INTERNATIONAL STANDARD

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Rubber- or plastics-coated fabrics for water-resistant clothing — Specification —

Part 2:
Polyurethane- and silicone elastomer-coated fabrics

Supports textiles revêtus de caoutchouc ou de plastique pour vêtements imperméables à l'eau — Spécifications —

Partie 2: Tissus revêtus de polyuréthanne ou d'élastomère silicone

Reference number
ISO 8096-2 : 1989 (E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8096-2 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

ISO 8096 consists of the following parts, under the general title *Rubber- or plastics-coated fabrics for water-resistant clothing — Specification*:

Part 1: PVC-coated fabrics

Part 2: Polyurethane- and silicone elastomer-coated fabrics

Part 3: Natural rubber- and synthetic rubber-coated fabrics

Annexes A to L of this part of ISO 8096 form an integral part of the standard. Annex M is for information only.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
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Rubber- or plastics-coated fabrics for water-resistant clothing — Specification —

Part 2:
Polyurethane- and silicone elastomer-coated fabrics

1 Scope

This part of ISO 8096 specifies requirements for fabrics coated on one side with a polyurethane or silicone elastomer or a coating the major constituent of which is a polyurethane or silicone elastomer and intended for use in water-resistant clothing.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8096. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8096 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 105-B02 : 1988, *Textiles — Tests for colour fastness — Part B02: Colour fastness to artificial light: Xenon arc fading lamp test.*

ISO 105-C02 : 1987, *Textiles — Tests for colour fastness — Part C02: Colour fastness to washing: Test 2.*

ISO 105-D01 : 1987, *Textiles — Tests for colour fastness — Part D01: Colour fastness to dry cleaning.*

ISO 105-X12 : 1987, *Textiles — Tests for colour fastness — Part X12: Colour fastness to rubbing.*

ISO 1420 : 1978, *Rubber- or plastics-coated fabrics — Determination of resistance to penetration by water.*

ISO 1421 : 1977, *Fabrics coated with rubber or plastics — Determination of breaking strength and elongation at break.*

ISO 2286 : 1986, *Rubber- or plastics-coated fabrics — Determination of roll characteristics.*

ISO 2411 : 1973, *Fabrics coated with rubber or plastics — Determination of the coating adhesion.*

ISO 2602 : 1980, *Statistical interpretation of test results — Estimation of the mean — Confidence interval.*

ISO 3207 : 1975, *Statistical interpretation of data — Determination of a statistical tolerance interval.*

ISO 4674 : 1977, *Fabrics coated with rubber or plastics — Determination of tear resistance.*

ISO 4675 : 1979, *Fabrics coated with rubber or plastics — Low temperature bend test.*

ISO 5978 : 1979, *Rubber- or plastics-coated fabrics — Determination of blocking resistance.*

ISO 7854 : 1984, *Rubber- or plastics-coated fabrics — Determination of resistance to damage by flexing (dynamic method).*

3 Definitions

For the purposes of this part of ISO 8096, the following definitions apply.

3.1 coating adhesion strength: The force necessary to effect a separation of the coating from its substrate under defined conditions.

3.2 peel bond strength: The force necessary to separate, under defined conditions, two coated surfaces bonded together with a suitable adhesive.

4 Technical requirements

4.1 Physical requirements

The material shall comply with the requirements of table 1 or table 2, as appropriate.

4.2 Colour fastness requirements

The material shall comply with the requirements of table 3.

5 Sampling

Samples shall be taken which are representative of the manufacturing batch from which they are drawn. Specimens for testing shall be taken from these samples in accordance with figure 1. The specimens shall be taken not less than 1 m from the end of the roll and not within 10 cm of a selvedge. Subject to annex A, sampling shall be carried out at the discretion of the testing authority.

6 Testing and compliance

6.1 The performance values specified in tables 1, 2 and 3 are those required of the manufacturing batch as a whole.

6.2 The method of selecting specimens from each sample shall be in accordance with annex A.

6.3 Tests shall be conducted as specified in tables 1, 2 and 3 on specimens extracted from each sample.

6.4 In the event of dispute, the results of the tests conducted as specified in tables 1 and 2 shall be subject to analysis in accordance with the provisions of annex B.

In such event, if the lower confidence limit of the mean as calculated in accordance with annex B is below a requirement described as "minimum" in table 1, the bulk of the coated fabric which the sample represents shall be deemed not to comply with the requirements of this part of ISO 8096 in respect of that physical property.

