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Protective clothing for users of hand-held  
chainsaws — Part 2: Leg protectors

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# Contents

|                                                                                                                     | Page |
|---------------------------------------------------------------------------------------------------------------------|------|
| Introduction .....                                                                                                  | 1    |
| 1 Scope .....                                                                                                       | 1    |
| 2 Normative references .....                                                                                        | 1    |
| 3 Terms and definitions .....                                                                                       | 2    |
| 4 Requirements .....                                                                                                | 4    |
| 4.1 General .....                                                                                                   | 4    |
| 4.2 Innocuousness .....                                                                                             | 4    |
| 4.3 Sizing .....                                                                                                    | 5    |
| 4.4 Ergonomics .....                                                                                                | 5    |
| 4.5 Dimensional and other changes in protective materials as a consequence of cleaning .....                        | 5    |
| 4.6 Protective coverage .....                                                                                       | 5    |
| 4.7 Resistance to cutting to chainsaws .....                                                                        | 10   |
| 4.8 Requirements for strength of attachment of protective insert .....                                              | 10   |
| 5 Test samples .....                                                                                                | 11   |
| 6 Test methods .....                                                                                                | 11   |
| 6.1 Pre-treatment .....                                                                                             | 11   |
| 6.2 Measurement of dimensional change .....                                                                         | 12   |
| 6.3 Measurement of protective coverage .....                                                                        | 12   |
| 6.4 Testing of resistance to cutting .....                                                                          | 13   |
| 6.5 Test of the strength of the protective insert attachment .....                                                  | 15   |
| 6.6 Ergonomic testing .....                                                                                         | 18   |
| 6.7 Test report .....                                                                                               | 19   |
| 7 Marking .....                                                                                                     | 20   |
| 8 Pictogram .....                                                                                                   | 21   |
| 9 Information supplied by the manufacturer .....                                                                    | 21   |
| Annex A (informative) Selection of Design A, Design B or Design C .....                                             | 23   |
| Annex JA (normative) Method of calculation of average score and overall average score in ergonomic assessment ..... | 24   |
| Bibliography .....                                                                                                  | 28   |
| Annex JB (informative) Comparison table between JIS and corresponding International Standard .....                  | 29   |

## Foreword

This Japanese Industrial Standard has been revised by the Minister of Health, Labour and Welfare and the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Safety Appliances Association (JSAA)/ Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS T 8125-2 : 2009**), which has been technically revised.

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# Protective clothing for users of hand-held chainsaws — Part 2 : Leg protectors

## Introduction

This Japanese Industrial Standard has been prepared based on **ISO 11393-2 : 2018**, Edition 2, with some modifications of the technical contents.

Annex JA is unique to **JIS** and not given in the corresponding International Standard. The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JB.

## 1 Scope

This Standard specifies the performance requirements, test methods, design requirements, identification and marking information for leg protectors that offer protection against cutting by hand-held chainsaws.

**NOTE** The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 11393-2 : 2018 *Protective clothing for users of hand-held chainsaws — Part 2 : Performance requirements and test methods for leg protectors* (MOD)

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 21-1**.

## 2 Normative references

Part or all of the provisions of the following standards, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS L 1093 *Test methods for seam strength of textiles*

**NOTE** Normative reference in the corresponding International Standard : ISO 13935-2 *Textiles — Seam tensile properties of fabrics and made-up textile articles — Part 2 : Determination of maximum force to seam rupture using the grab method*

JIS L 1909 *Textiles — Determination of dimensional change*

**NOTE** Normative reference in the corresponding International Standard : ISO 5077 *Textiles — Determination of dimensional change in washing and drying*

JIS T 8005 *Protective clothing — General requirements*

NOTE Normative reference in the corresponding International Standard : ISO 13688 *Protective clothing — General requirements*

JIS T 8101 *Protective footwear*

NOTE Normative reference in the corresponding International Standard : ISO 20345 *Personal protective equipment — Safety footwear*

JIS T 8125-1 *Protective clothing for users of hand-held chainsaws — Part 1 : Test rig for testing resistance to cutting by a chainsaw*

NOTE Normative reference in the corresponding International Standard : ISO 11393-1 *Protective clothing for users of hand-held chainsaws — Part 1 : Test rig for testing resistance to cutting by a chainsaw*

### 3 Terms and definitions

For the purpose of this Standard, the following terms and definitions, and those given in JIS T 8125-1 apply.

