

INTERNATIONAL STANDARD

ISO
11610

NORME INTERNATIONALE

First edition
Première édition
2023-05

Protective clothing — Vocabulary

Habillement de protection — Vocabulaire

Schutzkleidung — Begriffe



Reference number
Numéro de référence
ISO 11610-2023 (F+D)
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Published in Switzerland
Publié en Suisse

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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).

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 — Personal protective equipment*, SC 13, *Protective clothing*, in collaboration with CEN/TC 162, *Protective clothing including hand and arm protection and lifejackets*.

This first edition of ISO 11610:2023 cancels and replaces the first edition of ISO/TR 11610:2004, which has been completely 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

The definitions compiled in this document are based on the technical report ISO/TR 11610:2004 and on the standards and draft standards prepared by both ISO/TC 94/SC 13 and CEN/TC 162.

For this reason, the terms and definitions laid down in this document do not only cover protective clothing and related terms but also terms from the areas of protective gloves and lifejackets which come within the scope of CEN/TC 162.

The document is based on the compilation of terms and definitions existing in the area of standardization of ISO/TC 94/SC 13 and CEN/TC 162 with the objective to establish a consistent terminology. Within this purpose, the subject matter of the definitions taken from standards and draft standards have been modified, in order to solve some inconsistencies in the existing wording of definitions, to simplify or alter some wordings and to harmonise the definitions concerned.

The present document aims to facilitate the use of terms to serve as a reference for further definitions when new standards are being developed or existing standards are being to be revised in the field of protective clothing, protective equipment, protective gloves and lifejackets.

This document should be taken into account when terms need to be defined in the Working Groups of ISO/TC 94/SC 13 and CEN/TC 162 and. Except in exceptional circumstances, terms included in clause of this document shall not be re-defined with a different meaning in a standard prepared by ISO/TC 94/SC 13 or CEN/TC 162. If the particular use of a term requires a further definition to limit its meaning within the definition in this document, this document shall be referred to and the term number given.

This document is structured with clauses and subclauses related to the different (technical) facets of protective clothing and protective equipment worn on the body, including hand and arm protection and lifejackets.

Terms and definitions are listed according to the hierarchy of the concepts.

Therefore, the vocabulary takes into consideration the more general ones to the particular ones, such as

- a) Vocabulary of textile and clothing ([Clause 4](#));
- b) Vocabulary of protective clothing ([Clause 5](#));
- c) Vocabulary of protection against heat and flame hazards ([Clause 6](#));
- d) Vocabulary of protection against chemical hazards ([Clause 7](#));
- e) Vocabulary of protection against foul weather, wind and cold hazards ([Clause 8](#));
- f) Vocabulary of protection against mechanical hazards ([Clause 9](#));
- g) Vocabulary of protection against infective agent hazards ([Clause 10](#));
- h) Vocabulary of diving protective clothing ([Clause 11](#));
- i) Vocabulary of protection against hazards due to lack of visibility ([Clause 12](#));
- j) Vocabulary of protection against electrostatic hazards ([Clause 13](#));
- k) Vocabulary of protection against electrical hazards ([Clause 14](#));
- l) Vocabulary of Selection, Use, Care and Maintenance - SUCAM ([Clause 15](#));
- m) Vocabulary of electronics ([Clause 16](#)).

Each clause (except [Clause 4](#), [Clause 15](#) and [Clause 16](#)) is

structured with the following sub-clauses:

For Clause X:

X.1 General terms and definitions of ... *(domain related to Clause X)*;

X.2 Terms and definitions of product types;

X.3 Terms and definitions of components and materials

X.4 Terms and definitions of risks and hazards;

X.5 Terms and definitions of test methods

This subclause structure is applied to each clause (except [Clause 4](#), [Clause 15](#) and [Clause 16](#)) even if there is no term and definition in a sub-clause. In such case, the following sentence is introduced:

"This subclause is empty of terms and definition but is kept for the structure consistency of this document."

[Annex A](#) lists the French and German vocabulary in alphabetical order of the English vocabulary (index).

Protective clothing — Vocabulary

1 Scope

This document contains a list of terms which are frequently used in the standardization of protective clothing (5.1.4) and protective equipment worn on the body, including hand and arm protection and lifejackets, and definitions of these terms.

The definitions are intended to support an unambiguous use of the terms listed.

This document is intended to serve as a reference document for the Working Groups of CEN/TC 162 and ISO/TC 94/SC 13 to ascertain what definitions already exist and may be used for setting up new standards and to provide guidance in the elaboration of new definitions.

2 Normative references

There are no normative references in this document.

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 <https://www.electropedia.org/>

4 Terms and vocabulary of clothing

4.1 General terms and definitions of textile and clothing

4.1.1 clothing

general provisions from design to distribution intended for covering the body with everything except the footwear

Note 1 to entry: The term "clothing" is intended for referring to the concept of clothing in opposition to the clothing product.

Note 2 to entry: In English, the terms "clothing" and "garment" were used as synonym in the standards. The term "clothing" may refer to either "*clothing*" (4.1.1) or "*garment*" (4.1.2). Only the context, in which the term is used, will determine which one of the two is intended. Henceforth, definitions have been introduced in this document to clearly distinguish their meaning.

4.1.2 garment

single article of *clothing* (4.1.1)

Note 1 to entry: The term "garment" is intended for referring to the product.

Note 2 to entry: The garment may consist of single or multiple layers.

EXAMPLE Trousers, jacket, coats, *gloves* (4.5.5), *gaiters* (4.5.11), socks, etc.

4.1.3

textile fibre

unit of matter characterized by its flexibility, fineness and high ratio of length to maximum transverse dimension, which render it suitable for textile applications

[SOURCE: Regulation EU 1007/2011, Article 3, 1. (b), (i)]

4.1.4

textile product

any raw, semi-worked, worked, semi-manufactured, manufactured, semi-made-up or made-up product which is exclusively composed of *textile fibres* (4.1.3), regardless of the mixing or assembly process employed

[SOURCE: Regulation EU 1007/2011, Article 3, 1. (a)]

4.1.5

textile material

material made of *textile fibres* (4.1.3) and intended to be used, as such or in conjunction with other textile or non-textile items, for the production of *textile products* (4.1.4)

Note 1 to entry: Textile material refers to linear textile materials (for example, fibres, yarns, threads) as well as surface textile material (for example, knitted, woven and non-woven fabrics).

4.1.6

non-textile element

product which is not composed of *textile fibres* (4.1.3)

Note 1 to entry: Non-textile elements may contain, for example, active medical devices, radio and electrically operated components, slide fastener, (press) buttons, membranes, non-textile patches.

4.1.7

advanced garment

garment (4.1.2) which shows enhanced functionality(ies)

Note 1 to entry: "protection" is one of the functions that a garment can provide.

4.1.8

functional textile material

textile material (4.1.5) to which a specific function is added by means of material, composition, construction and/or finishing (applying additives, etc.)

[SOURCE: ISO/TR 23383:2020, 3.3, modified — "textile product" was replaced by "textile material".]

4.1.9

smart textile material

intelligent textile material

interactive textile material

functional textile material (4.1.8), which interacts reversibly with its environment, i.e. it responds or adapts to changes in the environment

Note 1 to entry: The term "smart textile" may refer to either a "*smart textile material*" (4.1.9) or a "*smart textile system*" (4.1.11). Only the context, in which the term is used, will determine which one of the two is intended.

[SOURCE: ISO/TR 23383:2020, 3.4, modified — "textile product" was replaced by "textile material".]

4.1.10

textile system

assemblage of *textile product(s)* (4.1.4) and *non-textile element(s)* (4.1.6)

[SOURCE: ISO/TR 23383:2020, 3.7]

4.1.11**smart (intelligent, interactive) textile system**

textile based system which exhibits an intended and exploitable response either to changes in its surroundings/environment or to an external signal/input

[SOURCE: ISO/TR 23383:2020, 3.8, modified — "(intelligent, interactive)" was added in the term.]

4.2 Terms and definitions of body dimensions and ergonomics**4.2.1****torso**

trunk

part of the body to which the head and limbs are attached

4.2.2**finger**

one of the five digits of the *hand* ([4.2.24](#))

Note 1 to entry: The digits of the hand are anatomically numbered 1 to 5, starting with the thumb.

4.2.3**back of the hand**

posterior surface of the *hand* ([4.2.24](#)) between the wrist and the *fingers* ([4.2.2](#))

4.2.4**wrist**

region of the joint between the *hand* ([4.2.24](#)) and the forearm

4.2.5**wrist point**

most prominent point of the bulge of the head of ulna

Note 1 to entry: See [Figure 1](#).

Note 2 to entry: prominent bone at the little finger side of the *wrist* ([4.2.4](#)).

[SOURCE: ISO 8559-1:2017, 3.1.19, modified — "Figure 19" was replaced by "[Figure 1](#)" and the second definition moved to Note 2 to entry.]

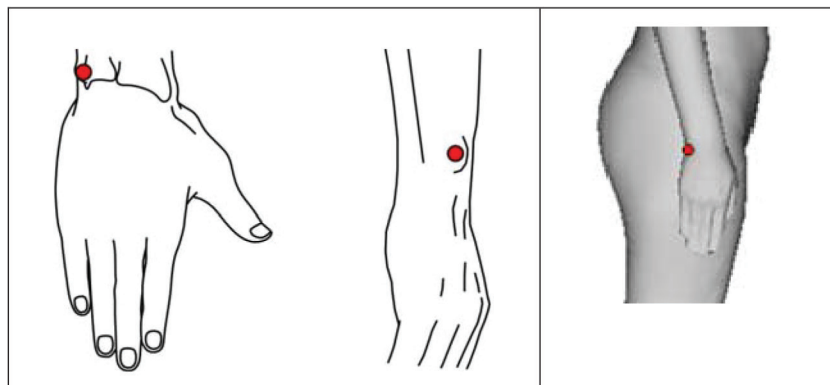


Figure 1 — Wrist point

4.2.6**wrist girth**

girth of the *wrist* ([4.2.4](#)) at the level of *wrist point* ([4.2.5](#))

Note 1 to entry: See [Figure 2](#).

[SOURCE: ISO 8559-1:2017, 5.3.19, modified — "Figure 75" was replaced by "[Figure 2](#)".]

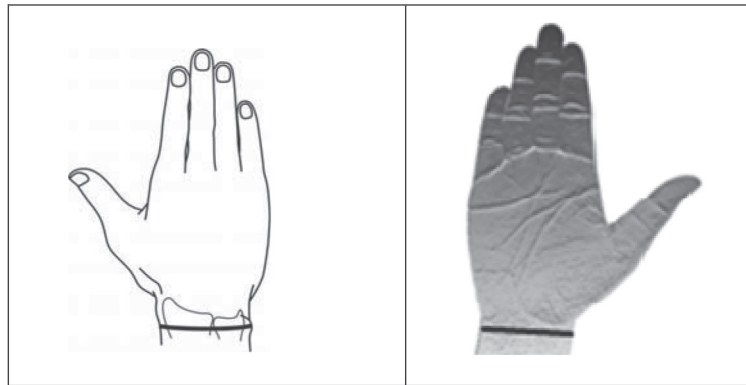


Figure 2 — Wrist girth

4.2.7

waist level

midway between the lowest rib point and the highest point of the hip bone at the side of the body

Note 1 to entry: See [Figure 3](#).

