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Meteorological balloons- — Specification

Ballons météorologiques — Spécifications

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documentsdocument should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawnISO draws attention to the possibility that some of the elementsimplementation of this document may beinvolve the subjectuse of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights. in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.htmlwww.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC4, *Products (other than hoses)*.

This second edition cancels and replaces the first edition (ISO 17717:2017), which has been technically revised.

The main changes compared to the previous edition are as follows:

— In table 3 of 4.3,in Table 3, the size of 10 withand its specified values has been added.;

— In table 6 of 4.5,in Table 6, the sizes of 10 to 100 withand their specified values have been added.;

— In table B.2 of Annex B,in Table B.2, the sizes of 10 to 100 withand their specified values have been added.;

— In table 8 of clause 5 and in C.3.2,in Table 8 and C.3.2, the mass range by mass has been changed to thesize range by size.;

— In A.2.4 and B.3.1,in A.2.4 and B.3.1, thin cotton gloves without coating on palm for precision work have been added.;

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— In E.3,in E.3, the statement has been changed to that "the number of samples shall be in accordance with table 8.Table 8".

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Meteorological balloons — Specification

Warning — Persons using this document should be familiar with laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to determine the applicability of any other restrictions.

1 Scope

This document specifies the minimum requirements and the test methods for meteorological balloons made from natural rubber latex or natural rubber latex compounded with synthetic rubber emulsion.

This document applies to two types of balloons:

— Type 1: meteorological balloon by dipping process;

— Type 2: meteorological balloon by moulding process.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 37, Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties

ISO 188, Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests

ISO 2859-1, Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obphttps://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/https://www.electropedia.org/

3.1
air bubble
thin portion with definite edge, concave or convex, which is created by air in the balloon film

3.2
body thickness
single-walled thickness of a meteorological balloon

3.3
cracking
localized cracks in the balloon film

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3.4
grease mark
stains on the balloon film due to machine grease or oil

3.5
hole
opening due to a ruptured *air bubble* (3.1),(3.1), foreign body impurities or other external factors

3.6
latex coagulum
gel adhered to inside and outside of the balloon film

3.7
permanent creases with adhesion of the film
localized occurrence of the balloon film folding over and sticking to itself

3.8
thin spot
portion of the balloon which has no defined edge and has a film thickness which is less than that of the average thickness of the balloon film

4 Requirements

4.1 Colour

The balloon shall be natural colour unless otherwise specified.

4.2 Appearance

When inspected in accordance with Annex A,Annex A, the appearance of the balloon shall conform to requirements in Table 1.Table 1. If the defect cannot be confirmed by visual inspection, then Annex B.Annex B shall be carried out.

Table 1 — Appearance

Defects		Requirements
Serious defects	hole, cracking	Non-existent
	grease mark	Non-existent
	permanent creases with adhesion of the film	Non-existent
Light defects	air bubble, latex coagulum	Air bubble and latex coagulum are allowed to exist, which is not concentrated, obviously thin, not more than 5 mm in diameter and does not affect the balloon film stretching.
	thin spot	The thin spot is allowed to exist. which is not concentrated, not obvious, and does not affect the balloon film stretching and the length is not more than 10 mm, double layer thickness is not more than 0,12 mm.

4.3 Size, mass and dimensions

When measured in accordance with Annex C and Annex D,Annex C and Annex D, the size, masses and dimensions of the type 1 meteorological balloons shall conform to the values given in Table 2,Table 2, the size,

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masses and dimensions of the type 2 meteorological balloons shall conform to the values given in Table 3.Table 3.

