
**Protective clothing — Performance
requirements for protective clothing
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*

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on 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 the following URL: 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*.

This second edition cancels and replaces the first edition (ISO 27065:2011), which has been technically revised.

The main changes compared to the previous edition are as follows:

- major changes have been made to Levels 1 and 3 requirements;
- protective clothing for re-entry workers has been included in the scope.

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 clothing (e.g. shirts, jackets, trousers, and coveralls) and partial-body protective clothing (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 provides the least protection and is not suitable for use with concentrated pesticide formulations. It can be used as the base protective clothing with additional items worn when the potential risk is relatively higher. 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. This protective clothing is not suitable for use with concentrated pesticide formulations. It can be used as the base protective clothing with additional items worn when the potential risk is relatively higher.

Level C3 protective clothing, including partial-body, is suitable for use when it has been determined that the potential risk is high. 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 clothing 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 an emulsifiable concentrate that is representative of a worst case scenario for penetration and repellency. Testing for penetration is conducted with diluted formulation. For permeation, the standard provides a provision for testing with diluted formulation and concentrate. 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.

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Protective clothing — Performance requirements for protective clothing 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 clothing covered by this document includes, but is 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 9073-4, *Textiles — Test methods for nonwovens — Part 4: Determination of tear resistance*

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 13937-3, *Textiles — Tear properties of fabrics — Part 3: Determination of tear force of wing-shaped test specimens (Single tear method)*

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

ISO 17491-4:2008, *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, *Protection against chemicals — Measurement of cumulative permeation of chemicals with low vapour pressure through materials*

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