[SOURCE: ISO 8559-1:2017, 3.1.22, modified — "Figure 22" was replaced by "[Figure 3](#)".]

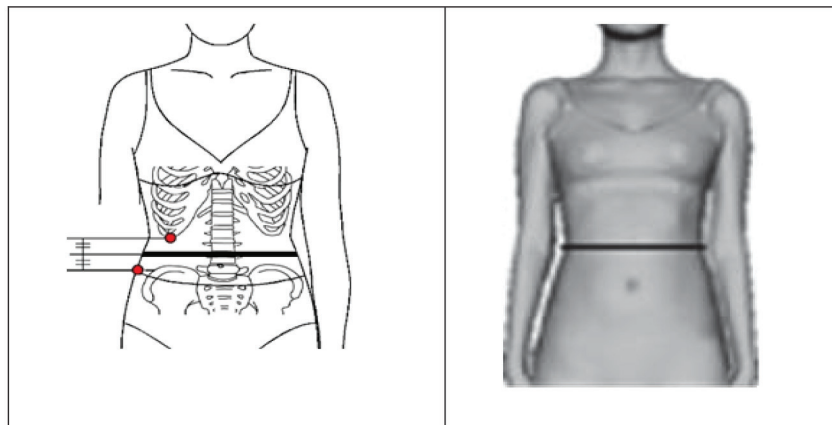


Figure 3 — Waist level

4.2.8

bust point

most anterior point of the bust when wearing a bra

Note 1 to entry: See [Figure 4](#).

[SOURCE: ISO 8559-1:2017, 3.1.11, modified — "Figure 11" was replaced by "[Figure 4](#)" and Note 2 to entry was deleted.]

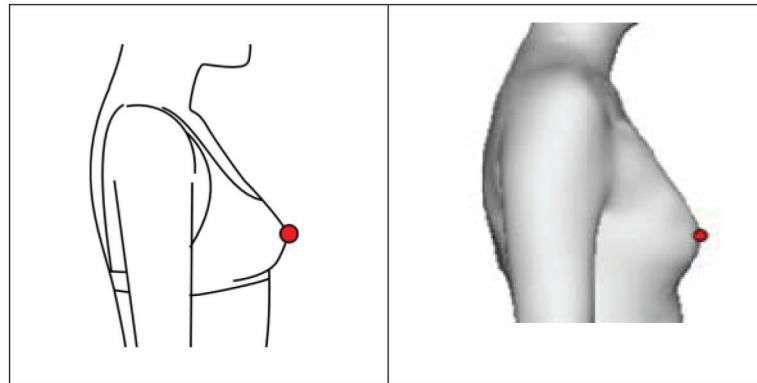


Figure 4 — Bust point

4.2.9**bust girth**

horizontal girth measured at bust point level

Note 1 to entry: See [Figure 5](#).

[SOURCE: ISO 8559-1:2017, 5.3.4, modified — "Figure 60" was replaced by "[Figure 5](#)".]

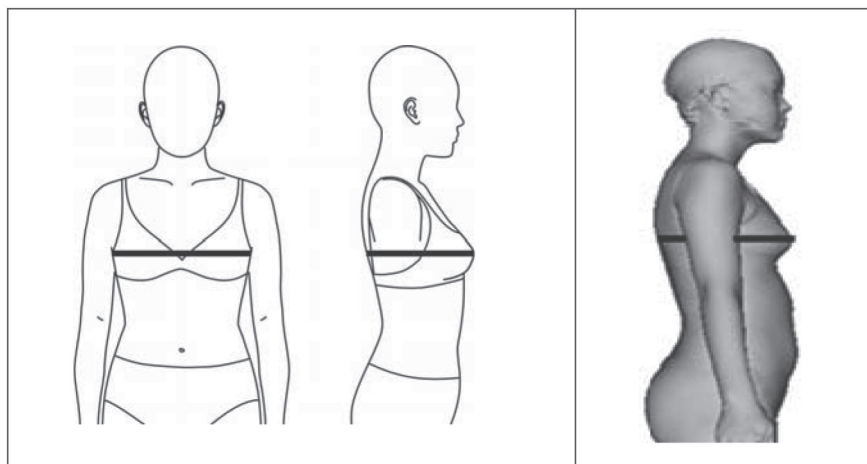


Figure 5 — Bust girth

4.2.10**chest girth**

horizontal girth of *torso* ([4.2.1](#)) measured at axilla

Note 1 to entry: See [Figure 6](#).

[SOURCE: ISO 8559-1:2017, 5.3.6, modified — "Figure 62" was replaced by "[Figure 6](#)".]

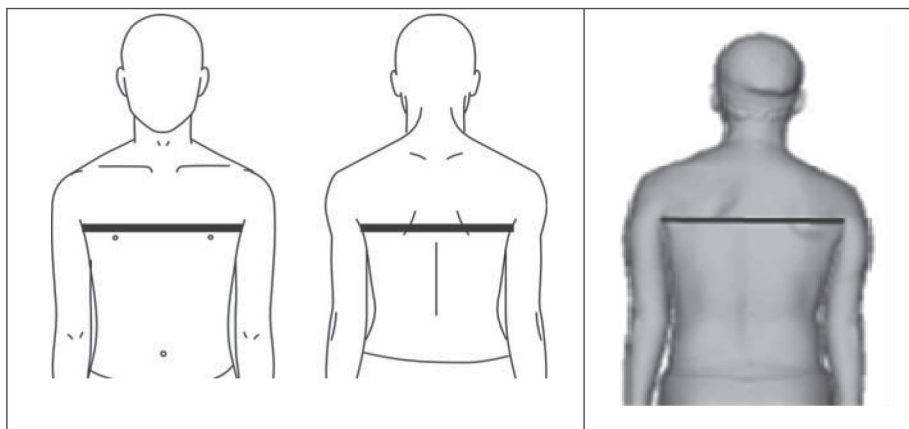


Figure 6 — Chest girth at axilla

4.2.11

under bust girth

horizontal girth of the body at the under bust level

Note 1 to entry: See [Figure 7](#).

[SOURCE: ISO 8559-1:2017, 5.3.8, modified — "Figure 64" was replaced by "[Figure 7](#)".]

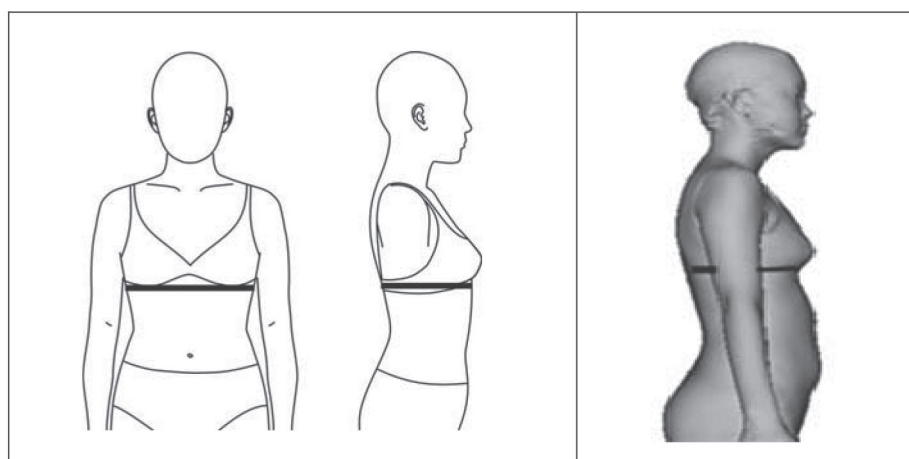


Figure 7 — Under bust girth

4.2.12

waist girth

horizontal girth of the body measured at the waist level

Note 1 to entry: See [Figure 8](#).

[SOURCE: ISO 8559-1:2017, 5.3.10, modified — "Figure 66" was replaced by "[Figure 8](#)".]

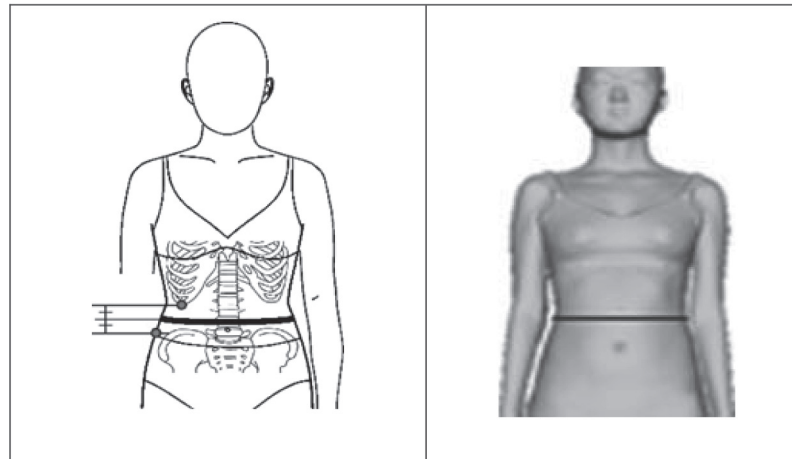


Figure 8 — Waist girth

4.2.13**back neck point to waist level**

distance from *back neck point* (4.2.14) along the neck base line to the *side neck point* (4.2.16), over the bust point, then straight to the waist level

Note 1 to entry: See [Figure 9](#).

[SOURCE: ISO 8559-1:2017, 5.4.13, modified — "Figure 97" was replaced by "[Figure 9](#)".]

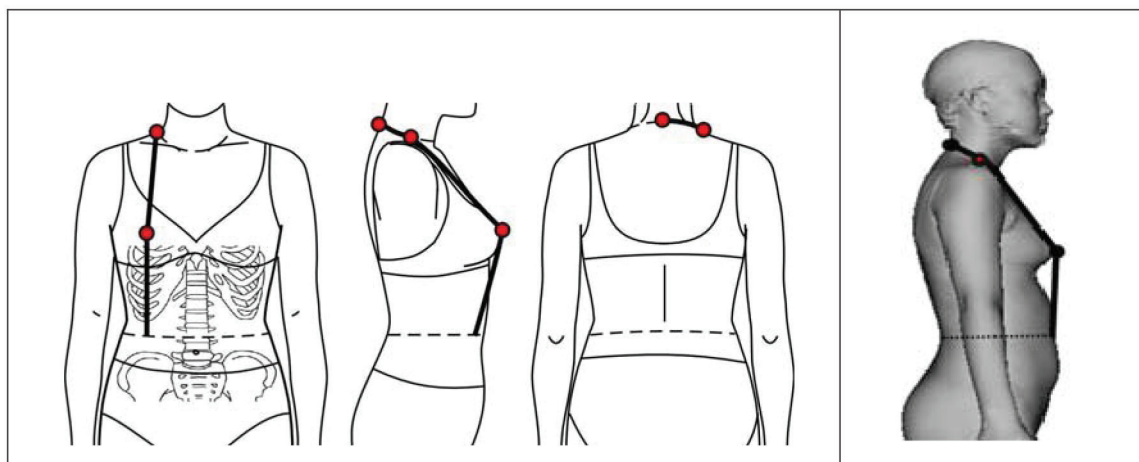


Figure 9 — Back neck point to waist level

4.2.14**back neck point**

tip of the prominent bone at the base of the back of the neck (spinous process of the seventh cervical vertebra) in the mid-sagittal plane, and projected posteriorly to the surface of the skin

Note 1 to entry: See [Figure 10](#).

