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

ICS 13.340.10

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Health, Labour and Welfare and the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal of establishing a Japanese Industrial Standard from Japan Society Appliances Association (JSAA)/Japanese Standards Association (JSA) with the draft of Industrial Standard based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

This Standard has been made based on **ISO 13998:2003** *Protective clothing—Aprons, trousers and vests protecting against cuts and stabs by hand knives* for the purposes of making it easier to compare this Standard with International Standard; to prepare Japanese Industrial Standard conforming with International Standard; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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

Introduction This Japanese Industrial Standard has been prepared based on the first edition of **ISO 13998** *Protective clothing—Aprons, trousers and vests protecting against cuts and stabs by hand knives* published in 2003 with some modifications of the technical contents.

The portions underlined with dots are the matters modified from the original International Standard. A list of modifications with the explanations is given in Annex 1 (informative).

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.

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 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.

1 Scope This 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.

NOTE : The International Standard corresponding to this Standard is as follows.

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

ISO 13998:2003 *Protective clothing—Aprons, trousers and vests protecting against cuts and stabs by hand knives* (MOD)

2 Normative references The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. If the indication of the year of coming into effect is given to these referred standards, only the edition of the indicated year constitutes the provision of this Standard but the revision and amendment made thereafter do not apply.

JIS L 1092:1998 *Testing methods for water resistance of textiles*

NOTE : **ISO 811**:1981 *Textile fabrics—Determination of resistance to water penetration—Hydrostatic pressure test* is equivalent to the said standard.

JIS T 8005:2005 *Protective clothing—General requirements*

NOTE : **ISO 13688**:1998 *Protective clothing—General requirements* is equivalent to the said standard.

JIS T 8052:2005 *Protective clothing—Mechanical properties—Determination of resistance to cutting by sharp objects*

NOTE : **ISO 13997**:1999 *Protective clothing—Mechanical properties—Determination of resistance to cutting by sharp objects* is equivalent to the said standard.

JIS T 8121-1:2006 *Protective clothing—Gloves and arm guards protecting against cuts and stabs by hand knives—Part 1: Chain-mail gloves and arm guards*

NOTE : **ISO 13999-1**:1999 *Protective clothing—Gloves and arm guards protecting against cuts and stabs by hand knives—Part 1: Chain-mail gloves and arm guards* is identical with the said standard.

JIS Z 2245:2005 *Rockwell hardness test—Test method*

3 Terms and definitions For the purposes of this 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 1 a)]

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 1 b)]

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 1 c) 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

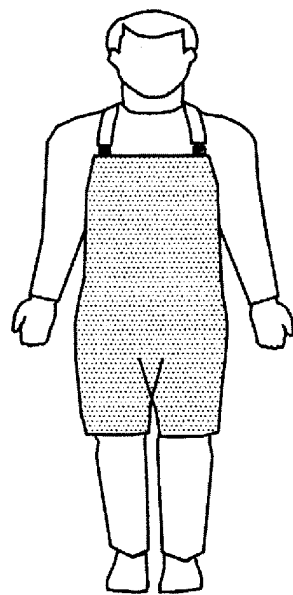
3.9 apron support the means by which the apron is supported on the body while the apron is in use

Apron supports may be:

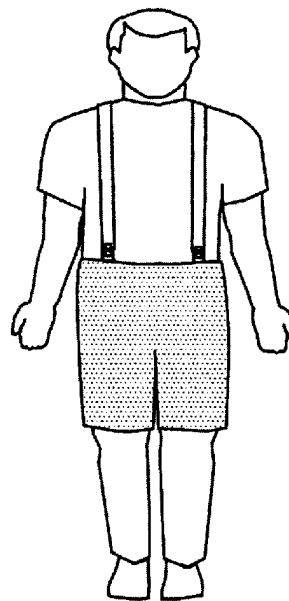
- shoulder straps in X-form as shown in figure 2 a), and an independent waist belt;
- shoulder straps connected to the waist belt in Y-form as shown in figure 2 b);
- sleeveless coats or harnesses to which the protective apron is attached;
- or extension of the protective material to form an entire garment,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

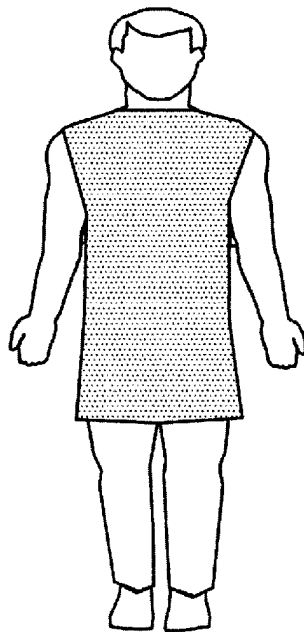


a) A divided apron showing the overlap providing coverage at the top of the division



