PD ISO/TR 21808:2024



BSI Standards Publication

# Best practices on the selection and use of personal protective equipment (PPE) designed to provide protection for firefighters

bsi.

# National foreword

This Published Document is the UK implementation of ISO/TR 21808:2024. It supersedes PD ISO/TR 21808:2021, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PH/14, Firefighters' personal protective equipment.

A list of organizations represented on this committee can be obtained on request to its committee manager.

**Contractual and legal considerations**

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

This publication is not to be regarded as a British Standard.

© The British Standards Institution 2024
Published by BSI Standards Limited 2024

ISBN 978 0 539 28290 0

ICS 13.340.10

**Compliance with a Published Document cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 January 2024.

**Amendments/corrigenda issued since publication**

| Date | Text affected |
|---|---|

PD ISO/TR 21808:2024

Technical Report

ISO/TR 21808

# Best practices on the selection and use of personal protective equipment (PPE) designed to provide protection for firefighters

*Meilleures pratiques sur la sélection, l'utilisation, le soin et l'entretien des équipements de protection individuelle (PPE) conçus pour pourvoir à la protection des pompiers*

Third edition
2024-01

Reference number
ISO/TR 21808:2024(en)

© ISO 2024



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

# Contents

Page

**Foreword** ..... **v**
**Introduction** ..... **vi**
**1 Scope** ..... **1**
**2 Normative references** ..... **1**
**3 Terms and definitions** ..... **1**
**4 General** ..... **3**
4.1 Responsibility of procedure development ..... 3
4.2 Ergonomics ..... 3
4.3 Compatibility ..... 4
4.3.1 General ..... 4
4.3.2 Physical compatibility ..... 5
4.3.3 Thermal protection compatibility ..... 5
4.3.4 Chemical protection compatibility ..... 6
**5 Selection** ..... **6**
5.1 General ..... 6
5.2 Selection for PPE procurement ..... 6
5.2.1 Identification of activity scope ..... 6
5.2.2 Risk assessment for procurement ..... 7
5.2.3 Identification of minimum protection levels that fit to the scope of activities ..... 7
5.2.4 Collect information on PPE that can be procured ..... 8
5.2.5 Collection of information on compatibility ..... 8
5.3 Evaluation by trial fitting for selection ..... 9
5.4 Provision of information for purchase by PPE manufacturers ..... 10
**6 Batch testing** ..... **10**
6.1 General ..... 10
6.2 Product certification ..... 10
**7 Use** ..... **10**
7.1 Start using PPE ..... 10
7.1.1 Training before use ..... 10
7.1.2 Record keeping ..... 11
7.2 Use in duty ..... 11
7.2.1 Routine inspection ..... 11
7.2.2 Risk assessment for the scope of activities at the time of mobilization ..... 12
7.2.3 Identification of protection required during the activity ..... 12
7.2.4 Selection of PPE ..... 12
7.2.5 Other consideration ..... 12
7.3 Care and maintenance of PPE after use ..... 12
7.4 Record of use ..... 12
7.5 Storage ..... 13
**8 Manufacturer information** ..... **13**
8.1 General ..... 13
8.2 Manufacturer information for selection and use ..... 14
**Annex A** (informative) **Risk assessment** ..... **15**
**Annex B** (informative) **Practical performance tests** ..... **24**
**Annex C** (informative) **Examples of relationship between type of activity, the heat/flame hazard linked to the activity and clothing to be chosen for protection based on the existing product standards** ..... **31**
**Annex D** (informative) **Performance levels relating to clothing designed to provide protection from heat and flame** ..... **34**

© ISO 2024 – All rights reserved

**Annex E** (informative) **Description of burn injury risks** ..... **54**
**Annex F** (informative) **Best practices on some of the items that may be addressed in labelling, subject to the required use of the PPE** ..... **56**
**Bibliography** ..... **57**

© ISO 2024 – All rights reserved

# 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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 equipment*, Subcommittee SC 14, *Firefighters personal equipment*.

This third edition cancels and replaces the second edition (ISO/TR 21808:2021), which has been technically revised and completely rewritten.

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.

© ISO 2024 – All rights reserved

# Introduction

The information in this document has been produced to assist firefighters, fire services and purchasers (or the person who advises the employer) in making the necessary decisions regarding the selection, use, care and maintenance of PPE for firefighters.

The purpose of this document is to establish a best practices document for PPE with the goal to evaluate and reduce the hazards and potential health risks associated with firefighting. This selection and use, guideline provides basic answers, criteria, and options for the fire service personnel that are selecting or using PPE through its life cycle with respect to protection it provides related to heat and flame or damaged PPE.

The main topics that the fire service needs to consider are highlighted in this document. This best practices document goes through the various steps and considerations such as risk assessment, compatibility, testing, information to be provided with the PPE so that the right management choices can be made for each fire service. Many paragraphs of the document contain bullet-lists as thought provokers or options that may need to be considered. The annexes provide additional information that if included, would make the main body of this document too complicated to read, but are necessary to describe hazards and risks, the value of the test methods for the end user, for example Annex E and Annex F provide importance guidance information.

The selection of appropriate PPE for heat and flame are based on your own risk assessment and procurement documents.

In the past 10 years, the world has experienced a rise in temperature due to climate change. As a result of this temperature rising, firefighters are facing the danger of heat stress, heat stroke and other fatal heat sicknesses. Many fire departments have begun considering heat stress management, taking into account the rising temperature and hot and humid climates, and have established new firefighting strategies, including tactics, training, equipment, and organization. Although some countries are placing more emphasis on heat and flame protection, the increased frequency and danger of heat stress and heat stroke incidents are estimated to result from the heavier and thicker PPE required. The risk of these newly generated risks, including dangerous heat stress/stroke, can not be underestimated. Risk assessments of firefighters' PPE(s) are to include the risks associated with heavier and thicker PPE(s) under various environmental conditions.

The compatibility in this document focused mainly on the physical compatibility between each element of PPE and the documentation.

This document is not intended for cleaning, inspection or repair of firefighter PPE. ISO 23616 is used for cleaning, inspection and repair of firefighters personal protective equipment (PPE).

Currently, TC 94/WG1 works to establish a parent standard for the development of this document. In case of the parent standard publication, consider the consistency of this document.

© ISO 2024 – All rights reserved

**Technical Report** **ISO/TR 21808:2024(en)**

# Best practices on the selection and use of personal protective equipment (PPE) designed to provide protection for firefighters

## 1 Scope

This document sets out the best practices for the selection and use of PPE designed to provide protection for firefighters while carrying out their duties.

The PPE covered in this document is intended for firefighting personnel exposed to risks associated with but not necessarily limited to the following activities:

— structural firefighting;

— wildland firefighting;

— incidents involving hazardous materials;

— incidents involving motor vehicle;

— urban search and rescue.

The purpose of this document is to highlight the main areas that a fire service needs to consider when providing PPE to its members. This document is a supplement to the information provided in the PPE standards or used in conjunction with them. Most paragraphs of the document contain bullet lists, these lists are provided for guidance only and they are not exhaustive.

Cleaning, inspection and repair of firefighters' personal protective equipment (including care and maintenance) are covered by ISO 23616.

## 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/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/TR 19591 and the following 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 https://www.electropedia.org/

**3.1**
**base-layer garment**
the first layer of a textile structure that is in direct contact with the skin (i.e. briefs, t-shirts, bras, socks)

© ISO 2024 – All rights reserved