



SLOVENSKI STANDARD
SIST EN 412:1996

01-februar-1996

Varovalni predpasniki za zaščito pred urezi z ročnimi noži

Protective aprons for use with hand knives

Schutzschürzen beim Gebrauch von Handmessern

Tabliers de protection lors de l'utilisation de couteaux à main

Ta slovenski standard je istoveten z: EN 412:1993

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EUROPEAN STANDARD

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English version

Protective aprons for use with hand knives

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard was prepared by the Technical Committee CEN/TC 162 "Protective clothing including hand and arm protection and lifejackets", of which the secretariat is held by DIN.

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This European Standard has been prepared under a mandate given to CEN by the Commission of the European Communities and the European Free Trade Association, and supports essential requirements of the EC Directive(s). <https://standards.iteh.ai/catalog/standards/sist/3dad2c7d-8794-41bf-86d5-0fe67695549/sist-en-412-1996>

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of an identical text or by endorsement, at the latest by July 1993, and conflicting national standards shall be withdrawn at the latest by July 1993.

The Standard was approved and in accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

1 Scope

This European Standard applies to protective aprons for use with hand knives. The standard specifies requirements for the apron's design, penetration resistance, ergonomic characteristics, straps, weight, material, marking and instructions. It also describes the appropriate test methods.

2 Definitions

NOTE: The terminology used to describe the attachments of straps and belts to aprons is given in figure 1.

For the purposes of this standard, the following definitions apply.

2.1 Apron

A garment covering the front of the body from the chest to the legs.

2.2 Protective surface

That part of an apron that is constructed of material designed to resist penetration by hand knives.

2.3 Protective material

The material(s) of which the protective surface of an apron is constructed.

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

2.4 Interstice

The space or opening between two or more elements of an apron's protective surface.

2.5 Apron support

The means by which the apron is supported on the body while the apron is in use.

NOTE: Apron supports may be:

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

2.6 Fastening point

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

2.7 Fastener

The means by which a removable strap or belt is attached to the fastening point on the apron.

2.8 Identifying mark

A mark on the outer surface of the apron indicating that it is the outer surface.