If the lower confidence limit of the mean as calculated in accordance with annex B is at or above a requirement described as "minimum" in table 1 or table 2, the bulk of the coated fabric which the sample represents shall be deemed to comply with the requirements of this part of ISO 8096 in respect of that physical property.

6.5 If, after the first series of tests, any physical property is deemed not to comply with the appropriate requirements of table 1 or table 2, two further samples shall be taken from the same source as the original sample and test specimens shall be taken from each sample so that duplicate tests may be conducted in respect of that physical property. The re-test results and the results of the first series of tests in respect of that physical property shall be jointly subject to analysis in accordance with the provisions of annex B. If the lower confidence limit of the mean so calculated in accordance with annex B is still below a requirement described as "minimum" in table 1 or table 2, the bulk of the coated fabric which the samples represent shall be deemed not to comply with the requirements of this part of ISO 8096. If the lower confidence limit of the mean is at or above a requirement described as "minimum" in table 1, the bulk of the coated fabric which the sample represents shall be deemed to comply with the requirements of this part of ISO 8096 in respect of that physical property.

6.6 If any of the specimens tested as specified in table 3 fails to comply with the appropriate requirements of table 3, the tests which the specimen has failed shall be repeated twice. For this purpose, two further samples shall be taken from the same source as the original sample and test specimens shall be taken from each sample so that duplicate tests may be conducted. If all the re-test results comply with the appropriate requirements of table 3, the bulk of the coated fabric which the samples represent shall be deemed to comply with the requirements of this part of ISO 8096. If any of the results of the re-tests do not comply with the appropriate requirements of table 3, the bulk of the coated fabric which the samples represent shall be deemed not to comply with the requirements of this part of ISO 8096.

7 Marking

Each roll of coated fabric shall have a label attached bearing the following information:

a) the name and/or distinctive mark of the manufacturer and means of identifying the manufacturer's batch number;

b) the reference number of this part of ISO 8096 (i.e. ISO 8096-2) and the appropriate grade reference, e.g. LP, HP or LS;

c) the fibre type of the base fabric, e.g. polyamide.

Table 1 — Physical requirements for polyurethane-coated fabrics

Property	Limit	Requirements		Method of test
		Grade		
		LP	HP	
Total mass/unit area (g/m^2)	min.	85	156	ISO 2286
Tearing force (N)				
longitudinal	min.	35	90	ISO 4674 Method A1
transverse	min.	35	90	
Breaking load (N)				
longitudinal	min.	620	1 150	ISO 1421 Constant rate of extension
transverse	min.	530	900	
Resistance to cracking	—	No cracks at −40 °C		ISO 4675
Blocking (PU coating to PU coating)	—	Separation without damage to coating		ISO 5978
Resistance to water penetration (kPa)				
as received	min.	10	10	Annex C
after flexing	min.	5	7	Annex D
after rubbing	min.	5	5	Annex E
after dry cleaning	min.	5	7	Annex F
after treatment in sodium hydroxide [1]	min.	5	5	Annex G
Coating adhesion (wet) (N)	min.	35	35	Annex H
Wet flexing	—	No delamination or change in resistance to water penetration		Annex J
Peel bond strength (N/50 mm) (before and after dry cleaning)	min.	35	35	Annex K

1) See introductory note to annex G.

