

Specification For Meteorological Balloon



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Specification for meteorological balloon

1 Scope

This standard specifies requirements for the technique, inspection, acceptance, marking, packing, transporting and storage of export meteorological balloons. This standard is intended as a reference for the export natural latex meteorological balloon that be used to sound the meteorological elements in the sky.



2 Normative references

The following standards contain provisions, which through reference in this test constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standard are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

GB/T 528-98, *Rubber, vulcanized or thermoplastic- Determination of tensile stress-strain properties.*

GB 2828-1987, *Sampling procedures and tables by attributes for lot-by-lot inspection.*

GJB 987A-98, *Meteorological balloon- Methods of test*

JD-ZC-021-2002, *Material-Test items and property index*

3 Requirements

3.1 Materials

3.1.1 The meteorological balloon shall be made with natural latex and assistants that make it comply with the requirements given in JD-ZC-021-2002.

3.1.2 The separants which will damage the properties shall not be used.

3.2 Physical and mechanical properties

3.2.1 Physical and mechanical properties shall comply with the requirements given in table 1.

Table 1 physical and mechanical property

Item	Index	
	Tensile strength, (Mpa)	Elongation at break, (%)
Before aging, minimum	16.7	560
After aging(100°C×8h), minimum	15.7	560

3.3 Dimensions shall be in accordance with requirements given in table 2.

Table 2 Dimensions

Item Size(g)	Mass(g)	Neck length(mm) min	Neck diameter(mm)max	Length(mm)
10	10~14	40	24	140~200
30	30~40	60	33	320~400
50	50~60	60	39	450~550
100	100~118	80	45	750~850
200	200~230	100	64	900~1050
300	300~330	100	64	1200~1400
350	350~390	100	64	1300~1500
400	400~440	100	64	1400~1600
500	500~550	100	64	1700~1900
600	600~650	100	64	1900~2200
750	750~800	110	64	2000~2300
800	800~850	110	64	2200~2500
950	950~1000	110	64	2200~2500
1000	1000~1100	110	77	2400~2700
1200	1200~1300	110	83	2700~3000
1600	1600~1700	130	83	2900~3300
2000	2000-2100	140	83	3200-3600

3.4 The residues of calcium chloride should be less than 0.10%.



3.5 Appearances of meteorological balloon shall comply with the requirements given in table 3.

Table 3 Appearances

Item	Specifications
Seed, hole, fissure, grease marks, sticky	Forbidden
Motley	The motley that because of the excessive-sulfurize, rusty stain or the sunshine irradiating shall not be allowed. The motley won't damage balloon properties and the color change due to anti-ageing reagent are permitted.
Local deformation	Local deformation with clear crumple pattern is not permitted. If crumple pattern is not clear, or the deformation is caused of the mushroom crown through vulcanizing, the local deformation is allowed.
Slip rubber, slab rubber	Slip or slab rubber that will not affect the balloon expansion is allowed to exist.
Air bubbles, thin spot	The decentralized or not obvious thin bubbles and thin spots are allowed to exist.
Body leaning	Lay the balloon in a straight; the leaning of the bottom shall be no more than the total length of the balloon. The standard is : $\leq 300g, 10\%$; $> 300g, 5\%$.
Cut	Cut length which less than 1cm is permitted.

3.6 Inflating for inspection diameter shall be in accordance with the requirements given in table 4.

Table4 Inflation for inspection diameter

Size, g	10	30	50	100	200	300	350	400	500
Minimum diameter, mm	330	640	900	1220	1650	2600	2700	2800	3800

Size, g	600	750	800	950	1000	1200	1600	2000	
Minimum diameter, mm	4000	4500	4700	4900	5000	5500	6000	6400	

4 Inspection methods



4.1 Dimension shall be inspected in accordance with the test methods given in GJB 987A.

4.2 Appearance check
The balloon appearance shall be inspected in vision without tensile force on it.

4.3 Inflation for inspection
After appearance check, inflate the balloon with compressed air up to the diameter given in table 4.

Release the air naturally; the intact balloon is qualified, then collect. Inflating speed at first shall be controlled, that the standard is not made the balloons shake violently. The air pressure at exit is no more than 0.2 MPa.

4.4 Physical property test

Physical property test shall comply with methods given in GB/T 528.

Oven aging test shall comply with methods given in GJB 987A.

4.5 The residue of calcium chloride inspection shall comply with methods given in GJB 987A.



5 Acceptance rules

5.1 Every lot of balloons shall be sampled and inspected in accordance with GB 2828. The inspection levels and AQL shall conform to those specified in table 5.

Table 5 Inspection levels and AQL

Item	Clause	Inspection level	AQL
Physical and mechanical properties	3.2		Choose 3 samples. It is only one unqualified test piece shall be permitted in a test, and the maximum unqualified sample is one in total.
Dimensions	3.3	S-2	6.5
Calcium chloride residue	3.4		Choose 3 samples. It is only one unqualified test piece shall be permitted in a test, and the maximum unqualified sample is one in total.
Appearance	3.5	General I	2.5
Inflation for inspection	3.6	S-4	1.0

5.2 When the inspection results conform to the AQLs specified in table 5 and table 6, the lot of product is regarded as complying requirements and shall be accepted.

5.3 When the dimension and the appearance is not conforming to the AQLs specified in table 5, the unqualified item can be sampled stricter for another test. If the result is complying with the standard, the lot is qualified, otherwise, unqualified.