[SOURCE: ISO 8559-1:2017, 3.1.6, modified — "Figure 6" was replaced by "[Figure 10](#)".]

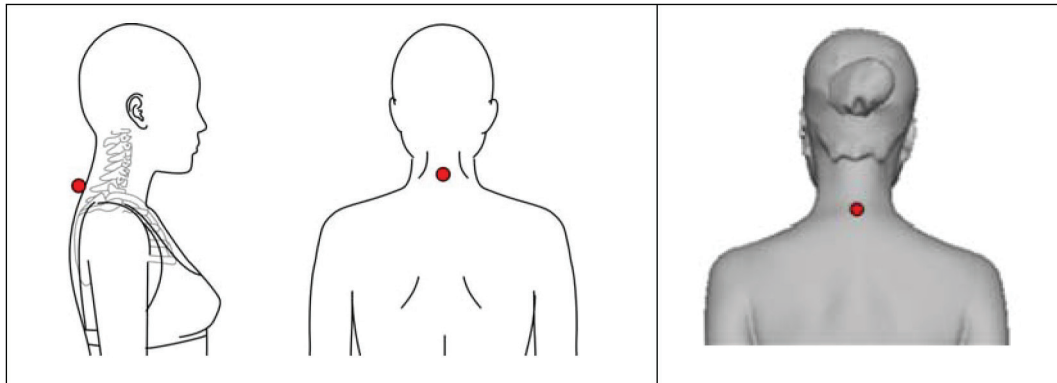


Figure 10 — Back neck point

4.2.15 neck base line

line at the neck base defined using a chainette that passes by the *back neck point* (4.2.14) and the *front neck point* (4.2.17)

Note 1 to entry: See [Figure 11](#).

[SOURCE: ISO 8559-1:2017, 3.2.1, modified — "Figure 27" was replaced by "[Figure 11](#)".]

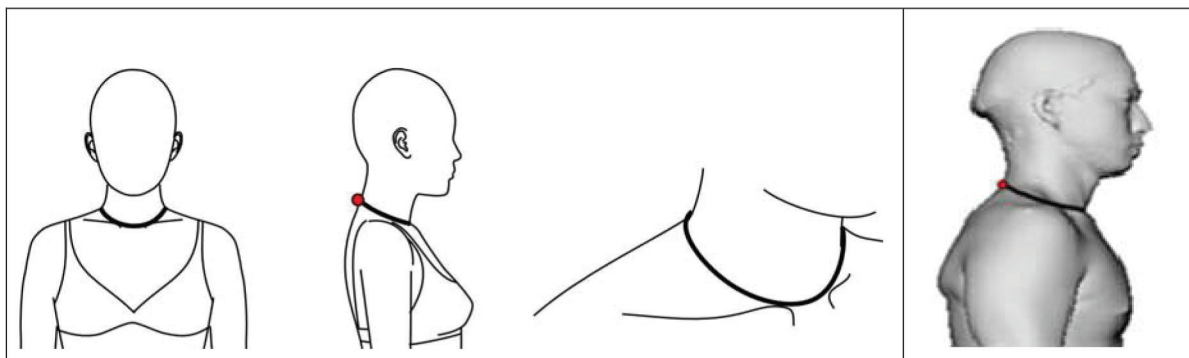


Figure 11 — Neck base line

4.2.16 side neck point

crossing point of the *neck base line* (4.2.15) and the anterior border of the trapezius muscle

Note 1 to entry: See [Figure 12](#).

[SOURCE: ISO 8559-1:2017, 3.1.7, modified — "Figure 7" was replaced by "[Figure 12](#)".]

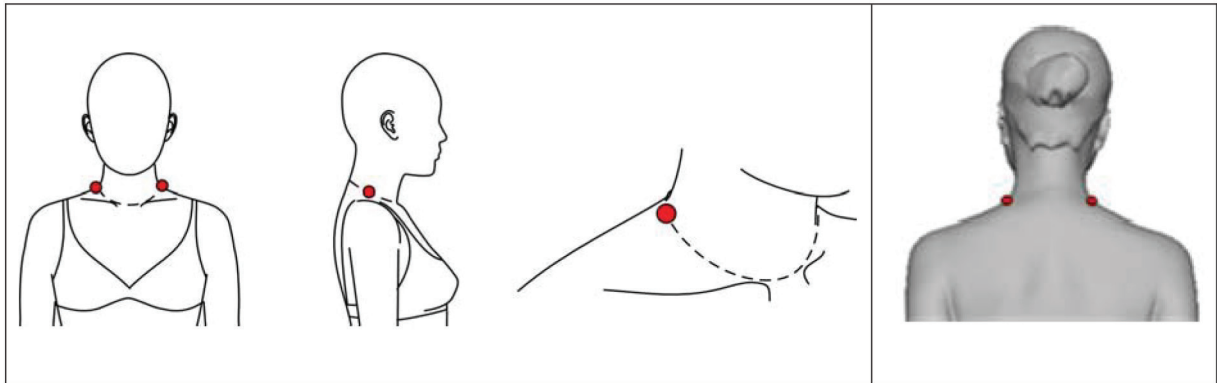


Figure 12 — side neck point

4.2.17**front neck point**

crossing point of the line connecting the medial superior borders of the left and right clavicles and the front median line

Note 1 to entry: See [Figure 13](#).

[SOURCE: ISO 8559-1:2017, 3.1.8, modified — "Figure 8" was replaced by "[Figure 13](#)".]

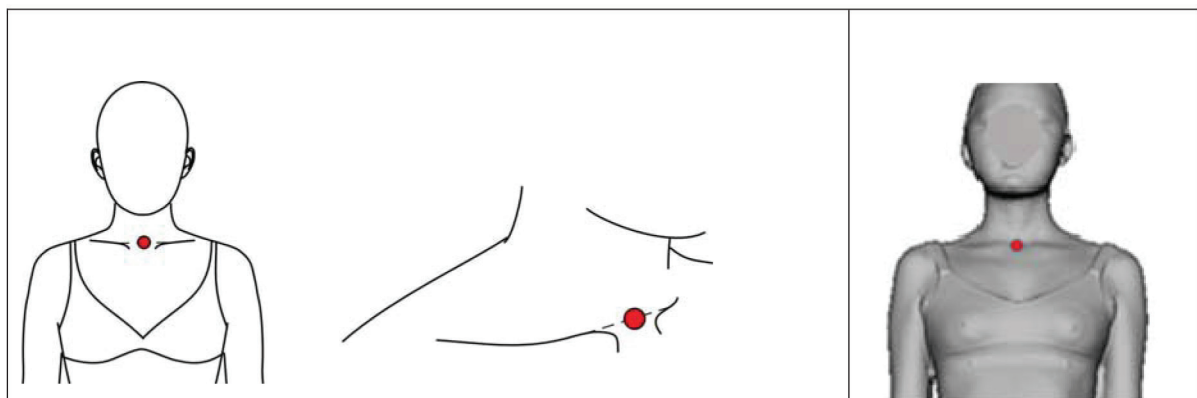


Figure 13 — Front neck point

4.2.18**ergonomics****human factors**

scientific discipline concerned with the understanding of interactions among human and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance

[SOURCE: ISO 9241-11:2018, 3.2.5]

4.2.19**anthropometry**

study and measurement of the physical dimensions and mass of the human body and its constituent (external) parts

Note 1 to entry: Taken from the Greek word *anthropos* (human being or Man) and *metron*, to measure.

[SOURCE: ISO 15535:2012, 3.6]

4.2.20

biometrics

automated recognition of individuals based on their behavioural and biological characteristics

[SOURCE: ISO/IEC 24713-1:2008, 3.5]

4.2.21

interactive system

combination of hardware and/or software and/or services and/or people that users interact with in order to achieve specific goals

Note 1 to entry: This includes, where appropriate, packaging, user documentation, online and human help, support and training.

[SOURCE: ISO 9241-11:2018, 3.1.5]

4.2.22

human-centred design

HCD

approach to system design and development that aims to make *interactive systems* ([4.2.21](#)) more usable by focusing on the use of the system; applying *human factors* ([4.2.18](#)), *ergonomics* ([4.2.18](#)) and usability knowledge and techniques

Note 1 to entry: The term “human-centred design” is used rather than “user-centred design” in order to emphasize that this document also addresses impacts on a number of stakeholders, not just those typically considered as users. However, in practice, these terms are often used synonymously.

Note 2 to entry: Usable systems can provide a number of benefits including improved productivity, enhanced user well-being, avoidance of stress, increased accessibility, and reduced risk of *harm* ([5.4.1](#)).

[SOURCE: ISO 9241-11:2018, 3.2.6]

4.2.23

human system interface

HSI

the boundary that represents the point of physical interaction between a human being and the application platform

Note 1 to entry: Also referred to as human/computer interface, HCI (deprecated).

Note 2 to entry: In the field of machine tools, the user interface often is referred to as man machine interface, MMI (for BACS deprecated).

[SOURCE: ISO 16484-2:2004, 3.95, modified — Note 3 to entry was deleted.]

4.2.24

hand

end part of the upper limb beyond the *wrist* ([4.2.4](#))

Note 1 to entry: Hand includes the palm, the *back of the hand* ([4.2.3](#)) and the *fingers* ([4.2.2](#)).

4.3 Terms and definitions of components, materials, finishing

4.3.1

fabric

item showing a spread surface in regard to its thickness, formed by entanglement of any *textile materials* ([4.1.5](#)), having a cohesion given by any textile process

Note 1 to entry: Textile processes include weaving, knitting, braiding, lacing, tufting, and nonwoven bonding.

4.3.2**nonwovens**

engineered fibrous assembly, primarily planar, which has been given a designed level of structural integrity by physical and/or chemical means, excluding weaving, knitting or papermaking

Note 1 to entry: Film and paper structures are not considered as nonwovens.

[SOURCE: ISO 9092:2019, 3.1.1]

4.3.3**coated fabric**

textile *fabric* (4.3.1) with an adherent layer or layers of rubber- and/or plastics-based material on one or both surfaces, resulting in a flexible product

[SOURCE: ISO 1382:2020, 3.95]

4.3.4**exterior fabric**

outer fabric of a *garment* (4.1.2), either in the form of a single or composite *fabric* (4.3.1)

4.3.5**material**

substances, excluding *hardware* (4.3.26) and labels, of which a *garment* (4.1.2) is made

4.3.6**multilayer material**

material (4.3.5) consisting of different layers intimately combined prior to the garment manufacturing stage

Note 1 to entry: Garment manufacturing stages are, for example, weaving, quilting, coating, gluing.

4.3.7**lining**

innermost lining

innermost layer of *fabric* (4.3.1) or other *material* (4.3.5) inserted in a *garment* (4.1.2) which is intended to be nearest to the wearer's body

Note 1 to entry: Where the *lining* (4.3.7) forms part of a quilted assembly, the quilted assembly shall be regarded as the *innermost lining* (4.3.7).