Table 2 — Physical requirements for silicone elastomer-coated fabrics

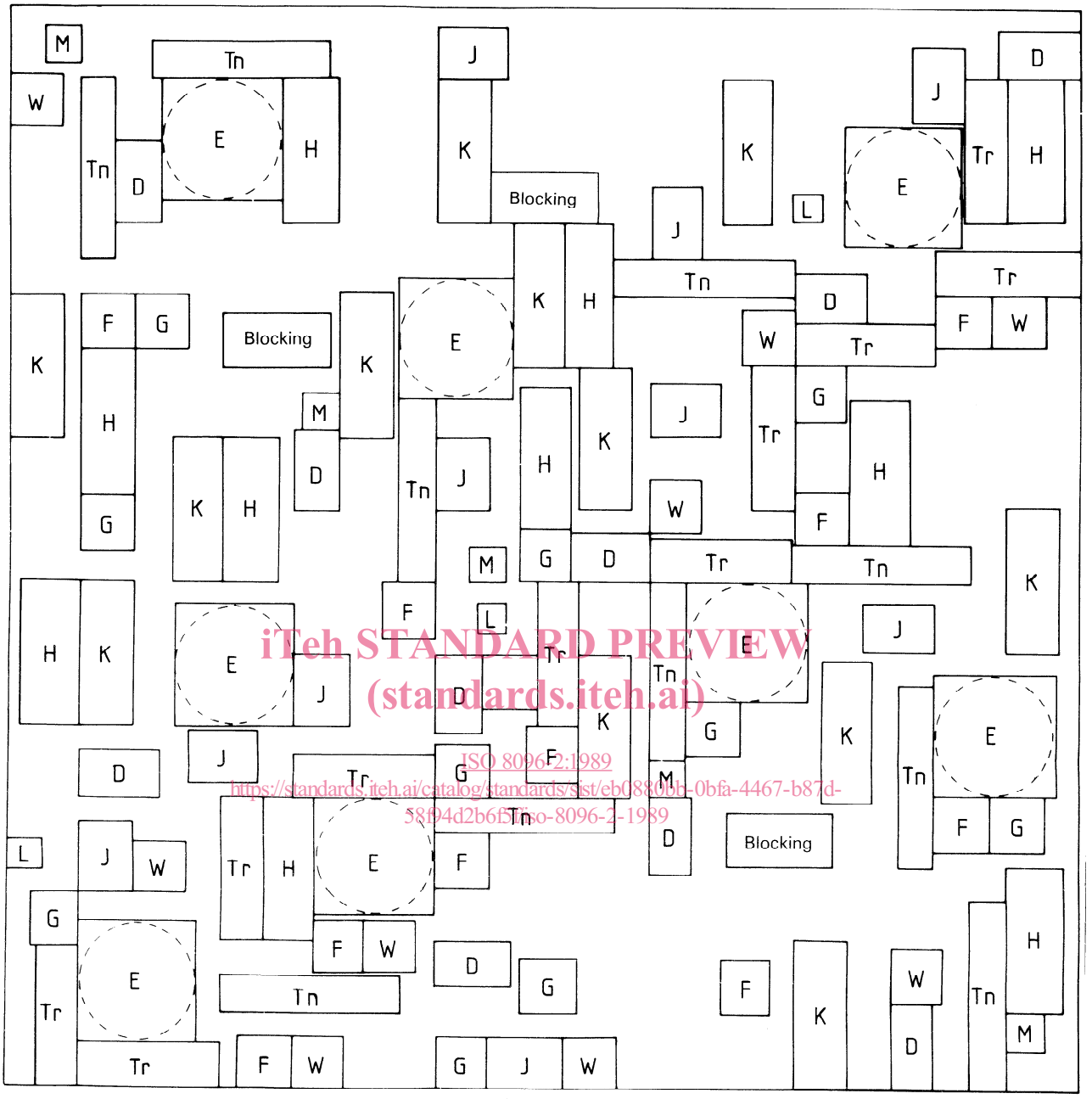
Property	Limit	Requirement	Method of test
		Grade LS	
Total mass/unit area (g/m^2)	min.	70	ISO 2286
Tearing force (N)			
longitudinal	min.	100	ISO 4674 Method A1
transverse	min.	100	
Breaking load (N)			
longitudinal	min.	570	ISO 1421 Constant rate of extension
transverse	min.	450	
Resistance to cracking	—	No cracks at −40 °C	ISO 4675
Resistance to water penetration (kPa)			
as received	min.	10	Annex C
after flexing	min.	5	Annex D
after rubbing	min.	5	Annex E
after dry cleaning	min.	5	Annex F
after treatment in sodium hydroxide [1]	min.	5	Annex G
Wet flexing	—	No delamination or change in resistance to water penetration	Annex J

1) See introductory note to annex G.

Table 3 — Colour fastness requirements

Property	Limit	Requirements for all grades	Method of test
Colour fastness to artificial light (xenon arc)	min.	5-6 [1)]	ISO 105-B02
Colour fastness to rubbing	min.	4-5	ISO 105-X12
Colour fastness to washing			ISO 105-C02
change in colour of specimen	max.	4-5	
stain on white	max.	4-5	
Colour fastness to dry cleaning			ISO 105-D01
change in colour of specimen	max.	4-5	
staining of solvent	max.	4-5	

1) The colour fastness ratings specified are those of that side of the coated fabric worn outermost. (This will normally be the uncoated or substrate side, but not necessarily so.)



