical into the contacted (outside) surface of a material, diffusion of the sorbed molecules in the material, and desorption of the molecules from the opposite (inner) surface of the material.

Note 2 to entry: In this document, a chemical is a pesticide.

[SOURCE: ISO 11610:2023, 7.5.13, Note 2 to entry added]

3.9

pesticide

chemical compound that are used to control pests, including insects, rodents, fungi and unwanted plants (weeds)

Note 1 to entry: Pesticides are used in public health to control vectors of disease, such as mosquitoes, and in agriculture to control pests that damage crops.

Note 2 to entry: For the purpose of this standard pesticides (plant protection products) are defined as chemicals used in agricultural settings, green spaces, roadsides, etc.

Note 3 to entry: Pesticides (plant protection products) approved for use in one country may not be approved in another country.

3.10

pesticide operator

person handling pesticides in agricultural settings

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: For the purpose of this standard, farm, forest, nursery, greenhouse, green spaces, and roadsides are examples of agricultural settings.

3.11

protective clothing

clothing designed for the intended purpose of protecting all or part of the body from one or more potential hazards

[SOURCE: ISO 11610:2023, 5.1.1, the term *protecting* replacing *isolating*]

3.12

protective garment material

any material or combination of materials used in an item of protective garment for the purpose of isolating parts of the body from hazard

Note 1 to entry: For the purpose of this document, protective garment materials include those materials used in the construction of whole or partial body protective garment that serve as the barrier for the wearer.

[SOURCE: ISO 11610:2023, 5.1.5, Note 1 to entry added]

3.13

re-entry worker

person who can be in contact with a plant protection product in an area that has previously been treated

3.14

repellency

characteristic to resist wetting and penetration by a liquid

[SOURCE: ISO 11610:2023, 7.5.1]