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**Protective clothing —
General requirements**

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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 8005 : 2015**), which has been technically revised.

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Protective clothing — General requirements

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 13688** : 2013, Edition 2, and Amendment 1 : 2021 with some modifications of the technical contents for the convenience of users. The amendment(s) to the said International Standard(s) has been incorporated into this 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 JA.

1 Scope

This Standard specifies general performance requirements for ergonomics, innocuousness, size designation, ageing caused by cleaning, compatibility and marking of protective clothing and the information to be supplied by the manufacturer with the protective clothing.

This Standard is only intended to be used in combination with other standards for protective clothing, containing requirements for specific protective performance and not on a stand-alone basis.

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

ISO 13688 : 2013 *Protective clothing — General requirements* + Amendment 1 : 2021 (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. For standards with the year indication, only the editions of the indicated year shall be applied and the revisions (including amendments) made thereafter shall not be applied. For those without the indication of the year, the most recent editions (including amendments) shall be applied.

JIS K 6558-10-1 : 2018 *Leather — Chemical tests — Determination of chromium (VI) content — Part 1 : Colorimetric method*

JIS K 6558-10-2 : 2018 *Leather — Chemical tests — Determination of chromium (VI) content — Part 2 : Chromatographic method*

JIS L 0001 : 2014 *Textiles — Care labelling code using symbols*

NOTE Normative reference in the corresponding International Standard : ISO 3758 : 2012 *Textiles — Care labelling code using symbols*

JIS L 0111 : 2006 *Glossary of terms used in body measurements for clothes*

JIS L 1096 : 2010 *Testing methods for woven and knitted fabrics*

JIS L 1931-1 : 2014 *Textiles — Professional care, drycleaning and wetcleaning of fabrics and garments — Part 1 : Assessment of performance after cleaning and finishing*

JIS L 1940-1 : 2019 *Textiles — Methods for determination of certain aromatic amines derived from azo colorants — Part 1 : Detection of the use of certain azo colorants accessible with and without extracting the fibres*

NOTE Normative reference in the corresponding International Standard : ISO 14362-1 : 2017 *Textiles — Methods for determination of certain aromatic amines derived from azo colorants — Part 1 : Detection of the use of certain azo colorants accessible with and without extracting the fibres*

JIS L 1940-3 : 2019 *Textiles — Methods for determination of certain aromatic amines derived from azo colorants — Part 3 : Detection of the use of certain azo colorants, which may release 4-aminoazobenzene*

NOTE Normative reference in the corresponding International Standard : ISO 14362-3 : 2017 *Textiles — Methods for determination of certain aromatic amines derived from azo colorants — Part 3 : Detection of the use of certain azo colorants, which may release 4-aminoazobenzene*

ISO 3071 : 2020 *Textiles — Determination of pH of aqueous extract*

ISO 3175-1 : 2017 *Textiles — Professional care, drycleaning and wetcleaning of fabrics and garments — Part 1 : Assessment of performance after cleaning and finishing*

ISO 4045 : 2018 *Leather — Chemical tests — Determination of pH and difference figure*

ISO 5077 : 2007 *Textiles — Determination of dimensional change in washing and drying*

ISO 7000 *Graphical symbols for use on equipment — Registered symbols*

ISO 8559-1 : 2017 *Size designation of clothes — Part 1 : Anthropometric definitions for body measurement*

ISO 8559-2 : 2017 *Size designation of clothes — Part 2 : Primary and secondary dimension indicators*

ISO 17075-1 : 2017 *Leather — Chemical determination of chromium(VI) content in leather — Part 1 : Colorimetric method*

ISO 17075-2 : 2017 *Leather — Chemical determination of chromium(VI) content in leather — Part 2 : Chromatographic method*

ISO 30023 : 2010 *Textiles — Qualification symbols for labelling workwear to be industrially laundered*

EN 1811 : 2011 + A1 : 2015 *Reference test method for release of nickel from all post assemblies which are inserted into pierced parts of the human body and articles intended to come into direct and prolonged contact with the skin*

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions, and those given in JIS L 0111 : 2006 apply.

3.1

ageing

change of one or more initial properties of protective clothing materials during the passage of time

Note 1 to entry Ageing includes ageing caused by cleaning.

3.2

harm

injury or damage to the health of people

3.3

hazard

situation which can be the cause of harm or damage to the health of the human body

Note 1 to entry There are different general types of hazards, e.g. mechanical hazards, chemical hazards, cold hazards, heat and/or fire hazards, biological agents hazards (biohazards), radiation hazards. A heat hazard can derive from contact heat, radiant heat, etc.

3.4

risk

combination of the probability of occurrence of harm and the severity of that harm

(Source : JIS Z 8051 : 2015, 3.9, modified)

3.5

performance level

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

Note 1 to entry See Annex A.