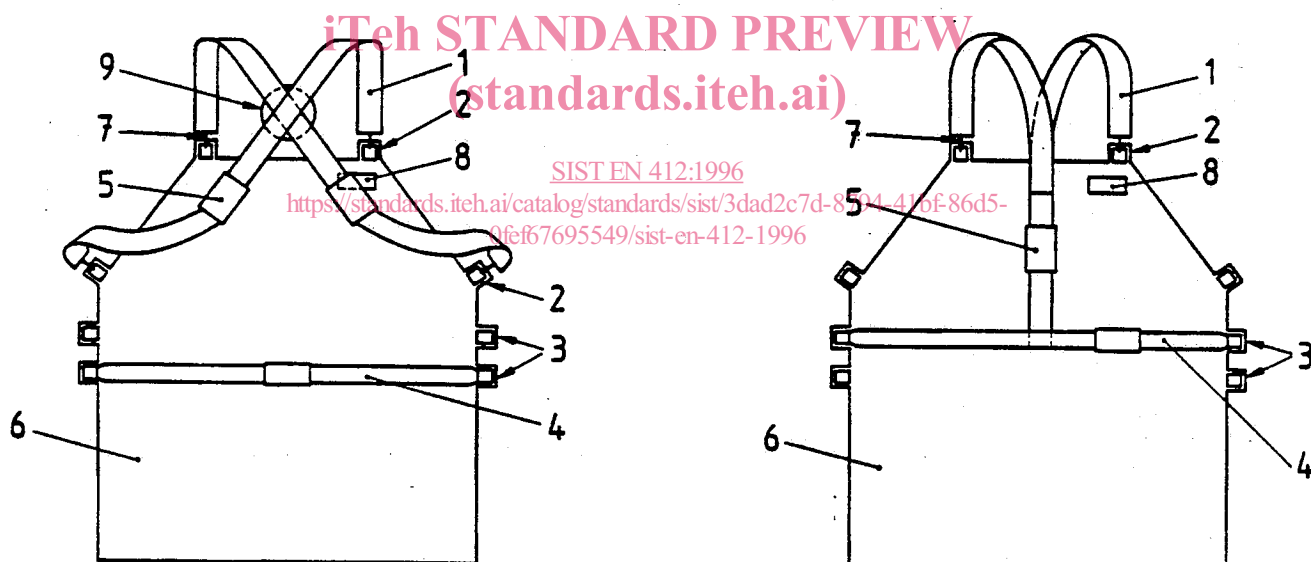


Figure 1a: X form straps

Figure 1b: Y form straps

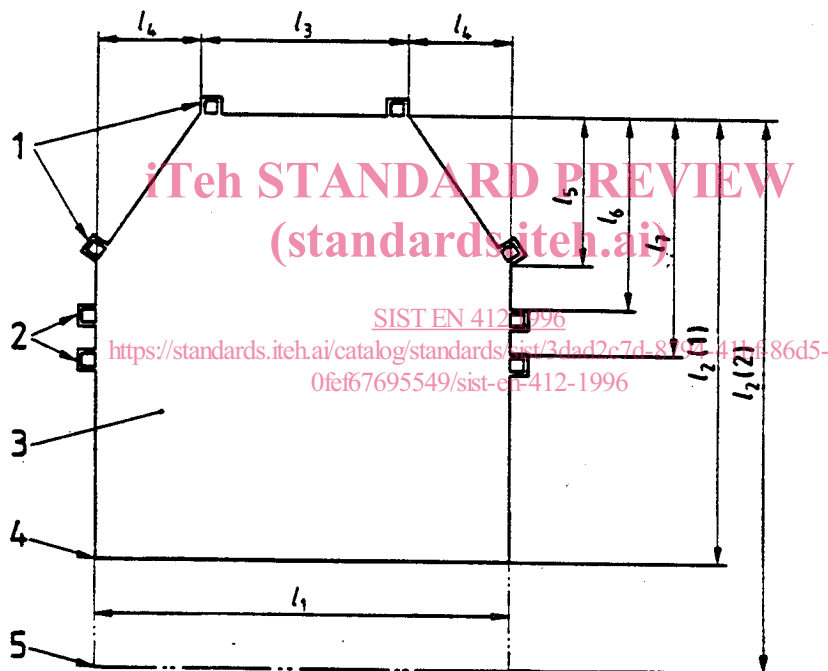
- 1 Shoulder strap
- 2 Shoulder strap fastening points
- 3 Waist belt fastening points
- 4 Waist belt
- 5 Adjuster for altering the strap length
- 6 Protective surface
- 7 Fastener
- 8 Identifying mark which is only visible on the outer surface
- 9 Restraining buckle through which the straps can slide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

Figure 1: Straps and belts of aprons

3 Requirements

3.1 Dimensions of the protective surface of the apron

The minimum dimensions for the protective surface of aprons are specified for two sizes. Size 1 shall have a width of at least 550 mm and a length of at least 600 mm. Size 2 shall have a width of at least 550 mm and a length of at least 750 mm. The aprons shall taper equally on both sides to the upper edge. 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. Figure 2 shows the apron dimensions. The dimensions shall be measured as described in 4.5.1.



- 1 Shoulder strap fastening points
- 2 Waist belt fastening points
- 3 Protective surface
- 4 Lower edge size 1
- 5 Lower edge size 2

- l_1 = Not less than 550 mm
 $l_2(1)$ = (Size 1) Not less than 600 mm
 $l_2(2)$ = (Size 2) Not less than 750 mm
 l_3 = 275 mm \pm 25 mm
 l_4 = 0,5 ($l_1 - l_3$) \pm 20 mm
 l_5 = 200 mm \pm 15 mm
 l_6 = 260 mm \pm 15 mm
 l_7 = 320 mm \pm 15 mm

Figure 2: Size 1 and size 2 apron dimensions

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3.2 Construction

3.2.1 General

When tested in accordance with 4.5.1 to 4.5.5, no welded rings or similar connections between protective surface components of aprons shall break or open.

3.2.2 Penetration resistance

Penetration resistance shall be provided over the whole protective surface, and when any part of the surface is tested in accordance with 4.5.2 the mean penetration shall not exceed 12,0 mm and no single penetration shall exceed 15,0 mm.

3.2.3 Tensile strength

When tested in accordance with 4.5.3 no ring, link or plate shall break or open when a force of 200 N is applied.

