
**Protective clothing — Aprons, trousers
and vests protecting against cuts and
stabs by hand knives**

*Vêtements de protection — Tabliers, pantalons et vestes de protection
contre les coupures et les coups de couteaux à main*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 13998 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 13, *Protective clothing*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this standard, read "...this European Standard..." to mean "...this International Standard...".

Annex ZZ provides a list of corresponding International and European Standards for which equivalents are not given in the text.

For the purposes of this International Standard, the CEN annex regarding fulfilment of European Council Directives has been removed.

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Foreword

This document (EN ISO 13998:2002) has been prepared by Technical Committee CEN/TC 162, "Protective clothing including hand and arm protection and lifejackets", the secretariat of which is held by DIN, in collaboration with Technical Committee ISO/TC 94/SC 13 "Personal safety — Protective clothing and equipment".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2003, and conflicting national standards shall be withdrawn at the latest by June 2003.

This document supersedes EN 412:1993

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

The annexes A and B are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard : Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

Protective aprons, trousers and vests that offer some protection against stabs and slashes are used in work where a knife is moved towards the users' body, especially when working with hand knives in slaughterhouses, in the meat, fish and shell fish processing industries, in large-scale catering establishments, and in manual boning-out operations to process meat, fish, game and poultry. Protective aprons, trousers and vests that offer some protection against stabs and slashes may also offer adequate protection for those working with hand knives in the plastics, leather, textile and paper industries, when laying flooring and in similar tasks.

Performance level 1 aprons, trousers and vests as specified in this standard provide some cut protection and are only appropriate where the work is light, and where powerful cutting movements towards the body do not occur (see annex A).

Performance level 2 aprons, trousers and vests are appropriate for use in slaughter houses and in boning operations and in processing industries when narrow bladed knives are used in cutting actions in which the point of the knife is not directed towards the body. They are appropriate when broad bladed knives are used in cutting actions in which the point of the knife may be directed towards the body.

Attention is drawn to legislation and other standards concerning public health in the food industry and hygiene in the meat processing industries, that might apply to the construction, construction materials and cleaning of protective aprons, trousers and vests and associated straps and fasteners.

1 Scope

This European Standard applies to protective aprons trousers and vests for use with hand knives, and to other garments providing similar protection to parts of the body in accidents. It specifies requirements for the design, penetration resistance, cut resistance, sizing, ergonomic characteristics, innocuousness, water permeability, cleaning and disinfection, marking and information to be supplied by the manufacturer for users of protective aprons, trousers and vests. It also describes the classification of protection levels and appropriate test methods.

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2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this draft revision of the European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments).

EN 340:1993, *Protective clothing - General requirements*.

EN 1082-1:1996, *Protective clothing — Gloves and arm guards protecting against cuts and stabs by hand knives — Part 1: Chain mail gloves and arm guards*.

EN ISO 13997, *Protective clothing — Mechanical properties — Determination of resistance to cutting by sharp objects (ISO 13997:1999)*.

EN 20811:1992, *Textiles — Determination of resistance to water penetration — Hydrostatic pressure test*.

3 Terms and definitions

For the purposes of this European standard the following terms and definitions apply:

3.1

apron

a garment covering the front of the body from the chest to the legs

3.2

divided apron

an apron the protective surface of which is vertically divided in the thigh region and restrained to each leg, see Figure 1a

3.3

protective trousers

a garment worn below the waist and provided with separate legs. The protective surface may be confined to certain parts of the garment, see Figure 1b

3.4

protective vest

a garment worn on the torso of the body and covering the chest down to at least the waist, the shoulders, and parts of the upper arms. The protective surface may be confined to certain parts of the garment see Figure 1c and d

3.5

protective surface

that part of a garment that is constructed of material designed to resist penetration by hand knives

3.6

protective material

the material(s) of which the protective surface of a garment is constructed

NOTE This material may be metal chain mail or linked metal plates or materials with the same function.