Table 2 — Size, mass and dimensions of the type 1 meteorological balloons

Size	Mass g	Dimension				
		Body length mm	Body thickness mm	Neck diameter mm	Neck length mm	Neck thickness mm
10	10 ± 4	200 to 300	0,05 to 0,3	18 to 26	40 to 80	0,5 to 0,9
20	20 ± 4	245 to 355	0,05 to 0,3	20 to 28	40 to 80	0,5 to 0,9
30	30 ± 4	340 to 460	0,05 to 0,3	24 to 32	60 to 100	0,5 to 0,9
50	50 ± 5	520 to 680	0,05 to 0,3	25 to 33	60 to 100	0,5 to 0,9
70	70 ± 5	540 to 740	0,05 to 0,3	25 to 35	60 to 100	0,6 to 1,0
100	100 ± 10	560 to 800	0,05 to 0,3	26 to 40	70 to 110	0,8 to 1,2
200	200 ± 20	950 to 1 250	0,05 to 0,3	28 to 54	70 to 110	0,8 to 1,2
300	300 ± 30	1 300 to 1 700	0,05 to 0,3	38 to 65	100 to 160	0,8 to 1,2
350	350 ± 30	1 450 to 1 850	0,05 to 0,3	39 to 65	100 to 160	0,8 to 1,2
400	400 ± 35	1 500 to 1 900	0,05 to 0,3	40 to 65	100 to 160	0,8 to 1,2
500	500 ± 40	1 800 to 2 200	0,05 to 0,3	46 to 70	100 to 160	0,8 to 1,2
600	600 ± 50	2 000 to 2 400	0,05 to 0,3	49 to 75	100 to 190	0,8 to 1,2
700	700 ± 50	2 100 to 2 500	0,05 to 0,3	49 to 75	100 to 190	0,8 to 1,2
800	800 ± 60	2 100 to 2 500	0,05 to 0,3	51 to 80	100 to 190	1,0 to 1,4
1 000	1 000 ± 70	2 100 to 2 500	0,05 to 0,3	51 to 86	100 to 190	1,1 to 1,7
1 200	1 200 ± 100	2 700 to 3 300	0,05 to 0,3	55 to 86	100 to 210	1,1 to 1,7
1 600	1 600 ± 150	2 900 to 3 700	0,05 to 0,3	73 to 90	100 to 210	1,1 to 1,7
2 000	2 000 ± 150	2 900 to 3 700	0,05 to 0,3	74 to 90	100 to 210	1,1 to 1,7
3 000	3 000 ± 200	2 900 to 3 700	0,05 to 0,3	75 to 90	100 to 210	2,1 to 2,7
NOTE In addition to the above sizes, balloons of other sizes are also available for customers with special requirements.						

Table 3 — Size, mass and dimensions of the type 2 meteorological balloons

Size	Mass g	Dimension				
		Body length mm	Body thickness mm	Neck diameter mm	Neck length mm	Neck thickness mm
10	10 ± 4	200 to 300	0,15 ± 0,05	12 to 18	70 to 100	1,1 ± 0,5

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Size	Mass g	Dimension				
		Body length mm	Body thickness mm	Neck diameter mm	Neck length mm	Neck thickness mm
20	20 ± 4	250 to 380	0,15 ± 0,05	12 to 18	70 to 100	1,1 ± 0,5
30	30 ± 4	300 to 420	0,15 ± 0,05	12 to 18	70 to 100	1,1 ± 0,5
50	50 ± 4	360 to 560	0,15 ± 0,05	12 to 18	70 to 100	1,1 ± 0,5
70	70 ± 5	550 to 750	0,15 ± 0,05	12 to 18	70 to 100	1,1 ± 0,5
100	100 ± 10	600 to 800	0,15 ± 0,05	12 to 18	70 to 100	1,1 ± 0,5
200	200 ± 12	850 to 1 050	0,15 ± 0,05	25 to 35	100 to 140	1,5 ± 0,5
300	300 ± 15	950 to 1 150	0,15 ± 0,05	25 to 35	100 to 140	1,5 ± 0,5
350	350 ± 20	1 100 to 1 350	0,15 ± 0,05	25 to 35	100 to 140	1,5 ± 0,5
400	400 ± 22	1 150 to 1 400	0,15 ± 0,05	25 to 35	100 to 140	1,5 ± 0,5
500	500 ± 25	1 400 to 1 700	0,15 ± 0,05	25 to 35	100 to 140	1,5 ± 0,5
600	600 ± 27	1 600 to 1 900	0,15 ± 0,05	25 to 35	100 to 140	1,5 ± 0,5
700	700 ± 28	1 700 to 1 950	0,15 ± 0,05	25 to 35	100 to 140	1,5 ± 0,5
800	800 ± 30	1 800 to 2 050	0,15 ± 0,05	25 to 35	100 to 140	1,5 ± 0,5
1 000	1 000 ± 35	1 950 to 2 150	0,15 ± 0,05	25 to 35	100 to 140	1,5 ± 0,5
1 200	1 200 ± 40	2 200 to 2 500	0,15 ± 0,05	25 to 35	100 to 140	1,5 ± 0,5
1 500	1 500 ± 45	2 300 to 2 600	0,15 ± 0,05	25 to 35	120 to 160	2,15 ± 0,55
1 600	1 600 ± 50	2 300 to 2 700	0,15 ± 0,05	25 to 35	120 to 160	2,15 ± 0,55
2 000	2 000 ± 80	2 800 to 3 300	0,15 ± 0,05	40 to 60	160 to 200	2,15 ± 0,55
3 000	3 000 ± 110	3 200 to 3 800	0,15 ± 0,05	40 to 60	160 to 200	2,15 ± 0,55