3.6

protective clothing

clothing which is designed to provide protection against one or more hazards

Note 1 to entry Protective clothing are designed to give protection against the hazards encountered in specific types of activities. Examples of such protective clothing are aprons that provide protection against hand knives, trousers for use with chainsaws, clothing for protection against chemicals, high visibility clothing and motor-cycle rider's protective clothing.

3.7

control dimensions

dimensions of body part as a basis for the size designation of finished protective clothing

Note 1 to entry Unit : centimetres (cm).

3.8

primary dimension, PD

alternative term : primary body dimension, PD

control dimension that has to be used to designate the size of protective clothing for the consumer

3.9

secondary dimension, SD

alternative term : secondary body dimension, SD

control dimension that should additionally be used to designate the size of protective clothing for the consumer

3.10

waist to waist over the shoulder line

distance from the back waist level vertically up to the middle of the shoulder line, and vertically down to the waist level, over the bust point in the front

Note 1 to entry The distance from the waist level to the bust point in the front and the distance from the back waist level to the shoulder line shall be vertical.

Note 2 to entry See Clause 6.

3.11

torso

trunk of the human body, i.e. without arms, legs and head

3.12

compatibility

ability of two or more elements of personal protective equipment (PPE) that are worn as part of an ensemble, to maintain the required performance of PPE as an ensemble

Note 1 to entry Where two or more items of PPE are worn on the body, the basic structure of each PPE shall not be modified and the interfaces between PPE need to ensure that each provides the required performance.

4 Basic material safety and ergonomic requirements

4.1 General

Manufacturers of protective clothing shall, from the view point of material safety and ergonomics, take into account the following points in their production.

NOTE For general ergonomic principles for protective clothing, see **EN 13921** [10].

4.2 Innocuousness of materials

Protective clothing shall not adversely affect the health or hygiene of the user. The materials in protective clothing shall not, in the foreseeable conditions of normal use, release substances generally known to be toxic, carcinogenic, mutagenic, allergenic, toxic to reproduction or otherwise harmful.

NOTE 1 Information on the classification and identification of harmful substances can be found, e.g. in [11] of the Bibliography.

NOTE 2 Guidance on how to consider acceptability of materials in protective clothing is given in the flow chart in informative Annex B (Figure B.1).

The following list of documents is given for information and as examples of documents to be examined for the selection of protective clothing materials :

- information supplied by the manufacturer could include evidence-based information confirming that the product does not contain any substances at levels that are known or suspected to adversely affect user hygiene or health;
- materials specifications;
- safety data sheets (SDS) relating to the materials and/or article information sheet (AIS);
- information relating to the suitability of the materials for use with food, in medical devices, or other relevant applications;
- information relating to toxicological, allergenic, carcinogenic, toxic to reproduction or mutagenic investigations on the materials;
- information relating to ecotoxicological and other environmental investigations on the materials.

Materials should be selected to minimize the environmental impact of the production and disposal of protective clothing (see also Annex F).

The examination shall determine whether the claim that the materials are suitable for use in the protective clothing. Particular attention shall be paid to the presence of plasticisers, unreacted components, heavy metals, impurities and the chemical identity of pigments and dyes.

Each layer of material of the protective clothing shall comply with the following requirements.

- a) Chromium VI content in leather clothing shall not exceed 3 mg/kg according to **JIS K 6558-10-1 : 2018**, **JIS K 6558-10-2 : 2018**, **ISO 17075-1 : 2017** or **ISO 17075-2 : 2017**.
- b) All metallic materials which could come into prolonged contact with the skin (e.g. studs, fittings) shall have a release of nickel of less than 0.5 µg/cm² per week. The method of test shall be according to **EN 1811 : 2011 + A1 : 2015**.
- c) Protective clothing material shall have a value greater than pH = 3.5 and less than pH = 9.5. The test method for leather shall be according to **ISO 4045 : 2018** and for other materials according to Method B in 8.37 of **JIS L 1096 : 2010** or **ISO 3071 : 2020**.
- d) Azo colorants that release certain aromatic amines listed in **JIS L 1940-1 : 2019** and **JIS L 1940-3 : 2019** shall not be detectable by the method in these standards.

4.3 Design

The design of protective clothing shall be as follows.

- a) The design of protective clothing shall facilitate its correct positioning on the user and shall ensure that it remains in place for the foreseeable period of use, taking into account ambient factors, together with the movements and postures that the wearer could adopt during the course of work or other activity. For this purpose, appropriate means, such as adequate adjustment systems or adequate size ranges shall be provided so as to enable protective clothing to be adapted to the morphology of the user. (See Annex C).
- b) The design of protective clothing shall ensure that no parts of the body get uncovered by expected movements by the wearer (e.g. a jacket should not rise above the waist when the arms are raised) if this is defined in the specific product standard. The specific product standard for protective clothing shall contain test criteria (for example: checking that the garment can be put on and taken off easily; that arm and knee and bending movements are possible; that unprotected body areas do not appear during movements; that there is an adequate overlap of jacket and trousers; that the manufacturers information is adequate to explain the correct usage of the protective clothing). (See Annex C).
- c) When two or more items of PPE, including protective clothing, are worn together, they should be compatible and each one shall comply with its own standard. None of them has to reduce the performance of the other item(s) and the appropriate level of protection should be provided at interface areas between those products, for example in sleeve to glove, trousers to footwear, hood and respirator combinations. There may be other combinations.
- d) In each product standard, a minimum mechanical property to assess the strength of protective clothing shall be defined.