3.7

interstice

the space or opening between two or more elements of a garment's protective surface

3.8

cover or covering materials

the material that may be used to construct a surrounding bag or a one-sided cover for the protective materials out of which a protective garment is constructed

3.9

apron support

the means by which the apron is supported on the body while the apron is in use. Apron supports may be:

- shoulder straps in X-form as shown in figure 2a, and an independent waist belt;
- shoulder straps connected to the waist belt in Y-form as shown in figure 2b;
- sleeveless coats or harnesses to which the protective apron is attached;
- or extensions of the protective material to form an entire garment, e. g., a sleeveless coat with a short back and long front as shown in Figure 1c and d

3.10

ultra narrow knife

a knife with a blade less than 8 mm wide, 20 mm from the tip. (See also Annex A)

3.11

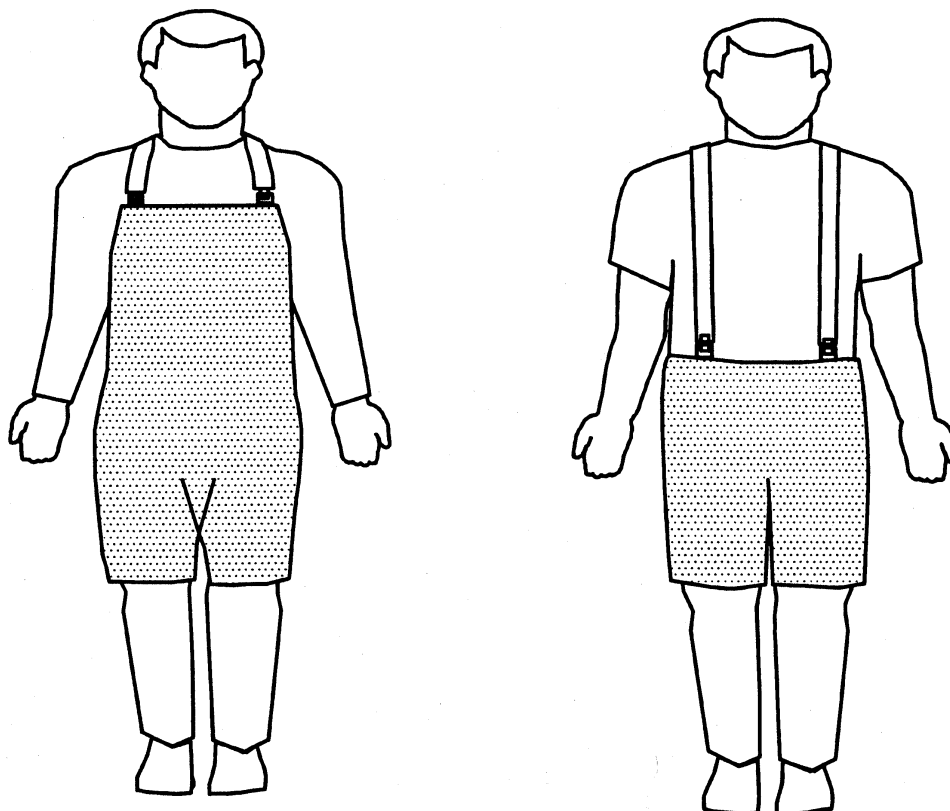
narrow knife

a knife with a blade between 8 mm and 12,5 mm wide, 20 mm from the tip

3.12

broad knife

a knife with a blade more than 12,5 mm wide, 20 mm from the tip

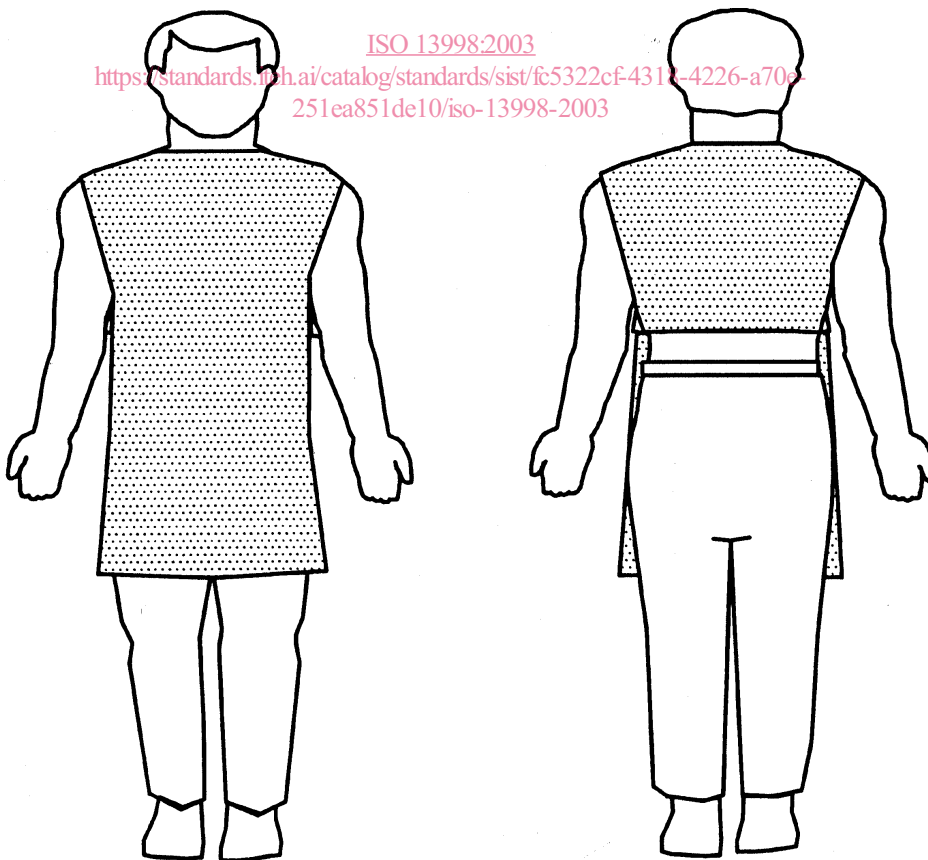


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a) A divided apron showing the overlap providing coverage at the top of the division

b) Shorts, front view

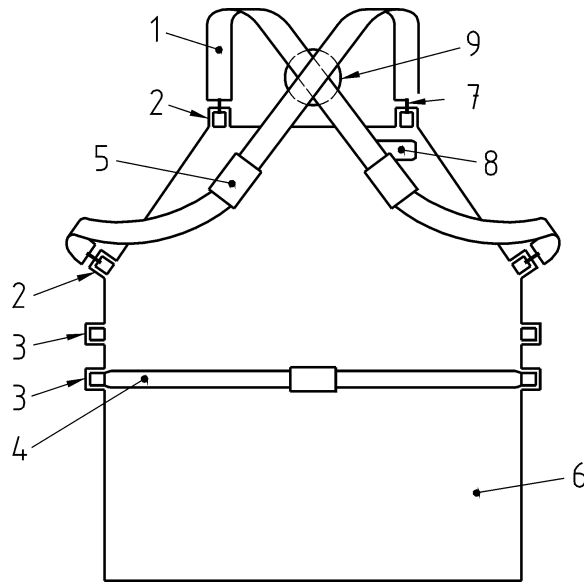
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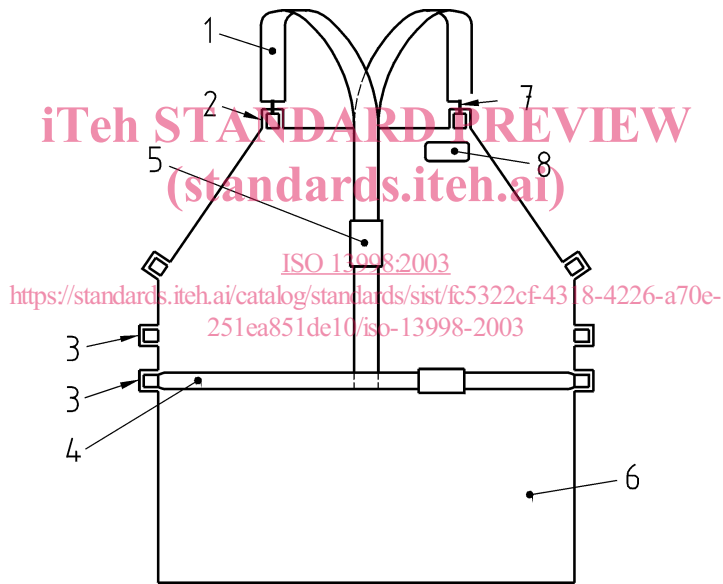