5.4 Packing shall be in accordance with requirements in table 6.

Table 6 Packing check

Inspection item	Clause	Inspection level	AQL
Packing bag, packing box	6.2	S-2	2.5
Certification and description	6.2		
Neck marks	6.1a		
Packing bag marks	6.1b		
Packing box marks	6.1c		
Marking	6.1e		

6. Marking, packing, transporting and storage



6.1 Marking

a) The size and date of manufacture shall be marked on the neck of balloon which mass over 200g (not include 200g).

b) Inner package shall be clearly marked with the followings in Chinese or English: name of product, size, quantity, color, and date of manufacture.

c) Unit package shall be clearly marked with the following in Chinese or English: name of product, size, lot number quantity, color, manufacturer, manufacturer's address, and date of manufacture.

d) Certification shall be clearly marked with number of standard, name of product, size, lot number, quantity, manufacturer, manufacturer's address, date of manufacture and inspector, as well as a qualified seal.

e) All of above shall be clearly and completely marked on the obvious place.

6.2 Packing

One or several balloons shall be packed in plastic-film bag, and then, put the bag into a box. A certain number of boxes shall be packed in unit package. A sheet of certification and description shall be put into each unit package. Requirements are as follow:

a) Unit package shall be durable and strength. When carry it, balloon shall not be damaged and spilled.

b) Carton or wooden trunk which has damp proof materials inside shall be made as unit package.

6.3 Transporting and storage

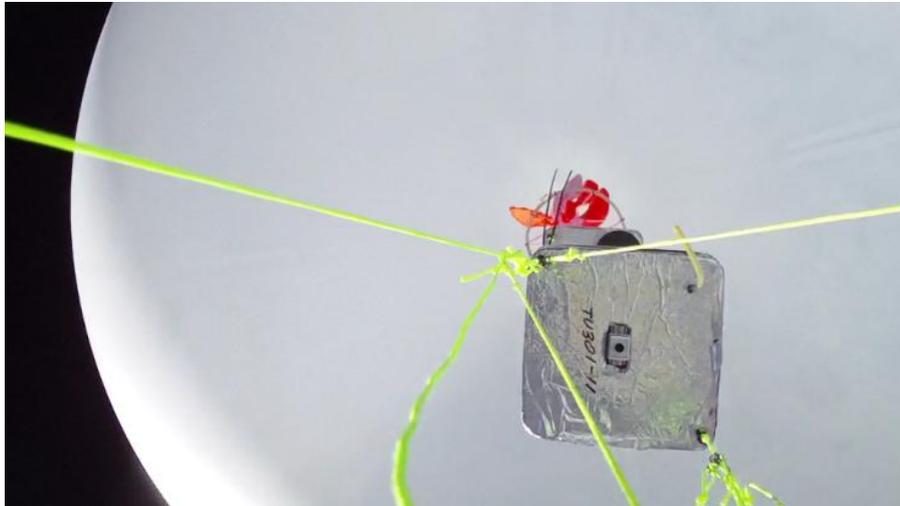




a) Products shall be covered through transporting and storage to avoid sunshine irradiating and rain, and keep clean and dry. Product is forbidden to contact with acid or alkali, oil, organic solvent and other things, which do harm to the properties of rubber. And it must be apart from the heat source more than 1m.

b) Storehouse shall be kept ventilation, cool and dry. The room temperature shall be kept 0~28°C, relative humidity lower than 70%. Balloon shall be put on the goods shelf 20cm away from the ground. Big pile is unsuitable; every pile shall be kept for a suitable distance. And must overturn the piles at least every three month.

c) Under above conditions, the products storage period is 18 months.



TECHNICAL INDEX FOR EXPORT METEOROLOGICAL BALLOON

NO.	SIZE (g)	WEIGHT (g)	NECK LENGTH (cm)	NECK DIAMETER (cm)	HORIZONTAL DIAMETER (cm)	AVERAGE BURSTING ALTITUDE (m)	COLOR	PACKAGE STANDARD	PACKAGE DIMENSION (mm)	PACKAGE GROSS WEIGHT (kg)	PAYLOAD (g)	AVERAGE RATE OF ASCENT (m/min)	
1	10	10~14	≥4	≤2.4	9~12	7000	RED, BLACK OR NATURAL	600 PER BOX	750×400×150	10	0	100	
2	30	30~40	≥6	≤3.4	20~25	10000		250 PER BOX	750×400×150	10.5		200	
3	50	50~60	≥6	≤3.9	29~35	12000		200 PER BOX	750×400×150	13		200	
4	100	100~118	≥8	≤4.5	48~54	16000		100 PER BOX	750×400×150	13.5		200	
5	200	200~230	≥10	≤6.4	57~66	21000		60 PER BOX	750×400×150	15	250	≥340	
6	300	300~330	≥10	≤6.4	77~89	25000	NATURAL	30 PER BOX	750×400×150	12			
7	350	350~390	≥10	≤6.4	83~95	26000		30 PER BOX	750×400×150	13			
8	400	400~440	≥10	≤6.4	90~101	27000		30 PER BOX	750×400×150	15			
9	500	500~550	≥10	≤6.4	108~121	30000		25 PER BOX	750×400×150	15			
10	600	600~650	≥10	≤6.4	121~140	31000		15 PER BOX	750×400×150	11.5			
11	750	750~800	≥11	≤6.4	137~162	32000		10 PER BOX	750×400×150	10			
12	800	800~850	≥11	≤6.4	140~162	33000		10 PER BOX	750×400×150	10.5			
13	950	950~1000	≥11	≤6.4	142~165	33500		10 PER BOX	750×400×150	12			
14	1000	1000~1100	≥11	≤7.7	153~172	34000		10 PER BOX	750×400×150	13			
15	1200	1200~1300	≥11	≤8.3	172~191	33500		10 PER BOX	750×400×150	14.5			
17	1600	1600~1700	≥13	≤8.3	190~210	37000		5 PER BOX	750×400×150	10.5			1050
18	2000	2000~2100	≥13	≤8.3	195~220	38000		5 PER BOX	750×400×150	12.5			