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Personal safety — Personal protective equipment — Guidelines on compatibility testing of PPE

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National foreword

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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 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 — Personal protective Equipment*.

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

When, following a risk assessment, users are required to wear more than one type of personal protective equipment (PPE) to minimise the risk to their safety, health and well-being, it is important that there are no negative interactions between wearers and the PPE, between the items of PPE and between the PPE and other necessary items to the operations and processes.

Any item of PPE introduces some barrier between part(s) of the body and the environment. This barrier is essential for protection, but it is recognized that this can have unwanted side-effects on the wearer in terms of imposing additional physical effort, hindering movement, impairing sensory perception or causing discomfort. Such side-effects can reduce the efficiency and accuracy of task performance and/or discourage the user from wearing the PPE and, consequently compromising the level of protection afforded.

This document deals with the identification of issues and provides guidance for test procedures to assess the compatibility of items of PPE worn together in an ensemble and between the PPE and the operating environment and processes.

International standards for PPE and requirements and test methods are generally related to individual items of PPE and only a few, for instance ISO 10333-1, ISO 16073-2 and ISO/TS 11999-2, include the assessment of interactions with other items of PPE. For instance, the interface between PPE items at the neck, wrist and ankle needs to provide the appropriate coverage and functionality to protect the wearer from hazards.

The ultimate responsibility for protective equipment is with the wearers' employer, however there may be different levels of shared responsibility with manufacturers and/or wearers themselves. The employer is also the authority on their individual operating environment and processes

Since it is expected that a wide range of equipment may be used by personnel, it is important to note that most PPE are not approved as an ensemble. It is the responsibility of those selecting the equipment to determine if the selected PPE items are compatible and do not impair the performance of other PPE nor impede the ability of the wearer to conduct their activities safely. Given the importance of compatibility, those selecting the PPE ensemble should also be responsible for, or in close coordination with those responsible for the respiratory protection program. Suitability factors should include, but not be limited to issues such as correct use of each item of PPE, mobility, dexterity, field of view and clarity of vision. Heat stress is an issue too but it is not addressed in this document.

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Personal safety — Personal protective equipment — Guidelines on compatibility testing of PPE

1 Scope

This document describes compatibility for ensembles of personal protective equipment (PPE) to be used by personnel where operating situations and processes require more than one piece of PPE. Where there is more than one risk to health and safety, it is necessary to wear or use more than one item of PPE at the same time. Such equipment should be compatible and continue to be effective to minimise the risks.

This document includes examples of interactions between items of PPE, between PPE and the operating environment and the effects of PPE on the correct functioning of integrated sensors and electronic devices.

This document provides suggestions of test procedures to assess the effects of any interactions and identify unacceptable restrictions to safe operations.

NOTE The principles of this document are also applicable to assessment of interactions with other items in an ensemble that are necessary to the work and that are not PPE, for example cap lamps, instruments, tools.

This document is also intended to be a general guideline for writers of performance requirements standards and test methods for PPE. This document can also be used by PPE manufacturers, distributors, solutions providers, purchasers, wearers and employers as guidance in PPE design and selection.

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

ISO 4007, *Personal protective equipment — Eye and face protection — Vocabulary*

ISO 16972, *Respiratory protective devices — Vocabulary and graphical symbols*

ISO/TR 11610, *Protective clothing — Vocabulary*

ISO/TR 19591, *Personal protective equipment for firefighters — Standard terms and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 374-1, ISO 374-2, ISO 4007, ISO 16972, ISO/TR 11610, ISO/TR 19691 and the following apply.

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

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

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

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