c) Vest, Coat or Tee-shirt style apron; front view

d) Vest, Coat or Tee-shirt style apron; back view

Figure 1 — Types of protective garment other than flat aprons



a — X form shoulder straps



b — Y form shoulder straps

Key

- 1 Shoulder strap
- 2 Shoulder strap fastening points
- 3 Waist belt fastening points
- 4 Waist belt
- 5 Adjuster for altering the strap length
- 6 Protective surface
- 7 Fastener
- 8 Identifying mark which is only visible on the outer surface
- 9 Restraining buckle through which the straps can slide independently

Figure 2 — Straps and belts of aprons

3.13**fastening point**

a loop or ring that is an integral part of the garment and to which straps or a belt can be attached

3.14**fastener**

the means by which a removable strap or belt is attached to the fastening point on the garment

3.15**outer surface identifying mark**

a mark on the outer surface of the garment indicating it is the outer surface

3.16**waist line**

the horizontal line marking the plane at the level of the top of the hip bones (supra cristal plane)

3.17**central point of an apron or vest on the chest**

the point on the midline of the apron at a distance of $\frac{1}{2} l_2$ above the waist line (see figure 3)

4 Performance level classification

The performance level number designates the degree of the protection that it is intended the garment should provide. This number is used in designating the test severity to which the garment is to be subjected.