4.4 Comfort

The comfort of protective clothing shall be as follows.

- a) Protective clothing shall provide users with a level of comfort consistent with the level of protection required against the hazard which is present, the ambient conditions, the level of the user's activity, and the anticipated duration of use of the protective clothing.

Protective clothing shall not

- have rough, sharp or hard surfaces that irritate or injure the user;
 - be so tight, loose and/or heavy so that it restricts normal movement (see Annex C).
- b) Protective clothing that imposes significant ergonomic burdens such as heat stress, or is inherently uncomfortable because of the need to provide adequate protection, shall be accompanied in the information supplied by the manufacturer by specific advice or warnings. Specific advice on the appropriate duration for continuous use of the protective clothing in the intended application(s) shall be given.

5 Ageing caused by cleaning

5.1 General

This Standard is concerned only with the dimensional change caused by cleaning on the performance of the clothing and legibility of marking.

5.2 Washing and dry cleaning

The cleaning for evaluating ageing caused by cleaning shall be in accordance with the manufacturer's instructions such as care labelling code using symbols (e.g. JIS L 0001 : 2014), on the basis of standardized processes. Manufacturers should typically indicate one or several of the various methods and processes of JIS L 1930 [2], JIS L 1931-2 [3], JIS L 1931-3 [4], JIS L 1931-4 [5], ISO 3175-5 [7], ISO 3175-6 [8], ISO 15797 [9] or equivalent standardized processes for cleaning. The number of cleaning cycles shall be the number of times the protective clothing can be washed as indicated in the instruction manual or other documents, if specified by the manufacturer. If the number of cleaning cycles is not specified, five cleaning cycles shall be performed.

Where rapid deterioration in performance is caused by the use of cleaning procedures, the manufacturer, in the marking and/or in the information, shall indicate the maximum number of cleaning operations that may be carried out before the protective clothing has to be discarded.

5.3 Dimensional change due to cleaning and legibility of marking

One sample shall be subjected to five cleaning cycles or a number of times specified by the manufacturer (maximum recommended number of cleaning processes) according to 5.2. If both industrial washing and domestic washing are permitted, only industrial washing shall be carried out. If the manufacturer includes instructions for washing or washing and dry-cleaning, the protective clothing shall only be wash tested. If only

dry-cleaning is allowed, the protective clothing shall be dry-cleaned.

Measurement of dimensional change shall be carried out according to **ISO 5077 : 2007** and for dry cleaning in accordance with ~~JIS L 1931-1 : 2014~~ or **ISO 3175-1 : 2017**.

Changes in dimension due to cleaning of material for protective clothing shall not exceed ± 3 % for woven materials and ± 5 % for knitted material and nonwovens in either length or width, unless stated otherwise in a product standard.

~~The labelling on protective clothing shall be visually assessed for legibility after five cleaning cycles or a number of times specified by the manufacturer (maximum recommended number of cleaning processes).~~

6 General size designation

Protective clothing shall be marked with its size based on control dimensions measured in centimetres. Measurement procedures shall correspond to **ISO 8559-1 : 2017** and the designation of dimensions shall correspond to Table 1 or **ISO 8559-2 : 2017**, if not otherwise specified in other product standards (see also Annex D). The size designation of protective clothing shall comprise the control dimensions as given in Table 1 or **ISO 8559-2 : 2017**. Table 2 shows examples of primary dimensions (PD) and secondary dimensions (SD) for men's and women's garments as specified in **ISO 8559-2 : 2017**. The manufacturer can also designate additional control dimensions, e.g. the arm length for women's garments.

Examples of size designations are shown in Annex D (see also **ISO 8559-2 : 2017**). The interval figures given in Annex D are given as examples and are not requirements.

Table 1 Body dimensions for sizing protective clothing

No	Protective clothing	Control dimensions ^{a)} (ranges expressed as centimetres or kilograms)
1	Jacket, coat, vest	chest or bust girth and height
2	Trousers	waist or hip girth and height
3	Coverall	chest or bust girth, waist girth and height
4	Aprons	chest or bust girth, waist girth and height
5	Protective equipment (e.g. coverings for the back of the hand, arm covers, gaiters, hoods, genital protectors, wrist protectors, knee pads, back protectors, torso protectors)	Select the relevant measurement. For example : — chest or bust girth, waist girth and height — knee girth — body weight — waist to waist over the shoulder line
Note ^{a)} Body dimensions are defined in ISO 8559-1 : 2017 . Control dimensions given in this table are based on the primary dimensions (PD) and secondary dimensions (SD) as described in ISO 8559-2 : 2017 (see Table 2).		