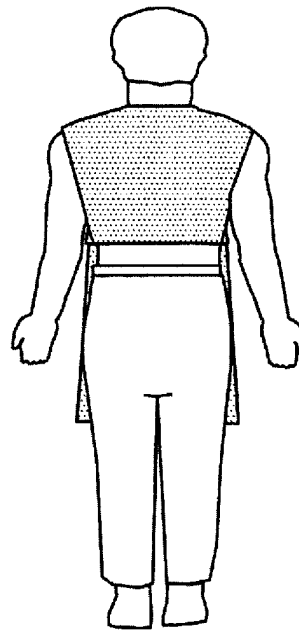
(Front view)

b) Shorts



(Front view)

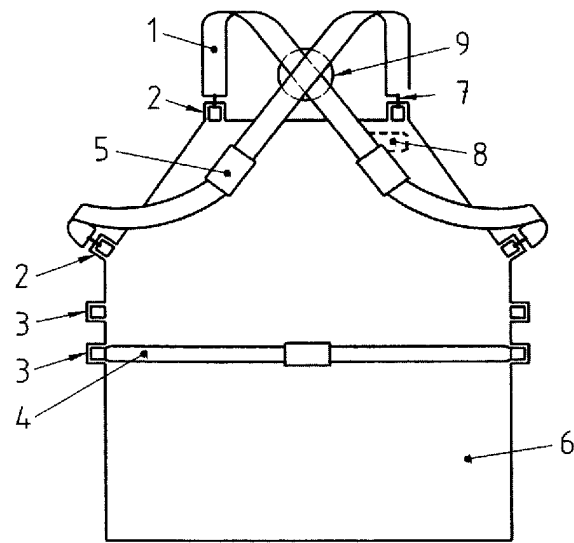
c) Vest, Coat or Tee-shirt style apron



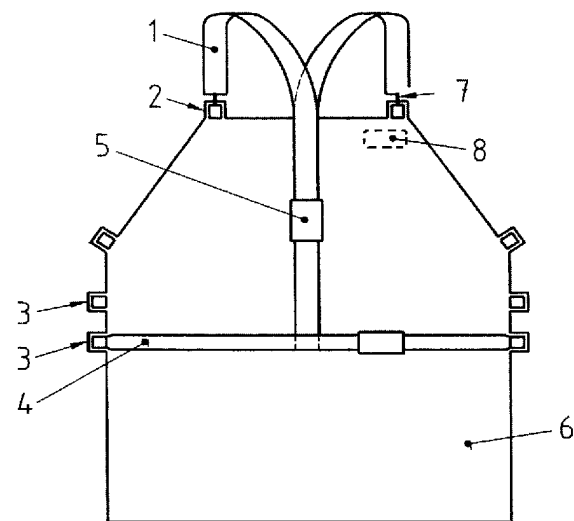
(Back view)

d) Vest, Coat or Tee-shirt style apron

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

3.12 broad knife a knife with a blade more than 12.5 mm wide, 20 mm from the tip

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)

3.18 cutting, cut an event in which a blade edge of a cutting tool travels on a material in such a way that a cut-through (penetration of blade edge of a cutting tool through the material) occurs

Information : “Incised wound” or “cut wound” is originally a medical term, which refers to a separation of connective tissue, without any skin peeling, caused by a blade travelling on the body surface in its longitudinal direction, but it can also be interpreted as meaning the movement of the blade causing such a wound on a human body.

3.19 garment an article of clothing, consisting of either a single layer or of multiple layers

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.

- NOTES
- 1 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 Annex A).
 - 2 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.

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 shall list in the information supplied by the manufacturer, the names of all substances possibly contained in the garment which are generally known to be sensitizers and give instructions on how to deal with actual event of allergies 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.