NOTE Level 1: These garments are suitable for working situations where the level of hazard is low such as when only broad bladed knives are used. (See informative annex A).

NOTE Level 2: These garments are suitable for working situations where the level of hazard is higher such as when narrow boning-out knives are used on large carcasses.

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5 Requirements**5.1 Innocuousness**

Protective equipment shall be designed and manufactured to provide protection when used according to the manufacturer's instructions, without endangering the user or other persons. Construction materials and incorporated substances shall not endanger those coming into contact with them: the manufacturer or his representative in the European Union shall list in the Information Supplied by the Manufacturer, the names of all substances contained in the garment which are generally known to cause allergies or to be sensitizers as required in clause 9. There shall not be hard or sharp edges, seams, buckles or other items on the surfaces, edges or fasteners of the garments that could harm users or other persons. Examinations shall be made according to 7.3.

5.2 Sizing

Protective equipment shall be marked with its size as required in clause 8. In accordance with EN 340:1993 the size shall be related to the height (stature), to the chest girth (or bust girth) and to the waist girth of the user the garment is intended to fit, and this shall be explained in the Information Supplied by the Manufacturer, see clause 9. Protective garments not extending above the waist shall be sized against the user's height and waist girth only. Dimensions and size marking shall be verified in accordance with 7.4.

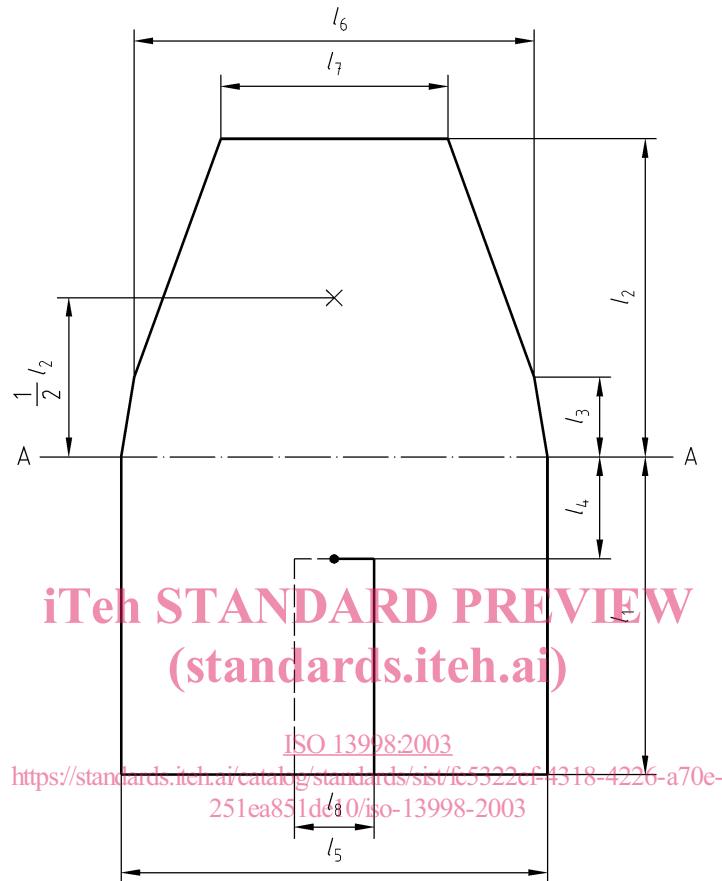
5.3 Minimum dimensions of zones of protection**5.3.1 Performance Level 1 and performance Level 2 Aprons**

Protective aprons meeting either performance level, shall have a protective zone the dimensions of which shall be related to the size of the intended users.

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The dimensions and position of the zone of protection relative to the overall coverage provided by the garment shall be given in the Information Supplied by the Manufacturer, see clause 9. The minimum zone of protection specified below shall be symmetrical about the vertical midline.

The minimum dimensions of the zone of protection shall be determined by the largest size of user the apron is designed to fit, according to the values in Table 1. These dimensions are illustrated in figure 3. The dimensions of the zone of protection shall be verified according to the method given in 7.5.1.



Key

- l_1 to l_8 Dimensions given in Table 1
- A – A The waist line as determined when the apron is worn
- X Defined central point on the chest

Figure 3 — Dimensions of the zones of protection of level 1 aprons