#### 3.1

##### **leg protectors**

any type of protective garment that protects at least the specified protective area to a specified level of resistance for the leg

#### 3.2

##### **protective material**

material that is designed to protect the wearer against the cutting effect of a hand-held chainsaw

Note 1 to entry The protective material may include the outer fabric of the garment.

#### 3.3

##### **protective insert**

fabric, usually placed between the outer fabric and the lining of a garment, that is able to stop the saw chain by clogging, braking or repelling the saw chain

#### 3.4

##### **protective coverage**

area of the garment that is covered by protective material (3.2)

Note 1 to entry It refers to the area that coincides with or is wider than the specified protective area (3.5).

#### 3.5

##### **specified protective area**

minimum required protective coverage (3.4)

#### 3.6

**front**

<leg protector> forward 50 % of the leg circumference

**3.7**

**rear**

<leg protector> backwards 50 % of the leg circumference

Note 1 to entry It can be difficult to establish the front and the rear of a leg protector. It is nevertheless of great importance to establish the front and the rear before pre-treatment and testing.

**3.8**

**cut-through**

any visible change on the underside of the innermost layer of the test specimen caused by the saw chain

Note 1 to entry If the test specimen is a material consisting of single or multiple layers, which for example constitutes the finished product, e.g. protective trousers, a moving saw chain is applied from the side of test specimen that is on the outside as seen from the body of wearer. It refers to the damage done to the underside of the layer opposite the surface to which the saw chain is applied, when the saw chain slows down and stops while cutting through the layers of test specimen.

**3.9**

**attachment**

connection between the protective insert and the outer or lining fabric

Note 1 to entry Connection is usually sewn.

**3.10**

**attachment force**

force that the connection between the protective insert and any structural fabric can withstand

**3.11**

**leggings**

seat-less trousers

**3.12**

**chaps**

leg protectors (3.1) that cover the front of a leg and fasten around the waist and the back of the leg

**3.13**

**crotch**

point between the legs where the two side seams, which run up the inside of each leg, meet

Note 1 to entry In cases where the side seams do not lie along the edge of the trousers when they are flattened out, the theoretical crotch point effectively becomes the point where the two edges of the trousers converge.

### 3.14

#### **damage**

condition where some yarns of the protective material lose their position in the structure due to a broken ladder during the pre-treatment cycle

Note 1 to entry The broken ladder is often caused by a broken knitting yarn.

### 3.15

#### **fly**

fastening in the front of a pair of trousers

### 3.16

#### **joins**

place or line where two or more parts of the protective insert (3.3) are connected or fastened together, e.g. by seams or zippers

### 3.17

#### **pre-treatment**

standard way of preparing the samples before testing

Note 1 to entry This might include a number of cleaning cycles, submitting the sample to heat, mechanical action or any other relevant exposure, and is finished by conditioning.

### 3.18

#### **seam**

join where two or more layers of fabric, leather or other materials are held together with stitches

## **4 Requirements**

### **4.1 General**

General requirements not specifically covered in this Standard shall be in accordance with **JIS T 8005**. Tested leg protectors shall conform to all the requirements of this Standard.

### **4.2 Innocuousness**

Leg protectors shall not adversely affect the health or hygiene of the user. The materials shall not release or degrade to release substances generally known to be toxic,

carcinogenic, mutagenic, toxic to reproduction or otherwise harmful in the foreseeable conditions of normal use. The specific innocuousness requirements of **JIS T 8005, 4.2**, shall be met.

### 4.3 Sizing

Leg protectors shall be marked with their size determined in accordance with **JIS T 8005**.

### 4.4 Ergonomics

The leg protectors shall be designed to minimize discomfort and any impediment to movement while wearing them. When tested according to **6.6.2**, all adjustment systems of leg protectors shall not become incorrectly adjusted without the user's knowledge. The construction around the crotch shall facilitate lunges. When tested according to **6.6.2**, the overall average score of the ergonomic responses shall be 2 or less.