4.3.8**interlining**

layer between the outermost layer and the *innermost lining* (4.3.7) in a multilayer garment

4.3.9**liner**

removable *lining* (4.3.7)

Note 1 to entry: A *liner* (4.3.9) can be an inner garment designed to be attached or to be worn separately under an *outer garment* (4.3.16).

Note 2 to entry: A *liner* (4.3.9) is generally used to provide specific properties such as thermal insulation, watertightness.

4.3.10**thermal lining**

lining (4.3.7) providing thermal insulation

4.3.11**thermal liner**

liner (4.3.9) providing thermal insulation

4.3.12

moisture barrier

fabric (4.3.1) or membrane used in the *garment assembly* (4.3.30) designed to prevent the passage of water through the *garment* (4.1.2)

Note 1 to entry: Moisture barriers can be permeable to water vapor. Moisture barriers do not prevent the passage of some chemical, biological or radiological agents.

4.3.13

anti-wicking barrier

material (4.3.5) used to prevent the transfer of liquid from outside the *garment* (4.1.2) to inside the *garment* (4.1.2), usually in addition to or replacing part of the *moisture barrier* (4.3.12) at the edge(s)

4.3.14

drain mesh material

material (4.3.5) to allow drainage of liquid

4.3.15

under garment

underwear

garment (4.1.2) worn under other garments

4.3.16

outer garment

garment (4.1.2) worn over other garments

4.3.17

cuff

portion of a *garment* (4.1.2) (including glove) which covers the *wrist* (4.2.4)

4.3.18

closure

fastener

any of various devices for holding together two parts sometimes required to be separate, as two edges or flaps of a piece of *garment* (4.1.2)

EXAMPLE Button, slide fastener (also called "zip"), press fastener (also called "snap"), touch and close fastener (also called "hook and loop"), toggle button.

4.3.19

closure system

method of fastening openings in the *garment* (4.1.2) including combinations of more than one method of achieving a secure *closure* (4.3.18)

Note 1 to entry: This term does not cover *seams* (4.4.1).

4.3.20

fastening point

part of the *garment* (4.1.2) to which a *fastener* (4.3.18) can be attached

4.3.21

connection

assemblage (4.3.22) or *joint* (4.3.23)

4.3.22

assemblage

permanent fastening between two or more different *garments* (4.1.2), or between garment and *accessories* (4.3.25) or *hardware* (4.3.26)

4.3.23**joint**

join

non-permanent fastening between two different *garments* (4.1.2), or between garment and *accessories* (4.3.25)

4.3.24**wristlet**

part of a *garment* (4.1.2) that encircles the *wrists* (4.2.4) or ankles

4.3.25**accessory**

subordinate or supplementary part, object, or the like of a *garment* (4.1.2) used mainly for convenience, safety, etc.

Note 1 to entry: *Accessory* (4.3.25) may be permanently attached or removable.

4.3.26**hardware**

non-fabric integral part, object, or the like of a *garment* (4.1.2)

Note 1 to entry: *Hardware* (4.3.26) includes those made of metal or plastic, e.g. *fasteners* (4.3.18), rank markings.

4.3.27**outer material**

outermost *material* (4.3.5) of which the *garment* (4.1.2) is made

4.3.28**material assembly****component assembly**

combination of all *materials* (4.3.5) of a multi-layer garment (including *hardware* (4.3.26)) presented exactly as the finished garment construction

4.3.29**material combination**

material (4.3.5) produced from a series of separate layers, fixed together during the garment manufacturing stage

4.3.30**garment assembly**

series of *garments* (4.1.2) arranged in the order as worn

Note 1 to entry: It may contain *multilayer materials* (4.3.6), *material combinations* (4.3.29) or a series of separate garments in single or multiple layers

4.3.31**aluminised fabric**

fabric (4.3.1) with an aluminised layer on its surface(s)

Note 1 to entry: The aluminised layer can be obtained by metallisation or using a film.

4.3.32**integrated element**

<smart textiles> element which is incorporated into or onto a product

4.3.33**integrated smart textile**

integrated element (4.3.32) for which the element is a *smart textile system* (4.1.11)

4.3.34**integrated non-textile element**

integrated element (4.3.32) for which the element is a *non-textile element* (4.1.6)

4.4 Terms and definitions of design and construction

4.4.1

seam

permanent fastening between two or more pieces of *material* (4.3.5) by sewing and/or any other methods

Note 1 to entry: The other methods can be welding, taping, etc.

4.4.2

structural seam

seam (4.4.1) that is necessary for the integrity of the *garment* (4.1.2)

4.4.3

side seam

seam (4.4.1) that runs laterally along the worn *garment* (4.1.2)

4.4.4

overlapping seam

seam (4.4.1) where all or part of one or more layers of *material* (4.3.5) covers the other layer or layers causing a ridge

4.4.5

glove length

perpendicular line joining the *seam* (4.4.1) of the *cuff* (4.3.17) (or equivalent position if no seam is present) with the tip of the middle finger (or equivalent position in a *mitt* (4.5.7) or *one-finger mitt* (4.5.8))

4.4.6

interface area

area where openings interrupt the continuity of *material(s)* (4.3.5) or *garments* (4.1.2)

4.4.7

yoke

interface area (4.4.6) in the neck

4.4.8

model

model name

manufacturer's unique code or name that identifies a product having a design common to all examples of the series

Note 1 to entry: A *model* (4.4.8) of garment may be available in a range of *sizes* (4.4.9) and *styles* (4.4.10).

4.4.9

size

size of model

manufacturer's designation of the product indicating the dimensions and, if necessary, the gender of the user the product should fit

4.4.10

style

style of model

manufacturer's designation that identifies a particular combination of features of versions of a *model* (4.4.8) that define its appearance, but do not alter its *performance level* (5.1.8) of type

4.4.11

glove back

part of the glove which covers the back of the hand from the *wrist* (4.2.4) to the base of the *fingers* (4.2.2)

4.4.12**glove palm**

part of the glove which covers the front of the hand from the *wrist* (4.2.4) to the base of the *fingers* (4.2.2)

4.4.13**glove series**

single glove *style* (4.4.10) or glove type with the same palm material up to the wrist line where the only variants are *size* (4.4.9), left/right *hand* (4.2.24), colour or sewing pattern

4.5 Terms and definitions of product types**4.5.1****garment ensemble**

group of *garments* (4.1.2) worn together on the body at the same time

4.5.2**apron**

garment (4.1.2) covering the front of the body

4.5.3**divided apron**

apron (4.5.2) which is vertically divided in the thigh region and restrained to each leg

4.5.4**apron support**

means by which the *apron* (4.5.2) is supported on the body while the *apron* (4.5.2) is in use

4.5.5**glove**

garment (4.1.2) covering the *hand* (4.2.24) to the *wrist* (4.2.4) and, optionally, covering part of the forearm and arm

4.5.6**five-finger glove**

glove (4.5.5) having separate individual fingers and thumb

4.5.7**mitt****mitten**

glove (4.5.5) having a separate thumb and a common covering for the other *fingers* (4.2.2)

4.5.8**one-finger mitt**

glove (4.5.5) having a separate thumb and a separate forefinger and a common covering for the remaining *fingers* (4.2.2)

4.5.9**long-cuff glove**

DEPRECATED: gauntlet

glove (4.5.5) with a permanently attached stiff but flexible *cuff* (4.3.17) covering the forearm

Note 1 to entry: The term "gauntlet" is an inexact synonym of "long-cuff glove" and is therefore deprecated.

4.5.10**short-cuff glove**

glove (4.5.5) of length proximal to the *wrist* (4.2.4)

4.5.11**gaiter**

removable covering of the part of the leg below the knee which can also cover the upper surface of shoes

4.5.12

balaclava hood

one-piece *garment* ([4.1.2](#)) designed to fit closely over the entire head and to extend downwards to cover the neck

4.5.13

suit

garment combination made of the same *exterior fabric* ([4.3.4](#)) worn together

4.6 Terms and definitions of test methods, attributes, ageing

4.6.1

adhesion strength

force required to cause separation at the interface of the bonded components of a test piece or product

Note 1 to entry: The adhesion strength is related to the coating of a *coated fabric* ([4.3.3](#)).

[SOURCE: ISO 1382:2020, 3.13, modified — Note 1 to entry was added.]

4.6.2

elasticity

property of a *material* ([4.3.5](#)) by which it tends to recover its original size and shape immediately after the removal of the force causing deformation

[SOURCE: ISO 20932-1:2018, 3.2, modified — definition slightly changed.]

4.6.3

shrinkage

decrease in one or more dimensions of an object or *material* ([4.3.5](#))

4.6.4

degradation

deleterious change in one or more physical properties of a *material* ([4.3.5](#))

EXAMPLE Flaking, swelling, disintegration, *embrittlement* ([6.5.6](#)), colour change, dimensional change, appearance change, hardening, softening.

4.6.5

dexterity

<gloves> manipulative ability to perform a task

Note 1 to entry: Dexterity is related to the thickness of glove material, its *elasticity* ([4.6.2](#)) and its deformability, amongst others.

4.6.6

thermal insulation

resistance to dry heat transfer via conduction, convection, and radiation

4.6.7

thermal resistance

R_{ct}
temperature difference between the two faces of a *material* ([4.3.5](#)) divided by the resultant heat flux per unit area in the direction of the gradient

Note 1 to entry: It is a quantity specific to *textile materials* ([4.1.5](#)) or composites which determines the dry heat flux across a given area in response to a steady applied temperature gradient. The dry heat flux may consist of one or more conductive, convective and radiant components.

Note 2 to entry: Thermal resistance is expressed in square metres kelvin per watt.

[SOURCE: ISO 11092:2014, 2.1]

4.6.8**total thermal insulation**

total *thermal resistance* (4.6.7) to dry heat loss from the test subject, which includes the resistance provided by the *garment* (4.1.2) and the air layer around the dressed test subject

4.6.9**water penetration resistance**
 W_p

property of a *material* (4.3.5) to support the hydrostatic pressure based on the opposition to the passage of water through the *material* (4.3.5)

4.6.10**water-vapour resistance**
 R_{et}

water-vapour pressure difference between the two faces of a *material* (4.3.5) divided by the resultant evaporative heat flux per unit area in the direction of the gradient

Note 1 to entry: It is a quantity specific to *textile materials* (4.1.5) or composites which determines the “latent” evaporative heat flux across a given area in response to a steady applied water-vapour pressure gradient. The evaporative heat flux may consist of both diffusive and convective components.

Note 2 to entry: Water-vapour resistance is expressed in square metres pascal per watt.

[SOURCE: ISO 11092:2014, 2.2]

4.6.11**water-vapour permeability index**
 i_{mt}

ratio of thermal and water-vapour resistances in accordance with the following formula:

$$i_{mt} = S \cdot \frac{R_{ct}}{R_{et}}$$

where S equals 60 Pa/K

Note 1 to entry: The water-vapour permeability index is dimensionless, and has values between 0 and 1. A value of 0 implies that the material is water-vapour impermeable, that is, it has infinite water-vapour resistance, and a material with a value of 1 has both the thermal resistance and water-vapour resistance of an air layer of the same thickness.