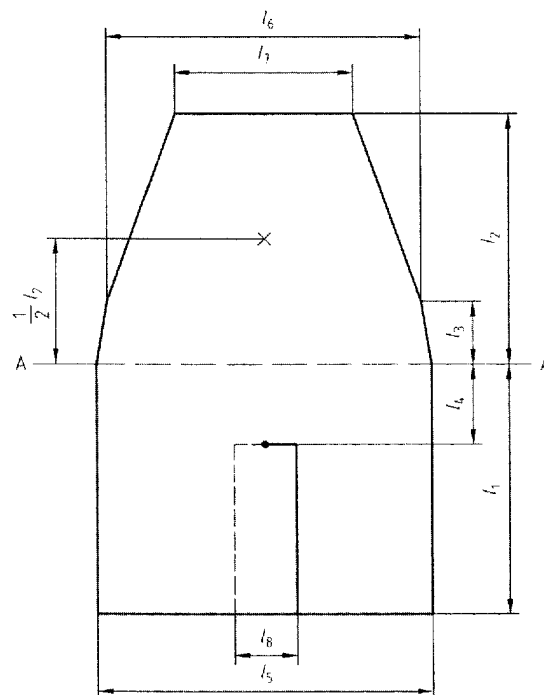
5.2 Sizing Protective equipment shall be marked with its size as required in clause 8. In accordance with **JIS T 8005** the size shall be related to the height (stature), to the chest girth (or bust girth) and to the waist girth of the user the garment is intended to fit, and this shall be explained 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.

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

Table 1 Minimum dimensions of the zone of protection of performance level 1 and level 2 aprons

Dimension (see figure 3)	Value of the dimensions of the apron expressed as a percentage of the control body dimension of the largest user the apron is specified to fit		
	height	chest or bust girth	waist girth
l_1	> 22 %	—	—
l_2	> 20 %	—	—
l_3	> 6 %	—	—
l_4 (a)	> 12 %	—	—
l_5	—	—	> 45 %
l_6	—	> 45 %	—
l_7	—	> 25 %	—
l_8 (a)	—	—	> 10 %
Note (a) Performance level 1 only			

5.3.2 Performance level 1 divided aprons The overall dimensions of divided aprons shall be as for undivided aprons except that the lower part may be divided by a vertical slit. This slit shall not extend higher than a point determined by the

dimension l_4 on figure 3 which shall not be less than 12 % of the height of the largest user the apron is intended to fit.

The protective material either side of the slit in divided aprons shall be increased in width so that the two sides overlap by not less than dimension l_8 in figure 3 when the apron is laid on a level surface.

5.3.3 Protective trousers Protective trousers shall have a continuous zone of protection from the waist to just above the knee. The zone of protection shall cover the anterior surfaces of the abdomen and thighs extending posteriorly to the mid-coronal plane of the body. The zone of protection shall have a width greater than 50 % of the circumference of the part of the body it is designed to protect. The vertical dimension of the zone of protection measured from the waist line towards the knee shall be not less than 30 % of the largest specified user's height. The dimensions of the zone of protection shall be verified according to the method given in 7.5.3.

5.3.4 Protective vests Protective vests shall have a continuous zone of protection from below the waist to cover the front of the chest, the top and back of the shoulders, and the upper half of the upper arms. The protective zone shall have a width greater than 45 % of the part of the body below the arm holes that is covered. The zone shall extend down the back of the shoulders to the lower level of the arm holes of the garment. The circumference of the neck inlet of the protective zone shall be less than 55 % of the chest circumference of the user the garment is designed to fit. The front length of the protective zone from the top of the shoulders shall be greater than 35 % of the height of the user the garment is designed to fit. The distance between the lower edge of the sleeve measured along the line from the elbow to the centre point of the back of the neck of the garment shall be greater than 42 % of the chest circumference of the user the garment is designed to fit. The dimensions of the zone of protection shall be verified according to the method given in 7.5.3.

5.4 Support and restraint of aprons, divided aprons and protective trousers

5.4.1 All garments Protective clothing shall be provided with support and restraint systems so that it does not become displaced in normal use or during an accident.

5.4.2 Restraint of aprons The maximum displacement of the defined central point of the apron on the chest, shall be 75 mm when a force of 30 N is applied in lateral and downwards directions as described in 7.6.

5.4.3 Apron supports All apron supports shall be adjustable in length and the adjusters shall be of a type that does not slip under load. No strap shall pull through a buckle more than 10 mm under a load of (100 ± 5) N during testing according to 7.6.1.

The apron support over the shoulder shall be at least 35 mm wide. The apron support around the waist shall be at least 25 mm wide. Provision shall be made so that any free end of a strap or belt can be secured to the straps, belt, or apron after adjustment of the apron support. Fastenings and adjusters shall be irremovable except by intent. Fastening points for X form and Y form straps shall be provided on at least as many points as indicated in figure 2 for aprons designed to take these straps.