**NOTE** Lunges means to take a long step forward keeping the trailing foot still while bending the knee of the leading leg.

The design shall be without any appendages below the knee region, such as adjustable buckles, which can become entangled in machinery, including chainsaws, or the undergrowth. The only possible exceptions to this requirement are the fastening points of chaps (Design B). When tested according to **6.6.3**, the leg protector shall be free of rough surfaces, sharp edges, sharp points, etc., which could cause excessive irritation or injuries.

### 4.5 Dimensional and other changes in protective materials as a consequence of cleaning

#### 4.5.1 Dimensional change as a consequence of cleaning

After cleaning according to the manufacturer's instructions, the dimensional change when measured according to **6.2** shall be not more than 6 % in any direction.

#### 4.5.2 Changes in protective materials as a consequence of cleaning

After cleaning one sample according to the manufacturer's instructions, and after cleaning one sample according to **6.1.2** at 60 °C and spin-drying, detach the outer and lining fabrics of both samples and check that there is no damage (**3.14**) in the protective material due to cleaning.

### 4.6 Protective coverage

#### 4.6.1 General designs

This Standard defines three designs : Design A and Design C for trousers and leggings, and Design B for chaps. Design A, Design B and Design C have different specified protective areas (**3.5**) as stated in **4.6.2, 4.6.3, 4.6.4**, respectively. The protective coverage (**3.4**) shall be assessed according to **6.3**.

**NOTE** Guidance on selecting Design A, Design B or Design C is given in Annex A.

The percentage of areas of the front or rear of leg protectors shall be assessed visu-

ally by laying the finished leg protector flat.

Between the crotch (3.13) and the fly (3.15), a gap of not more than 10 mm wide is permitted. It is recommended to keep this gap as small as possible. For zippers, buttons, etc., an opening gap in the centre front of not more than 10 mm is allowed. Peripheral openings at the right side at the waist region may be up to 30 mm.

Each layer of the protective insert (3.3) of one garment shall be continuous from the top to the bottom without joins (3.16). There shall be no joins in the protective material within the specified protective area. Designs incorporating joins down the legs of Design C are acceptable according to 4.6.4 c) and e).

The two halves of leggings and chaps shall be joined together from the top of the waistband down to the point of the crotch at the front.

Braces and belts shall have a minimum width of 30 mm.

4.6.2 Design A

The specified protective area for Design A is described under a), b), c), d), and e) and is shown in Figure 1. It is measured according to 6.3.2.