[SOURCE: ISO 11092:2014, 2.3]

4.6.12**water-vapour permeability**
 W_d

characteristic of a *textile material* (4.1.5) or composite depending on water-vapour resistance and temperature in accordance with the following formula:

$$W_d = \frac{1}{R_{et} \cdot \phi T_m}$$

where ϕT_m is the latent heat of vaporization of water at the temperature, T_m , of the measuring unit, equals, for example, to 0,672 W·h/g at $T_m = 35\text{ °C}$

Note 1 to entry: Water-vapour permeability is expressed in grams per square metre hour pascal.

[SOURCE: ISO 11092:2014, 2.4]

4.6.13

ageing

change of the product performance over time during use or storage

Note 1 to entry: For example:

- *cleaning* ([4.6.16](#)), *maintenance* ([15.4](#)) or disinfecting processes;
- exposure to visible light and/or ultra-violet radiation;
- exposure to high or low temperatures or to changing temperatures;
- exposure to chemicals including humidity;
- exposure to biological agents such as bacteria, fungi, insects or other pests;
- exposure to mechanical action such as abrasion, flexing, pressure and strain;
- exposure to contaminants such as dirt, oil, splashes of molten metal, etc.;
- exposure to wear and tear.

4.6.14

conditioning

one or more operations intended to bring a sample or test specimen into a state of equilibrium with regard to temperature and humidity

[SOURCE: ISO 291:2008, 3.4]

4.6.15

pre-treatment

standard way of preparing items before testing

Note 1 to entry: This might include e.g. a number of *cleaning cycles* ([4.6.17](#)), submitting items (samples, test specimens, garments, etc.) to heat, mechanical action or any other relevant exposure and is finished by *conditioning* ([4.6.14](#)).

4.6.16

cleaning

process by which a *garment* ([4.1.2](#)) is made again serviceable and/or hygienically wearable by removing any dirt or contamination

4.6.17

cleaning cycle

washing plus drying or dry *cleaning* ([4.6.16](#)) treatment followed, if required, by ironing or finishing

4.6.18

clo value

unit to express the relative *thermal insulation* ([4.6.6](#)) values of various *garment assemblies* ([4.3.30](#))

Note 1 to entry: One clo is equal to 0,155 m²K/W.

4.6.19

delay time

<protection against chemicals> time between the actual arrival of the test chemical on the collecting side of the specimen and the time when the analytical instrumentation can detect it

4.6.20

backing material

defined testing material that is placed behind a test specimen during testing

4.6.21

back face

face of a test specimen placed against the *backing material* ([4.6.20](#))

5 Terms and vocabulary of protective clothing

5.1 General terms and definitions of protective clothing

5.1.1

protective clothing

clothing (4.1.1) designed for the intended purpose of isolating all or part of the body from one or more potential *hazards* (5.4.2)

5.1.2

protective garment

single article of *protective clothing* (5.1.1) which covers or replaces personal *garment* (s) (4.1.2)

5.1.3

warning clothing

clothing (4.1.1) designed for the intended purpose of signalling the presence of the wearer

5.1.4

protective garment model

model (4.4.8) of a *protective garment* (5.1.2)

Note 1 to entry: *Protective garment model* (5.1.4) includes generally a specified *performance level* (5.1.8), a specified minimum *zone of protection* (5.4.4) and thus anticipated body coverage.

5.1.5

protective garment material

any *material* (4.3.5) or combination of materials used in an item of *protective garment* (5.1.2) for the purpose of isolating parts of the body from *hazard* (5.4.2)

5.1.6

protective material

any *material* (4.3.5) or combination of materials used in a *protective garment* (5.1.2)

5.1.7

unit of protective material

cut-out piece or panel of *protective material* (5.1.6) consisting of all the *fabric* (4.3.1) or other layers that constitute the *protective material* (5.1.6) that goes into the construction of a garment without any *joints* (4.3.23) within it

Note 1 to entry: Units can be joined together to provide the complete *protective coverage* (5.4.6) required, before insertion and attachment to garments, but such units retain their individuality for testing purposes.

5.1.8

performance level

level of performance

number or letter that designates a particular category or range of performance by which the results of testing can be graded

5.1.9

compatibility (of PPE)

situation where two or more elements of *personal protective equipment* (5.1.11) may be used together and perform appropriately without modification, adaption or mutual interference

[SOURCE: ISO/TS 20141:2022, 3.1]

5.1.10

smart personal protective system

combination of single items of *personal protective equipment* (5.1.11) that protects against applicable/relevant *risks* (5.4.3) encountered by the wearer and which exhibits an intended and exploitable response either to changes in its surroundings/environment or to an external signal/input

Note 1 to entry: The expression “smart PPE” is used as a metonymy to represent a *smart personal protective system* (5.1.10).

Note 2 to entry: Examples for all other auxiliary equipment or elements are ICT *hardware* (16.13) and software, data logging, monitoring and warning systems (both the individual and the safety management), localization equipment, communication systems. Parts of the PPS (Personal Protective System) include PPE such as: head protection (helmet), hearing protection, eye and face protection, respiratory protection, protection against fall from a height, foot protection (safety shoes, boots), hand protection (*gloves* (4.5.5), arm protection), body protection/*protective garments* (5.1.2) (including e.g. ballistic impact protection).

Note 3 to entry: The presence of electronics does not automatically mean smart and there might be other ways to make a personal protective system smart than by electronics.

5.1.11

personal protective equipment

PPE

device or appliance designed to be worn or held by an individual for protection against one or more health and safety *hazards* (5.4.2)

5.2 Terms and definitions of product types

5.2.1

constant wear suit

suit (4.5.13), designed to be routinely worn for a long time in anticipation of facing potential *hazard* (5.4.2), but permitting physical activity by the wearer to such an extent that actions may be undertaken without undue encumbrance.

5.2.2

re-usable chemical protective garment

chemical *protective garment* (5.1.2) that is constructed from *materials* (4.3.5) which allow the garment to be cleaned after repeated chemical exposures such that it remains suitable for continued use

5.2.3

protective system

combination of garments and any other products which are used in conjunction with it

5.2.4

protective sleeve

flexible garment covering the arm from the *wrist* (4.2.4) to above the elbow

Note 1 to entry: It may be self-supporting because of its *elasticity* (4.6.2) or held in place by straps or other systems. Sleeves are normally worn inside the *cuff* (4.3.17) of a *glove* (4.5.5) and lightly grip the wrist.

5.2.5

arm guard

protective equipment covering the forearm

5.2.6

long arm guard

protective equipment that covers the forearm and extends onto the upper arm

Note 1 to entry: It may be secured to the body or to garment so that it remains in place during use.

5.2.7**arm guard and glove assembly**

arm guard (5.2.5) correctly attached to or correctly worn with a compatible *glove* (4.5.5) with a certain total length from the *wrist* (4.2.4)

5.2.8**leg protector**

any type of *protective garment* (5.1.2) which protects at least a *specified protective area* (5.4.7) of the leg

5.2.9**upper body protector**

any type of *protective garment* (5.1.2), which protects the upper part of the body

5.2.10**restraint**

part of protective equipment enabling secure fixation of the equipment to the body of the wearer

5.2.11**foot protector**

any product which protects the foot and the lower part of the leg or any part of this area

5.2.12**facial opening**

opening in front of the hood

Note 1 to entry: Facial opening can be interfacing with the breathing apparatus facemask.

5.3 Terms and definitions of components and materials

This sub-clause is empty of terms and definition but is kept for the structure consistency of this document.

5.4 Terms and definitions of risks and hazards**5.4.1****harm**

injury or damage to the health of people

[SOURCE: ISO/IEC Guide 51:2014, 3.1, modified - “or damage to property or the environment” has been deleted]

5.4.2**hazard**

potential source of *harm* (5.4.1)

[SOURCE: ISO/IEC Guide 51:2014, 3.2]

5.4.3**risk**

combination of the probability of occurrence of *harm* (5.4.1) and the severity of that harm

[SOURCE: ISO/IEC Guide 51:2014, 3.9, modified — Note 1 to entry has been deleted.]

5.4.4**zone of protection**

area of protective equipment that is primarily intended to ensure the protection of the wearer and that is subject to specific testing

5.4.5

puncture

wound in which a penetrating object makes a discrete hole through the skin which more or less closes after withdrawal of the object

5.4.6

protective coverage

area of the body which is covered by the whole of the protective equipment and its attachments

5.4.7

specified protective area

required *protective coverage* ([5.4.6](#))

5.4.8

heat stress

sum of metabolic and environmental factors leading to heat storage in the body

Note 1 to entry: Factors include garment.

5.5 Terms and definitions of test methods

This sub-clause is empty of terms and definition but is kept for the structure consistency of this document.

6 Terms and vocabulary of protection against heat and flame hazards

6.1 General terms and definitions of protection against heat and flame hazards

6.1.1

thermal protection

property that characterises the overall protective performance of a garment or protective *garment ensemble* ([4.5.1](#)) relative to how it prevents the transfer of heat that is sufficient enough to cause burn injury

6.2 Terms and definitions of product types

6.2.1

firefighter's protective clothing

protective clothing ([5.1.1](#)) designed for firefighting

6.2.2

firefighter's protective garment

single article of *firefighter's protective clothing* ([6.2.1](#)) providing protection for the firefighter's *torso* ([4.2.1](#)), neck, arms, and legs, but excluding the head, *hands* ([4.2.24](#)) and feet

6.2.3

firehood

item worn directly in contact with the head to protect exposed parts of the head and neck where the protective coat/helmet/respiratory protective device (RPD) facepiece interface

[SOURCE: ISO/TR 19591:2018, 3.106]

6.2.4

reflective protective clothing for specialized firefighting

protective clothing ([5.1.1](#)) designed to provide protection against high levels of radiant, convective, and contact heat, relying on the ability of the *outer materials* ([4.3.27](#)) to reflect intense *radiant heat* ([6.5.43](#)), and appropriate for specialized firefighting operations

6.3 Terms and definitions of components and materials

This sub-clause is empty of terms and definition but is kept for the structure consistency of this document.

6.4 Terms and definitions of risks and hazards

6.4.1

approach fire fighting

interior attack firefighting

activities of rescue, fire suppression and property conservation generally performed in the interior or in the immediate vicinity of the fire of the involved structure conducted at a distance involving very high levels of radiant, convective and contact heat and which may involve voluntary direct entry into flames

Note 1 to entry: Fires can be from bulk flammable gas and bulk flammable liquid fires.

6.4.2

entry fire fighting

specialized fire fighting (6.4.4) operations which may involve voluntary direct entry into flames

Note 1 to entry: Entry fire fighting can include the activities of rescue and fire suppression at incidents involving very high levels of radiant, convective and contact heat, such as aircraft fires, bulk flammable gas and bulk flammable liquid fires.

6.4.3

proximity fire fighting

specialized fire fighting (6.4.4) operations, which may include the activities of rescue and fire suppression at incidents involving very high levels of radiant, convective and contact heat, which are conducted close to the fire but do not involve fire entry

Note 1 to entry: Fires can be aircraft fires, bulk flammable gas and bulk flammable liquid fires.

6.4.4

specialized fire fighting

fire fighting operations involving approach, *proximity* (6.4.3) or *entry fire fighting* (6.4.2)

6.4.5

burn injury

burn damage which occurs at various levels of depth with human tissues

Note 1 to entry: Burn injury in human tissue occurs when the tissue is heated and kept at an elevated temperature for a critical period of time. The amount of burn injury, first, second, or third-degree depends upon the level of the elevated temperature and the duration of exposure.