3.2.4 Flexibility

When tested in accordance with 4.5.4 the force required to flex the apron shall not exceed 6 N. After the test the apron shall show no permanent deformation or damage such as tears or gaps.

3.2.5 Dimensions of interstices

After the flexibility of the apron has been assessed in accordance with 4.5.4 the dimensions of interstices between or within any plates, rings or similar components of the protective material of the apron shall be such that the gauge described in 4.4. is unable to pass through the apron when applied as described in 4.5.5.

3.2.6 Apron support

All apron supports shall be adjustable in length and the adjusters shall be of a type that does not slip under load during use of the apron.

NOTE: See A.5 for information and recommendations.

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. Note that it may be necessary that fabric supports can be removed for separate cleaning of the support and protective parts of a garment. This could be a requirement in some industries (see the introduction to this standard) .

Apron supports shall be designed so that they do not exert a force on the back of the neck of the user.

3.2.7 Mass

The mass per unit area of the protective material from which an apron is made shall not exceed 4500 g/m².

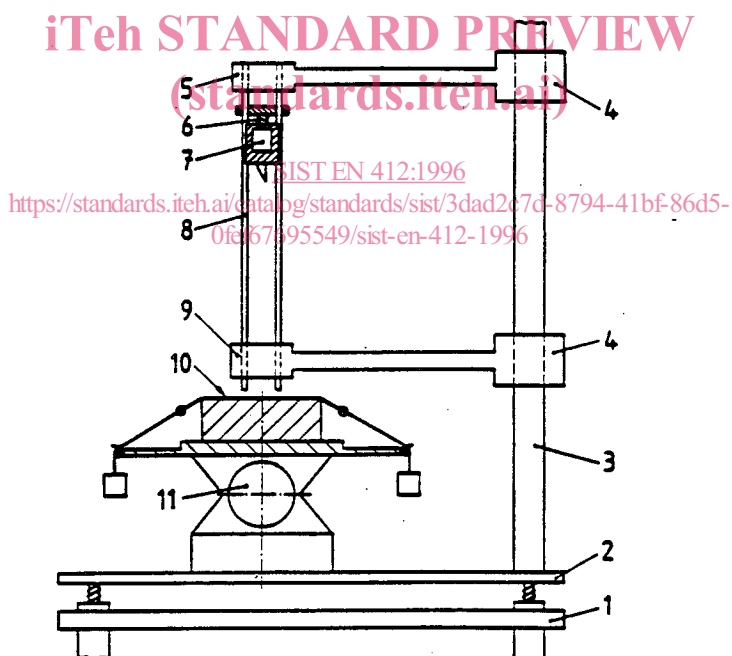
The mass of size 1 and size 2 aprons shall not exceed 1350 g for size 1 and 1700 g for size 2.

4 Test apparatuses and procedures

4.1 Penetration testing apparatus

4.1.1 Principle

The protective material of an apron is tested by repeated impact of standard knife blades held in a guided falling block. The component parts of a test apparatus are shown in figure 3. The design is not normative. Details of the test sample support, falling block and test blade are given in subsequent clauses. Design details, such as the means for allowing removal of the block and test blade after impact, and necessary safety guards are not shown.



- | | |
|----------------------------------------------------|-----------------------------------------------------|
| 1 Table | 8 Guide rods |
| 2 Base plate | 9 Fixing block for the lower end of the guide rods. |
| 3 Support | (falling block passing through). |
| 4 Bracket | 10 Test sample |
| 5 Fixing block for the upper end of the guide rods | 11 Tilting mechanism |
| 6 Electromagnetic release mechanism | |
| 7 Falling block and test blade | |

Figure 3: A penetration testing apparatus

4.1.2 Blade holding block

The blade holding block is shown in figure 4.