Key

M	Mass determinations	Tn	Tensile determinations
L	Low-temperature determinations	Tr	Tear strength determinations
W	Water resistance determinations		Blocking as shown

Figure 1 — Scheme for selection of test specimens

NOTES

1 The letters shown in the figure relate to annexes D to K and the key above.

2 Specimens for light fastness testing may be taken from any suitable place on the sample, provided that all colours are represented.

Annex A
(normative)

Method of sampling and selecting test specimens

A.1 In the event of dispute, the following sampling requirements shall apply.

A.2 A sample shall be taken from each manufacturing batch identified as such in accordance with clause 7 at the rate of not less than one sample per 1 000 running metres.

A.3 Unless otherwise specified by the purchaser, samples shall not be taken within 1 m of the end of the roll or within 10 cm of a selvedge.

A.4 The size of samples taken from each manufacturing batch shall be such that the aggregate size of the samples is sufficient to enable test specimens to be selected for the purpose of fulfilling the appropriate test requirements in tables 1, 2 and 3.

A.5 The specimens for testing shall be selected from the samples taken in accordance with clause A.4 so that all samples are represented by specimens in each of the tests conducted in accordance with the appropriate requirements of tables 1, 2 and 3.

A.6 In the case of multi-coloured samples, all colours shall be represented by the specimens selected for colour fastness testing in accordance with table 3.

Annex B
(normative)

Determination of the standard deviation and confidence interval of the mean

B.1 The distribution of test results in the tests for physical properties specified in table 1 and table 2 shall be taken to be a normal distribution.

B.2 The test results obtained from the tests for physical properties specified in tables 1 and 2 shall be subjected to statistical analysis and an estimate of the standard deviation s shall be made in accordance with ISO 3207, i.e.

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

B.3 The 95 % confidence interval of the mean shall be calculated assuming a two-sided case in accordance with the provisions of ISO 2602 and the lower limit of the mean of the population taken to be

$$\bar{x} - \frac{t_{0,975}}{\sqrt{n}} s$$

B.4 In the case of re-tests as required by 6.5, the results of the first series of tests shall be included amongst the results of the re-tests for the purposes of estimating the standard deviation and the confidence interval of the mean.

Annex C
(normative)

Determination of resistance to water penetration

C.1 The apparatus specified in method B of ISO 1420 shall be modified by replacing the pressure gauge specified for one graduated in kilopascals or kilonewtons per square metre with a maximum capacity of 100 kPa. A draw-off valve shall also be fitted to enable water pressure to be released after testing.

C.2 Employing the apparatus described in clause C.1, and raising the pressure at the rate of 10 kPa/min, test 10 specimens at the pressure indicated in table 1 or table 2, as appropriate, maintaining the indicated pressure for 2 min before opening the draw-off valve. Five specimens per side of the coated fabric shall be tested.

C.3 Record the pressure at which any damp patches appear. Disregard any results where lateral leakage has occurred and repeat the test on a fresh specimen.

C.4 Calculate the arithmetic mean of the 10 results so obtained and report this value as the resistance to water penetration, in kilopascals.

Annex D
(normative)

Determination of resistance to water penetration after flexing

Ten specimens each 107 mm × 65 mm shall be exposed to a temperature maintained at 70 °C ± 2 °C in a relative humidity (RH) of 100 % for 24 h. Upon removal from this atmosphere, the specimens shall be placed in an atmosphere of 20 °C ± 2 °C and 65 % RH for a period of 24 h, and then each specimen shall be flexed for 200 000 cycles in accordance with method B of ISO 7854. After flexing, each specimen shall then be tested for resistance to water penetration in accordance with annex C. Five specimens shall be tested coating to water and five specimens fabric to water.

Annex E
(normative)

Determination of resistance to water penetration after rubbing

Eight specimens shall be subjected to 5 000 cycles using the apparatus described in annex L and a working pressure of 9 kPa ± 0,2 kPa, except that, in order to permit subsequent hydrostatic head testing, the coated specimen, backed by the standard abradant, shall be fixed to the bottom abradant tables, and the standard abradant shall be fixed to the specimen holders. The abrasion shall be on the coated side of the specimen. Each specimen shall then be tested for resistance to water penetration in accordance with annex C. Four specimens shall be tested coating to water and four specimens fabric to water.