6.4.6

first-degree burn injury

first-degree burn

burn damage in which only the superficial part of the epidermis has been injured

Note 1 to entry: The skin turns red, but does not blister or actually burn through. First-degree burn injury is reversible.

6.4.7

second-degree burn injury

second-degree burn

burn in which the epidermis and a varying extent of the dermis are burned, but the entire thickness of the dermis is not destroyed and the subcutaneous layer is not injured

6.4.8

second-degree burn injury area

second-degree burn area

sum of the areas represented by *heat flux sensors* (6.5.33) which calculate a *burn injury* (6.4.5) at the epidermis/dermis interface in human tissue

6.4.9

third-degree burn injury

third-degree burn

irreversible burn damage at the dermis/subcutaneous interface in human tissue

6.4.10

third-degree burn injury area

third-degree burn area

sum of the areas represented by the *heat flux sensors* (6.5.33) which calculate a *burn injury* (6.4.5) at the dermis/subcutaneous interface in human tissue

6.4.11

total area of predicted burn injury

sum of the areas represented by the *heat flux sensors* (6.5.33) which calculate at least a *second-degree burn injury* (6.4.7)

6.4.12

pain threshold

skin temperature at which pain occurs

Note 1 to entry: It is generally assumed that heat *pain threshold* (6.4.12) is 43 °C and the cold *pain threshold* (6.4.12) is 15 °C.

6.4.13

hyperthermia

thermal state of a human body where core temperature raises above 38 °C

6.4.14

time to pain

time taken for the pain receptors to reach 43,2 °C

6.4.15

support activities of firefighting

activities executed by firefighters who are not involved in *interior attack firefighting* (6.4.1)

EXAMPLE Support activities of firefighting can be:

- water and material supply
- extinguishing fires from the outside of the structure
- prevention of exterior spreading to adjacencies, preventing environmental damage and limiting effect of smoke
- securing traffic and environment
- first aid base activities
- preparing the fire ground for subsequent activities
- RPD replenishment tasks
- assessment zone
- BA communication
- forward command post

- evacuation
- assist planning
- assist logistics
- assist communication
- transportation

6.5 Terms and definitions of test methods

6.5.1

flame application time

time for which the ignition flame is applied to the test specimen

6.5.2

flame distribution

spatial distribution of incident flames from test facility burners which provides a controlled heat flux density over the manikin surface

6.5.3

inherent flame resistance

flame resistance that is derived from the essential characteristic of the fibre or polymer

6.5.4

horizontal reach

horizontal projection of the igniting flame with the burner in a horizontal position, measured as the distance between the tip of the burner and the extreme end of the yellow part of the flame when viewed in a dim light

6.5.5

ignition

initiation of combustion

6.5.6

embrittlement

charring

formation of a carbonaceous and brittle residue when *material* ([4.3.5](#)) is exposed to thermal energy

6.5.7

melt

<materials> respond to heat by flowing or *dripping* ([6.5.10](#))

6.5.8

melting

liquefaction of a *material* ([4.3.5](#)) when exposed to heat

6.5.9

drop

<protection against small splashes of molten metal> quantity of molten metal produced from the fusion of a metal rod by a welding torch, falling under the simultaneous action of its own weight and of the air movement produced by the welding torch

6.5.10

dripping

material response shown by flow of the *material* ([4.3.5](#)) and formation of falling droplets

6.5.11

hole

break in original structure of the test specimen's *fabric* (4.3.1) in any dimension and having a continuous perimeter caused e.g. by *melting* (6.5.8), glowing or flaming

6.5.12

debris

material (4.3.5) separating from the specimen during the test procedure and falling from the specimen without flaming

6.5.13

flaming debris

material (4.3.5) separating from the specimen during the test procedure and falling below the initial lower edge of the specimen and continuing to flame as it falls

6.5.14

molten debris

<protection against heat or flame> molten material separating from the specimen during the test procedure and falling from the specimen without flaming

6.5.15

separate

respond to heat by splitting, delamination or flaking

6.5.16

sticking

response evidenced by softening of a *material* (4.3.5) and adherence of one material to the surface of itself or another material

6.5.17

afterflame

persistence of flaming of *material* (4.3.5) under specified test conditions, after the *ignition* (6.5.5) source has been removed

6.5.18

char

charring (6.5.6) residue

6.5.19

afterflame time

duration of flame length of time for which a *material* (4.3.5) continues to flame, under specified test conditions, after the *ignition* (6.5.5) source has been removed

6.5.20

afterglow

persistence of glowing combustion of a *material* (4.3.5) under specified test conditions, after cessation of flaming or, if no flaming occurs, after removal of the *ignition* (6.5.5) source

Note 1 to entry: Afterglow is a continuation of combustion with the evolution of heat and light but without flame. Some materials absorb heat during the flame application and continue to emit this absorbed heat after removal of the igniting flame. This glowing without combustion should not be recorded as afterglow.

6.5.21

afterglow time

duration for which a *material* (4.3.5) continues to *afterglow* (6.5.20), under specified test conditions after cessation of flaming or after removal of the *ignition* (6.5.5) source, ignoring glowing debris

6.5.22

break-open

formation of a *hole* (6.5.11) in the *material* (4.3.5) during thermal exposure

6.5.23**change in appearance of the specimen**

<heat and flame> any change in appearance of the *material* (4.3.5) such as *shrinkage* (4.6.3), formation of *char* (6.5.18), discoloration, scorching, glowing, *melting* (6.5.8) etc.

6.5.24**contact temperature**

<protection against heat or flame> surface temperature of the contact area of the heating cylinder which is kept constant

6.5.25**exposure energy**

maintained thermal energy that is incident to the test specimen

6.5.26**exposure time**

total time over which the *exposure energy* (6.5.25) is applied to the test material

6.5.27**limited flame spread index**

<protection against heat or flame> a number indicating that the *material* (4.3.5) or *material assembly* (4.3.28) achieved a specific *level of performance* (5.1.8)

6.5.28**incident heat flux density**

amount of energy incident per unit time on the exposed face of the calorimeter

Note 1 to entry: Incident heat flux density is expressed in kW/m².

6.5.29**Stoll curve**

relationship between the amount of thermal energy transferred to human tissue and the time of exposure which predicts a second-degree burn in human tissue

6.5.30**human-tissue heat tolerance**

amount of thermal energy transferred to human tissue which predicts a reaction in human tissue, such as a pain sensation or a second-degree burn

6.5.31**thermal-threshold index****TTI**

time for the heat transmitted through a *material* (4.3.5) to just cause a second-degree burn in human tissue

Note 1 to entry: TTI is expressed in seconds.

6.5.32**heat flux**

thermal intensity indicated by the amount of energy transmitted per unit area and per unit time

6.5.33**heat flux sensor**

device capable of directly measuring the *heat flux* (6.5.32) density to the manikin's surface under test conditions, or of providing data that can be used to calculate the *heat flux* (6.5.32) density

6.5.34

heat transfer index

HTI

whole number calculated from the mean time to achieve a specified temperature rise under specified heat transmission from a flame application and a starting temperature

Note 1 to entry: Temperature rise of 24 °C is usually applied.

6.5.35

heat-transfer index-thermal

HTI-T

whole number calculated from the mean time to achieve a specified temperature rise under specified combined convective and *radiant heat* ([6.5.43](#)) exposure and a starting temperature

Note 1 to entry: Temperature rises of 12 °C and 24 °C are usually applied.

6.5.36

heat-transfer burn time

time from the start of the thermal exposure to heat transfer burn intersection

6.5.37

heat transfer levels

t_{12} , t_{24}

level given by the time t_{12} or t_{24} expressed in seconds, to achieve a calorimeter temperature rise of 12 °C or 24 °C

6.5.38

heat transmission factor

fraction of heat transmitted through a specimen exposed to a source of *radiant heat* ([6.5.43](#))

Note 1 to entry: It is numerically equal to the ratio of the transmitted to the *incident heat flux density* ([6.5.28](#)).

6.5.39

heat-transfer burn intersection

point at which the thermal energy transferred through the *material* ([4.3.5](#)) intersects the point on a *Stoll curve* ([6.5.29](#)) where a *second-degree burn injury* ([6.4.7](#)) is predicted to take place

6.5.40

molten metal splash index

figure equal to the minimum mass of molten metal poured which just causes damage to the PVC sensor film

6.5.41

percentage heat transmission factor

TF%

percentage of heat received by the calorimeter when a test specimen is placed in front of it.

Note 1 to entry: It is numerically equal to the percentage ratio of the transmitted to the *incident heat flux density* ([6.5.28](#)).

6.5.42

predicted total area of burn injury

sum of the areas represented by the heat flux sensors which calculate at least a *second-degree burn injury* ([6.4.7](#))

6.5.43

radiant heat

heat communicated by energy propagated through space and transmitted by electromagnetic waves

6.5.44**radiant heat transfer index****RHTI**

whole number calculated from the mean time to achieve a specified temperature rise under specified *incident heat flux density* (6.5.28) and a starting temperature

Note 1 to entry: Temperature rise of 24 °C is usually applied.

6.5.45**response to heat exposure**

observable response of the textile to the energy exposure as indicated by *break-open* (6.5.22), *melting* (6.5.8), *dripping* (6.5.10), *charring* (6.5.6), *embrittlement* (6.5.6), *shrinkage* (4.6.3), *sticking* (6.5.16) or *ignition* (6.5.5)

6.5.46**resultant basic thermal insulation**

$I_{cl,r}$

thermal insulation (4.6.6) from skin to *outer garment* (4.3.16) surface under defined conditions measured with a moving manikin

Note 1 to entry: The resultant basic thermal insulation value is determined in relation to the naked body surface area. The value is given in $m^2 K W^{-1}$ or in clo with the following conversion factor: 1 clo = 0,155 $m^2 K W^{-1}$.

6.5.47**resultant thermal insulation of boundary air layer**

$I_{a,r}$

<protection against cold> resistance against heat exchange by radiation and convection from the bare skin or the *outer garment* (4.3.16) surface to the ambient atmosphere measured with a moving manikin

6.5.48**resultant total thermal insulation**

$I_{t,r}$

<protection against cold> *total thermal insulation* (4.6.8) from skin to ambient atmosphere including garment and boundary air layer under defined conditions measured with a moving manikin

7 Terms and vocabulary of protection against chemical hazards**7.1 General terms and definitions of protection against chemical hazards****7.1.1****chemical protection**

property that characterises the overall protective performance of a garment or protective *garment ensemble* (4.5.1) relative to how it prevents the intrusion of chemicals

Note 1 to entry: Intrusion of chemicals can occur through *penetration* (7.5.21) or *permeation* (7.5.13) of chemicals as solids, airborne particles, aerosols, liquids, and gases.

7.2 Terms and definitions of product types**7.2.1****chemical protective clothing**

combined *garment assembly* (4.3.30) worn to provide protection to the skin against exposure to or contact with chemicals

7.2.2

chemical protective suit

garment worn to protect against chemicals that covers the whole, or greater part of the body

Note 1 to entry: A chemical protective suit may comprise of garments combined together to provide protection to the body. A *suit* (4.5.13) may also have various types of additional protection such as hood or helmet, boots and *gloves* (4.5.5) joined with it.