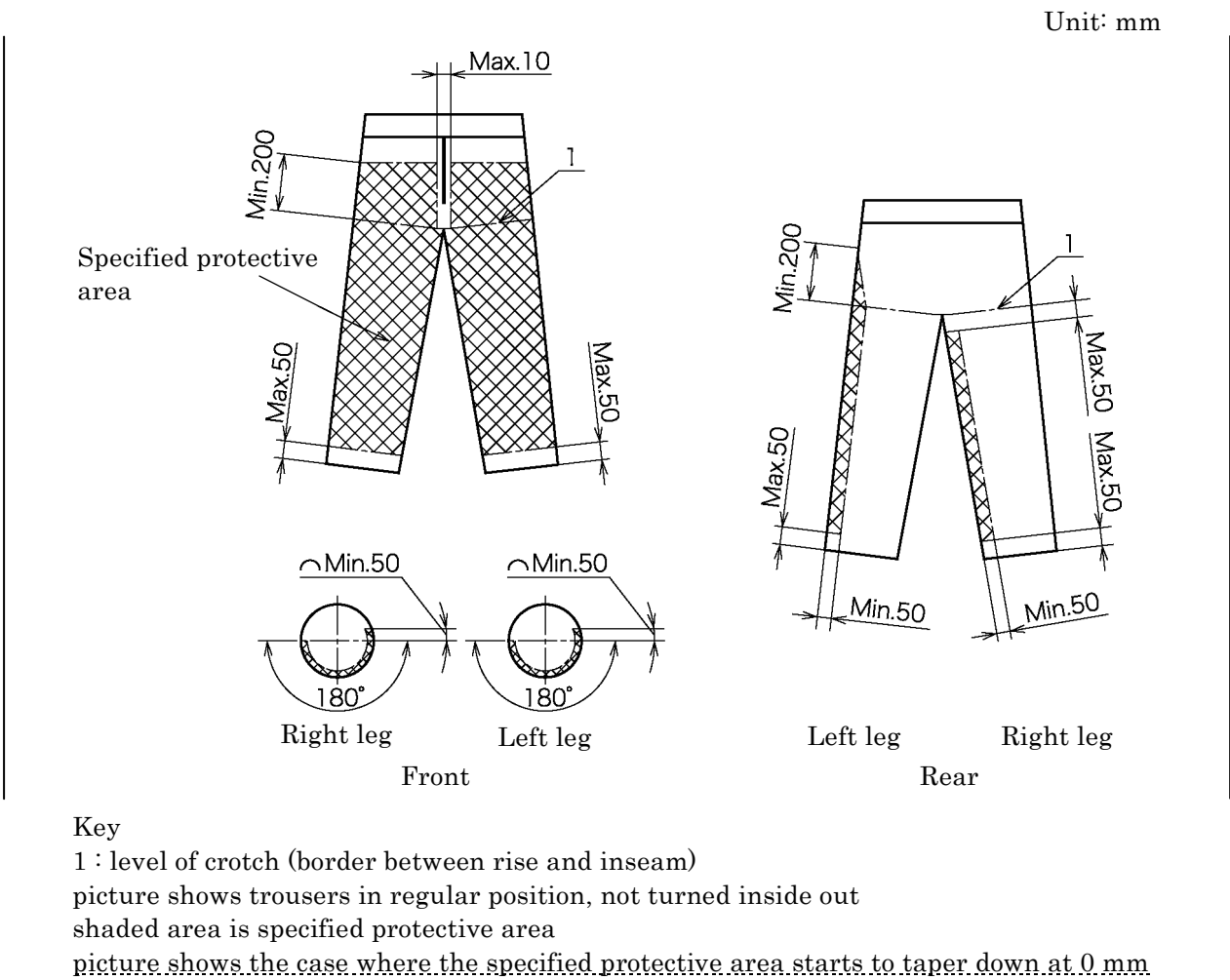


Figure 1 Specified protective area, Design A

- a) **Front** The specified protective area fully covers the front of the leg protector from a maximum of 50 mm above the lower end of the legs to a minimum of 200 mm above the crotch. It is permitted to leave out protective material at the fly. For sizes of leg protectors intended for wearers who have a waist size smaller than 92 cm, the specified protective area only needs to be a minimum of 160 mm above the crotch.
- b) **Rear, left leg** The specified protective area covers, on the outer side of the leg, at least a 50 mm-wide extension. It begins no more than 50 mm from the bottom of the leg and ends not more than 200 mm below the crotch, and then tapers to zero at a height of a minimum of 200 mm above the crotch or a minimum of 160 mm for smaller sizes as described in a).
- c) **Rear, right leg** The specified protective area covers, on the inner side, at least a 50 mm-wide extension. It begins no more than 50 mm from the bottom of the leg and ends not more than 50 mm below the crotch.
- d) **Fly** The gap in the specified protective area at the fly shall be not more than 10 mm, measured when the zipper is closed. Underneath the zipper, the protective material can also have a gap and it shall be not more than 10 mm.
- e) **Bottom end** The bottom end of the leg of each garment shall be designed to facilitate easy overlap of leg protectors with safety footwear worn by the user.

Leg protectors intended for users of chainsaws configured for left-handed operators (hereafter referred to as left-handed chainsaws) shall additionally include the 50 mm-wide protective material specified in b) and c) on the rear right-hand side of each leg.

#### 4.6.3 Design B (chaps)

The specified protective area for Design B is described under a), b), c), d), e) and f) and is shown in Figure 2. It is measured according to 6.3.3.