NOTE In addition to the ~~above~~ sizes given in this table, balloons of other sizes are also available for customers with special requirements.

4.4 Tensile Property

4.4.1 General

Tensile properties of balloons shall be measured in accordance with ISO 37, using three test pieces of Type 1 or Type 1A dumb-bell and taking the median value as the test result. Test pieces shall be taken from the middle part of balloon and equidistantly distributed along the circumference of the balloon body. The test pieces shall also be flat and the edge shall be smooth.

4.4.2 Tensile strength and elongation at break before accelerated ageing

Tensile strength and elongation at break of the balloons before accelerated ageing shall ~~comply~~conform with the requirements given in ~~Table 4.~~Table 4.

4.4.3 Tensile strength and elongation at break after accelerated ageing

Accelerated ageing shall be conducted in accordance with the method specified in ISO 188. The accelerated ageing condition is (8 ± 0,25) h at (100 ± 1) °C or (168 ± 2) h at (70 ± 1) °C. For reference purposes, the

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accelerated ageing conditions shall be (168 ± 2) h at (70 ± 1) °C. Tensile strength and elongation at break of the balloons after accelerated ageing shall comply with the requirements given in Table 4.Table 4.

Table 4 — Tensile properties

Property	Requirement
Tensile strength before accelerated ageing, MPa	≥17,0
Elongation at break before accelerated ageing, %	≥600
Tensile strength after accelerated ageing, (8 ± 0,25) h at (100 ± 1) °C or (168 ± 1) h at (70 ± 1) °C, MPa	≥16,0
Elongation at break after accelerated ageing, (8 ± 0,25) h at (100 ± 1) °C or (168 ± 1) h at (70 ± 1) °C, %	≥600

4.5 Bursting diameters

When tested in accordance with Annex E,Annex E, the bursting diameters of the type 1 meteorological balloons shall conform to the values given in Table 5.Table 5. The bursting diameters of the type 2 meteorological balloons shall conform to the values given in Table 6.Table 6.

Table 5 — Bursting diameters of the type 1 meteorological balloons

Size	10	20	30	50	70	100	200	300	350	400
Bursting Diameter, m	≥ 0,4	≥ 0,9	≥ 1,1	≥ 1,3	≥ 1,5	≥ 1,6	≥ 2,9	≥ 3,7	≥ 4,1	≥ 4,4
Size	500	600	700	800	1 000	1 200	1 600	2 000	3 000	—
Bursting diameter, m	≥ 4,9	≥ 5,8	≥ 6,1	≥ 6,6	≥ 7,6	≥ 8,0	≥ 9,2	≥ 10,0	≥ 12,0	—

Table 6 — Bursting diameters of the type 2 meteorological balloons

Size	10	20	30	50	70	100	200	300	350	400
Bursting diameter, m	≥ 0,4	≥ 0,9	≥ 1,2	≥ 1,4	≥ 1,6	≥ 1,8	≥ 3,5	≥ 4,3	≥ 4,8	≥ 5,2
Size	500	600	700	800	1 000	1 200	1 500	1 600	2 000	3 000
Bursting diameter, m	≥ 5,7	≥ 6,8	≥ 6,9	≥ 7,4	≥ 8,2	≥ 8,9	≥ 10,0	≥ 10,5	≥ 11,3	≥ 13,5

4.6 Ozone resistance

When testing the test pieces in accordance with Annex F,Annex F, crack, hole, split and other deterioration shall not be visible on the test pieces during the time given in Table 7.Table 7.

Table 7 — Ozone resistance

Size	300	350	400	500	600	700	800	1 000	1 200	1 600	2 000	3 000
Time, h	2									3		

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