7.2.3

chemical protective suit ensemble

combination of a *chemical protective suit* (7.2.2) with the wearer's respiratory protective equipment, *gloves* (4.5.5), boots, communications system, and cooling device, or some combination of those

7.2.4

gas-tight suit

gas-tight chemical protective garment

<protection against chemicals> one-piece garment with hood, *gloves* (4.5.5) and boots/booties which, when worn with appropriate respiratory devices, provides the wearer a high degree of protection against harmful liquids, particles and gaseous or vapour contaminants

7.2.5

protective clothing against radioactive contamination

protective clothing (5.1.1) intended to provide protection to the skin and if required to the respiratory tract against radioactive contamination

7.2.6

non-ventilated protective clothing

protective clothing (5.1.1) which provides protection against *particulate radioactive contamination* (7.4.2) for the whole body except for the respiratory tract, face, *hands* (4.2.24), and feet, and which is not supplied with clean air

7.2.7

ventilated protective clothing

<protection against particulate radioactive contamination> *protective clothing* (5.1.1) which provides protection against *particulate radioactive contamination* (7.4.2) for the respiratory tract and the whole body and which is supplied with breathable air ensuring internal ventilation and overpressure

7.2.8

limited use chemical protective garment

chemical *protective garment* (5.1.2) for limited duration of use, i.e. to be worn until hygienic *cleaning* (4.6.16) becomes necessary or chemical contamination has occurred and disposal is required

Note 1 to entry: This includes *protective garment* (5.1.2) for single use and for limited re-use according to the information supplied by the manufacturer.

7.3 Terms and definitions of components and materials

7.3.1

pass-through

pass-thru

<protection against chemicals> means by which compressed air can be passed through the wall of the garment for the purposes of breathing and/or ventilation

7.4 Terms and definitions of risks and hazards

7.4.1

radioactive contamination

presence of radioactive substances in or on a *material* (4.3.5) or in a place where they are undesirable or could be harmful

7.4.2**particulate radioactive contamination**

contamination by radioactive or radioactively contaminated solid particles

7.5 Terms and definitions of test methods**7.5.1****repellency**

characteristic to resist wetting and *penetration* (7.5.21) by a liquid

7.5.2**challenge chemical
test chemical**

liquid or gas that is used to challenge the *protective material* (5.1.6) specimen when testing

Note 1 to entry: The liquid or gas may be either one component (that is, a neat liquid or gas) or have several components (that is, a mixture).

7.5.3**test liquid**

test chemical (7.5.2) / *challenge chemical* (7.5.2) in form of liquid

7.5.4**aerosol**

suspension of solid, liquid or solid and liquid particles in gaseous medium

7.5.5**calibrated stain**

fluorescent or visible stain, with a defined minimum area, generated by dropping a specified quantity of test liquid on to an absorbent material

7.5.6**collection medium**

liquid or gas on the inner unexposed side of the test sample in which any permeated chemical is collected

7.5.7**inward leakage**

L_i

ingress of test particles from the outside of the chemical *protective garment* (5.1.2) to the inside

7.5.8**total inward leakage**

$L_{i,tot}$

ratio of the concentration of the test particles inside the *suit* (4.5.13) to the challenge concentration of test particles inside the test chamber

Note 1 to entry: The total inward leakage, $L_{i,tot}$, is expressed as percentage.

Note 2 to entry: The challenge concentration corresponds to 100%.

7.5.9**liquid-tight**

<protection against chemicals> resistant to *penetration* (7.5.21) by liquids in the form of a continuous jet

Note 1 to entry: This term covers "jet-tight" and "spray-tight".

7.5.10**nominal protection factor (100: L_i)**

ratio of the concentration of the contaminant in the ambient atmosphere to the concentration of contaminant inside the *suit* (4.5.13)

7.5.11

open-loop

<protection against chemicals> testing mode in which fresh *collection medium* (7.5.6) flows continuously through the collection chamber of the test cell and is not reused or recycled

7.5.12

closed-loop

<protection against chemicals> testing mode in which the *collection medium* (7.5.6) is continuously circulated or recycled

7.5.13

permeation

process by which a chemical moves through a protective clothing *material* (4.3.5) 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.

7.5.14

permeation mass

quantity of test chemical that passes through the *protective garment material* (5.1.5) within a given time

7.5.15

cumulative permeation mass

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

7.5.16

minimum detectable mass permeated

smallest mass of test chemical that is detectable with the complete permeation-test system

7.5.17

permeation rate

<protection against chemicals> mass of test chemical permeating a unit area of the test specimen per unit time

7.5.18

minimum detectable permeation rate

lowest rate of permeation that is measurable with the complete permeation-test system

7.5.19

cumulative permeation time

time at which the total quantity of chemical that has permeated through each square centimetre of *fabric* (4.3.1) has reached a predetermined mass

7.5.20

normalization permeation rate

permeation rate (7.5.17) used for determining the normalized breakthrough detection time

7.5.21

penetration

<protection against chemicals> process by which a chemical moves through pores, apertures or other openings in a *material* (4.3.5) or finished garment

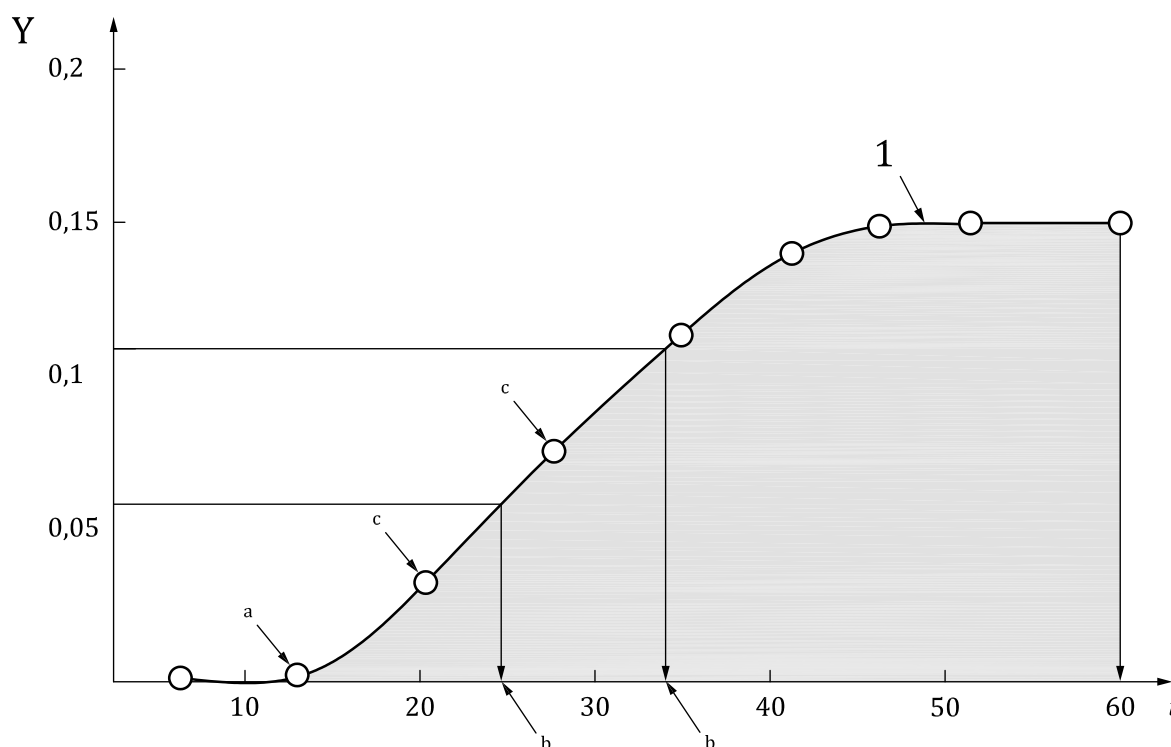
7.5.22

breakthrough detection time

time elapsed from the start of the test to the sampling time at which the test chemical is first detected.

Note 1 to entry: The breakthrough detection time is dependent on the sensitivity of the method and the frequency of sampling of the *collection medium* (7.5.6).

Note 2 to entry: See footnote a in [Figure 14](#).



Key

- 1 steady-state permeation
- t time (min)
- Y permeation rate ($\mu\text{g}/\text{cm}^2/\text{min}$)
- actual sampling data point
- a Breakthrough detection time.
- b Normalized breakthrough detection time.
- c Breakthrough time.

Figure 14 — Breakthrough detection time

7.5.23

normalized breakthrough detection time

time at which the permeation rate reaches the *normalization permeation rate* ([7.5.20](#))

Note 1 to entry: See footnote b in [Figure 14](#).

7.5.24

liquid retention

process by which a liquid is retained in a *material* ([4.3.5](#)) or finished garment

7.5.25

spray-tight

<protection against chemicals> resistant to *penetration* ([7.5.21](#)) by liquids in the form of a spray

7.5.26

absorbent overall

overall made from an absorbent *material* ([4.3.5](#)), worn under the test garment and intended for collecting liquid *penetration* ([7.5.21](#)) during spray and jet testing of chemical *protective garment* ([5.1.2](#))

8 Terms and vocabulary of protection against foul weather, wind and cold hazards

8.1 General terms and definitions of protective clothing

This sub-clause is empty of terms and definition but is kept for the structure consistency of this document.

8.2 Terms and definitions of product types

This sub-clause is empty of terms and definition but is kept for the structure consistency of this document.

8.3 Terms and definitions of components and materials

This sub-clause is empty of terms and definition but is kept for the structure consistency of this document.

8.4 Terms and definitions of risks and hazards

8.4.1

foul weather

specific conditions characterised by the combination of precipitation, rain and fog, ground humidity and wind at temperatures of -5°C and above

8.4.2

cold environment

specific conditions characterized by the combination of defined low temperatures, humidity, wind and thermal radiation

8.4.3

hypothermia

lowering of body temperature below normal

Note 1 to entry: Hypothermia begins when the condition in which the body core temperature is below 35°C .

8.5 Terms and definitions of test methods

8.5.1

IREQ

required garment insulation for the preservation of body heat balance at defined levels of physiological strain

Note 1 to entry: IREQ means Insulation required.

[SOURCE: ISO 11079:2007, 3.1.3, modified with "clothing" replaced by "garment", with addition of note 1 to entry]

9 Terms and vocabulary of protection against mechanical hazards

9.1 General terms and definitions of protection against mechanical hazards

9.1.1

chainsaw

portable powered saw with teeth on a saw chain

9.2 Terms and definitions of product types

9.2.1

abrasive blasting combination

combination of *protective garments* (5.1.2) protecting against the *risks* (5.4.3) arising in abrasive blasting operations and suitable respiratory protective equipment

9.2.3

chainsaw protective glove

product which protects the *back of the hand* (4.2.3) against cutting by a hand-held *chainsaw* (9.1.1)

9.2.4

footwear with integral protection

footwear in which the *chainsaw* (9.1.1) *protective material* (5.1.6) either comprises the *material* (4.3.5) of the footwear or is permanently attached to the footwear

9.2.5

protector

arrangement of energy absorbing and/or impact spreading *material* (4.3.5) designed as offering some protection against impact

9.2.6

body protector

sleeveless garment covering defined areas of the *torso* (4.2.1) and lower back and consisting of one or more layers of *material* (4.3.5) and designed to reduce injury from blunt impacts, falls and kicks

9.2.7

armour plate

<body armour> *material* (4.3.5) or combination of materials in a rigid structure intended to defeat particularly high energy, high velocity or armour piercing bullets and projectiles

Note 1 to entry: The materials are often formed into regular shaped plates that can be placed in pockets of the cover of a *bullet resistant vest* (9.2.8.1) which contains a *bullet resistant pack* (9.5.3).