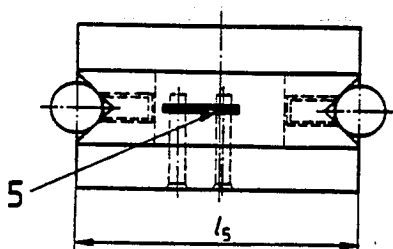


Figure 4a: Top view

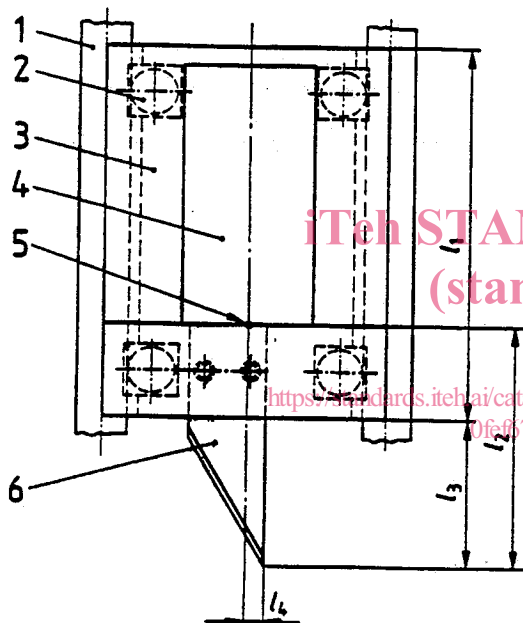


Figure 4b: Front view



Figure 4c: Sketch of side view

- 1 Guide rod
- 2 Wheel or bearing
- 3 Block
- 4 Cut out space to achieve correct mass distribution
- 5 Centre of gravity of block plus test blade
- 6 Test blade

$l_1 = 100 \text{ mm} \pm 1 \text{ mm}$

$l_2 = 65 \text{ mm} \pm 1 \text{ mm}$

$l_3 = 40 \text{ mm} \pm 1 \text{ mm}$ - An exception is given in 4.5.2.

$l_4 = 5 \text{ mm} \pm 0,1 \text{ mm}$

$l_5 = 75 \text{ mm} \pm 1 \text{ mm}$ - this is the distance between the guide rod centres, not the width of the block which is not prescribed.

Mass $1000 \text{ g} \pm 5 \text{ g}$

The remaining dimensions are not prescribed.

Figure 4: Blade holding block

The test blade shall be held in the block so that it protrudes by $40 \text{ mm} \pm 1 \text{ mm}$.

The position of the blade tip shall be offset by distance l_4 from the centre line of the block which shall pass through the centre of gravity of the block. The centre of gravity of the block and blade shall be $65 \text{ mm} \pm 1 \text{ mm}$ above the blade tip level.

The block shall be held in its initial position by an electromagnet. The block shall have four wheels or bearings and shall run freely on the two guide rods.

The height from which the block is released shall be set so that the velocity of the blade tip as it is about to strike the apron material equals that of a mass falling freely in a vacuum from the prescribed test height of 500 mm.

4.1.3 The test blade

The test blade shall have the profile and dimensions shown in figure 5. It shall be made of cold-forged stainless steel with a degree of hardness of more than 45 HRC. Its edge shall be straight and sharp. Before every penetration test, the impact blade shall conform to the specification.

NOTE: After machine grinding, the blade edge should be made smooth and sharp by hand finishing on an oil stone. Blades may be resharpened after use.

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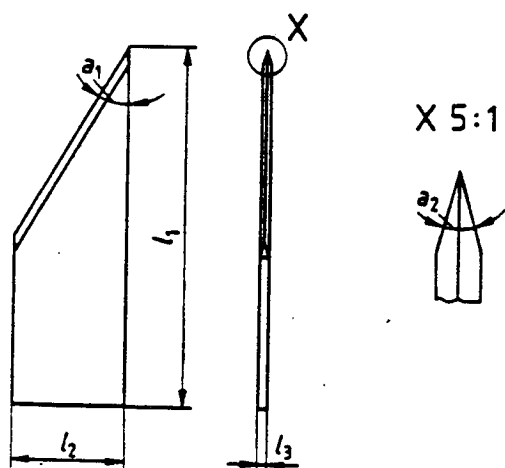


Figure 5a:
Side view

Figure 5b:
Edge view

Figure 5c: Detail of
the edge A-A

a_1 = Angle of the sharp edge to the back of the blade: $30^\circ \pm 1^\circ$

a_2 = The included angle of the sharp edge: $30^\circ \pm 1^\circ$

l_1 = Length of the blade: not less than 65 mm

l_2 = Width of the blade: $20 \text{ mm} \pm 0,5 \text{ mm}$

l_3 = Thickness of the blade: $1,5 \text{ mm} \pm 0,05 \text{ mm}$

Figure 5: Test blade.