9.2.8

resistant vest

<body armour> sleeveless garment covering part or all of the *torso* (4.2.1) and part of the abdomen in order to defeat perforation

Note 1 to entry: Normally a vest consists of a *cover* (9.2.10) or *carrier* (9.2.10) containing one or more packs that are designed to provide protection against one or more threats over the whole or the majority of the *torso* (4.2.1). The cover may also contain *modular inserts* (9.2.11.1) such as *armour plates* (9.2.7), and/or a trauma pack.

9.2.8.1

bullet resistant vest

<body armour> *resistant vest* (9.2.8) in order to defeat perforation by a bullet

9.2.8.2

knife resistant vest

<body armour> *resistant vest* (9.2.8) in order to defeat perforation by a knife

9.2.8.3

spike resistant vest

<body armour> *resistant vest* (9.2.8) in order to defeat perforation by a spike

9.2.9

trauma pack

<body armour> specific construction of *materials* (4.3.5) designed to be worn as part of a system with other specific components such as a cover and a *bullet resistant pack* (9.5.3)

Note 1 to entry: *Trauma packs* (9.2.9) are intended to reduce blunt trauma as indicated by a reduction in the indentation depth in ballistic testing. However, it is not proven that they are effective.

9.2.10
cover
carrier

<body armour> enclosing fabric garment into which the specific protective packs are inserted to complete the assembly of a particular specified *resistant vest* ([9.2.8](#))

9.2.11
covert body armour

body armour designed to be worn close to the body under a short, blouse or close-fitting knitted sweater or shirt

Note 1 to entry: It is normally intended that it should be inconspicuous and close fitting.

9.2.11.1
modular insert

<body armour> additional item that may be added to a bullet (knife, or needle and spike) resistant vest to enhance the level of protection or the number or threats against which it provides protection in specific areas

9.2.12
overt body armour

body armour designed to be worn on the top of other garments and often to be the outermost layer of garment

Note 1 to entry: The dimensions of overt body armour to fit an individual are greater than those of *covert body armour* ([9.2.11](#)), but the *size* ([4.4.9](#)) designation is the same for the same size of user.

9.2.13
horse rider protective jacket

<protection for horse riders> short-sleeved or long-sleeved garment incorporating *materials* ([4.3.5](#)) meeting the requirements for body *protectors* ([9.2.5](#)) and shoulder *protectors* ([9.2.5](#)) covering the defined areas of the *torso* ([4.2.1](#)), lower back and shoulders and designed to reduce injury from blunt impacts and falls

9.3 Terms and definitions of components and materials

This subclause is empty of terms and definition but is kept for the structure consistency of this document.

9.4 Terms and definitions of risks and hazards

9.4.1
laceration

tearing of the skin that results in an irregular wound

Note 1 to entry: Lacerations may be caused by injury with a sharp object or by impact injury from a blunt object or force.

9.4.2
blunt trauma

injuries resulting from energy transfer in impacts to the body that do not cause breakage of the skin

Note 1 to entry: The injury may be caused by a direct blow with a bar or baseball bat, or it is claimed by transferred energy from body armour that has defeated perforation by a bullet or a knife. The injuries constituting blunt trauma vary from slight bruising through temporary incapacity to major internal organ damage and death. The expression "behind body armour ballistic trauma" is sometimes used. No correlation is accepted between Plastilina deformation in ballistic or stab testing and blunt trauma.

9.4.3**contusion****bruise**

injury usually caused by a blunt impact in which the skin is not broken

Note 1 to entry: Underlying soft tissue is damaged by compression and by shearing forces. Fine blood vessels are damaged leading to bleeding, discoloration and swelling.

9.4.4**penetrating ballistic trauma**

injuries resulting from the passage of a bullet or similar projectile through the skin

Note 1 to entry: The injuries vary from slight to massive and fatal.

9.5 Terms and definitions of test methods**9.5.1****bullet resistance**

<body armour> property of a *material* (4.3.5) or combination of materials, reflecting their ability to defeat perforation by a bullet or similar projectile

9.5.2**bullet-resistant**

material (4.3.5) or product showing *bullet resistance* (9.5.1)

9.5.3**resistant pack**

<body armour> specific construction of layers of *materials* (4.3.5) designed to be worn in a specific cover and to provide a specified protection against one or more threats with a bullet or knife or spike

9.5.4**"shoot" pack****"stab" pack**

<body armour> specially constructed panel of *material* (4.3.5) replicating that in specific body armour used solely in quality assurance and developmental work

9.5.5**strike face**

<body armour> outer surface of a sample or a test specimen to be struck by a projectile or test blade or spike

9.5.6**back face**

<body armour> inner surface of a sample or a test specimen that is against the body

9.5.7**impact areas**

<impact protectors> areas of the body which are at greatest *risk* (5.4.3) of impacts

9.5.8**angle of impact**

<body armour> angle between the line of flight of the bullet, knife or spike and the line normal to the *strike face* (9.5.5) of the test specimen

9.5.9**edge separation distance**

<body armour> distance between a point of impact and the nearest line marking the edge of the *zone of protection* (5.4.4)

9.5.10

hit separation distance

<body armour> distance between the points of impacts in ballistic or stab testing

9.5.11

fair shot

fair impact

<body armour> shot that conforms to the test procedure requirements with respect to velocity, *angle of impact* (9.5.8), and point of impact

9.5.12

unfair shot

unfair impact

<body armour> shot that fails to conform to the test procedure requirements with respect to velocity, *angle of impact* (9.5.8), and point of impact

9.5.13

fair test sequence

<body armour> any test sequence consisting entirely of *fair shots* (9.5.11) or a sequence with *unfair shots* (9.5.12) in it, in which the test specimen meets the pass criteria

9.5.14

indentation depth

<body armour> maximum depth of the indentation made in the *backing material* (4.6.20) in an impact test

Note 1 to entry: The depth is measured relative to the original front surface of the *backing material* (4.6.20) as indicated by the level of surrounding undisturbed material.

9.5.15

penetration

<body armour> result of the process by which the *back face* (9.5.6) is completely traversed

Note 1 to entry: Penetration can be reached by a bullet or any fragment of it or by any rigid part of the test specimen (metal, ceramic or composite) or by a knife or spike tip protruding the *backing material* (4.6.20) of more than 1 mm.

9.5.16

penetration depth

<body armour> maximum depth of *penetration* (9.5.15) of the tip of a knife blade, needle or spike into the *backing material* (4.6.20)

Note 1 to entry: The penetration depth is measured from the surface of the *backing material* (4.6.20) in the indentation caused by the *back face* (9.5.6) of the test specimen.

9.5.17

chain braking

<protection for users of hand-held chain saws> effect whereby fibres or other *materials* (4.3.5) of the *personal protective equipment* (5.1.11) slow down the speed of the saw chain

9.5.18

chain stopping time

period of time taken for the saw chain to decelerate from a specified speed to a complete stop once the power has been disconnected

9.5.19

free-running stopping time

time for the flywheel to come to a complete stop once the power has been disconnected when there is no chain fitted to the guide bar

9.5.20**chain slipping**

protective effect whereby the saw chain slides over the surface of the *protective material* (5.1.6) without cutting it

9.5.21**threshold chain speed**

maximum speed which a sample can withstand during testing without cut-through occurring

9.5.22**clogging**

<protection for users of hand-held chain saws> effect whereby fibres, yarns or other *materials* (4.3.5) are drawn by the saw chain into the saw unit, thereby stopping the movement of the saw chain

9.5.23**cut-through**

<protection for users of hand-held chain saws> visible change on the underside of the innermost layer of the test sample caused by the saw chain

Note 1 to entry: Usually the specified length is 10 mm.

9.5.24**cut-through**

<protection against cutting> result of the process by which the first *penetration* (9.5.15) of the blade edge through the test specimen contacts the substrate

9.5.25**cutting line**

<protection for users of hand-held chain saws> tangent to the curve made by teeth of the saw chain at the point where it contacts a test specimen

9.5.26**cutting force**

calculated force that would be required to be applied to a blade of standard sharpness to just cut through a *material* (4.3.5) in a blade stroke of a specified length

Note 1 to entry: Usually the specified length is 20 mm.

9.5.27**cutting stroke length**

distance the cutting edge travels before *cut-through* (9.5.23, 9.5.24) occurs

9.5.28**interstice**

space or opening between two or more elements of a structure

Note 1 to entry: In knife resistant materials (body armour), interstices are the spaces between plates or rings or other hard units. In protection against cuts and stabs, a structure is a garment's protective surface.

9.5.29**resistance to cutting**

property describing the various ways to penetrate a *protective material* (5.1.6) with or as if with a sharp-edged object

Note 1 to entry: Sharp-edged object might be chain of a *chainsaw* (9.1.1), knives, sheet metal parts, swarf, glass, bladed tools or castings.

9.5.30**test blade**

<body armour> steel blade with at least one sharpened edge specified for use in tests

9.5.31

supplied test blades

<body armour> *test blade* (9.5.30) as supplied by the manufacturer with ground, or ground and honed edge

9.5.32

prepared test blades

<body armour> *test blade* (9.5.30) after verification of its dimensions, polishing on an oilstone, and examination

9.5.33

tearing blade

<resistance to puncture and dynamic tearing of materials> blunt blade projecting from the falling mass which punctures and tears the test specimen

Note 1 to entry: The hard steel tearing blade has a ground wedge shaped end that has a radius of curvature so that it is not sharp, but will puncture test materials. The main body of the blade is 3 mm thick and the lower surface is half round. This lower surface causes the blunt tear in the test specimen that is measured in the test. This blade performs the same function as the spike in ASTM D 2582-90, but it is more rigid so is capable of withstanding greater forces.

9.5.34

knife stab resistance

<body armour> property of a *material* (4.3.5) or combination of materials reflecting their ability to defeat perforation by a knife or similar weapon with at least one sharpened edge

9.5.35

knife stab resistant

<body armour> *material* (4.3.5) or product showing knife resistance

9.5.36

spike or needle stab resistance

<body armour> property of a *material* (4.3.5) or combination of materials reflecting their ability to defeat perforation by a sharp spike, narrow chisel, or a needle

9.5.37

spike or needle stab resistant

<body armour> *material* (4.3.5) or product showing *spike or needle stab resistance* (9.5.36)

9.5.38

glove vibration transmissibility

<protective gloves against vibration> ratio of the acceleration measured on the palm adaptor of the gloved hand to the acceleration measured on the instrumented handle

Note 1 to entry: Glove vibration transmissibility values greater than 1 indicate that the *glove* (4.5.5) amplifies the vibration, and values lower than 1 indicate that the *glove* (4.5.5) attenuates the vibration.

[SOURCE: ISO 10819:2013, 3.1]

9.5.39

puncture resistance

maximum force required to push a spike with a specified speed through the test specimens

Note 1 to entry: The puncture resistance is expressed in newtons.