



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 38009-2019

**Spectacle frames - Requirement and method for the detection
of nickel release**

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1 Scope

This Standard specifies the requirement for the nickel release from the metal parts of metal and combination frames, the method of wear simulation, the measurement of nickel release, calculations, and test report.

This Standard applies to those spectacle frames which, if produced with materials or surface treatments containing nickel.

2 Normative references

The following documents are indispensable for the application of this document.

For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 14214 Spectacle frames - General requirements and test methods (GB/T 14214-2003, ISO 12870:1997, MOD)

ISO 12870:2016 Ophthalmic optics - Spectacle frames - Requirements and test methods

3 Requirement

Metal parts of metal and combination spectacle frames that come into prolonged contact

with the skin shall not have a nickel release greater than 0.5 ug/(cm² - week).

Coated spectacle frames are tested in accordance with Clause 4 and Clause 5.

Spectacle frames, which are made of homogeneous alloy or pure metal and are uncoated, are tested in accordance with Clause 5.

In accordance with the requirements of 4.2.3 in ISO 12870:2016, the parts to be tested include:

- Rims of the spectacle frame;
- Nose bridge, brace bar, and other nasal-bearing surfaces, including metal nose pads;
- Sides (excluding joints, zone around joints and protected by plastic end-covers).

For spectacle frames made of nickel-containing materials with low nickel release or nickel-containing surface treatment, see Annex A.

4.1 Principle

The items to be tested are exposed to a corrosive atmosphere before being placed in a tumbling barrel together with a wear medium of abrasive paste and granules. The barrel is rotated so as to subject the test pieces to wear from the wear medium. The items are then tested for nickel release in accordance with Clause 5.

4.2.1 General

Except where indicated, all reagents and materials that can come into contact with samples shall be free of nickel, and all reagents shall be of analytical grade or better.

4.2.2.1 Container

It can be closed; has a sample holder. All parts are made of inert materials (such as glass or plastic).

4.2.2.2 Corrosive medium

TAKE 50 g of lactic acid (mass fraction >85%) and 100 g of sodium chloride;

DISSOLVE in 1000 mL of deionized water.

4.2.2.3 Degreasing solution

Choose neutral detergent and use it after proper dilution. It is also possible to prepare a detergent, such as 0.5% (mass fraction) aqueous solution of sodium dodecylbenzene sulfonate.

4.2.2.4 Deionized water

The conductivity of deionized water is not more than 1 uS/cm.

4.2.3.3 Abrasive paste, produced for dry-tumbling barrels and comprising:

- 6% to 8% ester wax of montanic acids - Wax E [CAS No. 73138-45-1];
- 3% octadecanoic acid (stearic acid) [CAS No. 57-11-4];
- 30% to 35% petroleum distillates, hydrotreated light paraffinic [CAS No. 64742-55-8];
- 2% polyethylene glycol cetyl/oleyl ether [CAS No. 68920-66-1] or triethanolamine [CAS No. 102-71-6];
- 48% silicon dioxide (quartz) 200 um mesh size [CAS No. 14808-60-7];
- 6% to 9% deionized water.

4.2.3.4 Granules, composed of outer shells of coconuts, walnuts, peanuts and

almonds, mixed in a ratio 1:1:1:1 by weight, ground and sieved to give a mixture of particles having dimensions of between 0.8 mm and 1.3 mm.

4.2.3.5 Wear medium, composed of abrasive paste (4.2.3.3) and wear

granules (4.2.3.4) which are mixed as indicated in 4.5.1. Before use, the required wear medium shall be conditioned in a laboratory for at least 24 h.

4.2.3.6 Retaining assembly, consisting of a threaded rod which carries three

hexagonal metal plates (Figures 2 and 3). The plate, A, is perforated with holes of diameter 1.5 mm, or as appropriate, positioned 10 mm to 15 mm from the edge of the plate, to take the ends of the tips of the sides. The plate, B, is perforated with holes of diameter 5.0 mm, or as appropriate, positioned 10 mm to 15 mm from the edge of the plate, to take the joint ends of the sides, together with an aperture of 40 mm diameter to act as a filling hole. A silicone rubber sheet is drilled with small holes matching the position of those in plate B; and placed on one side of the plate B. Plate C has at least one hole for a threaded rod. The nut is used to fix the plates and the distance between the plates.

According to the width of the front frame of the spectacle frame to be tested or the length of the sides, adjust the distance between the plates A and B.

25 absorbent paper. After degreasing, samples should be handled with plastic forceps or clean protective gloves.

Note 2: This degreasing stage is intended to remove extraneous grease and skin secretions due to handling, but not any protective coatings.

4.4 Corrosion

Pour the corrosive medium (4.2.2.2) into the container (4.2.2.1); fix the sample on the holder, so that the bottom of the sample is above the liquid level of the medium. Cover the container and put it in an oven (4.2.2.5) at 50 °C for 2 h.

Remove the container from the oven and carefully open it under a fume hood.

Rinse the items with deionized water (4.2.2.4). Place on absorbent paper and allow to dry at room temperature for about 1 h, then perform the wear procedure specified in 4.5 without delay.

Note: This stage is for protective coatings (such as metallic coatings, lacquers and organic coatings, etc.).

4.5.1 Preparation of wear medium

Weigh a sufficient quantity of wear granules (4.2.3.4) in order to fill the tumbling barrel (4.2.3.1) to half its depth. Add 7.5 g of abrasive paste (4.2.3.3) for every kilogram of wear granules and homogenize the wear medium by rotating in the barrel for 5 h.

If the wear medium has not been used within 1 week, re-homogenize by rotating it in the barrel for 1 h.

Note: This procedure coats the granules with the abrasive paste, forming the wear medium that is used to simulate wear.

Keep the wear medium in a closed container until use and between uses.

After two wear procedures, add 7.5 g more of abrasive paste for every kilogram of wear medium. Re-homogenize by rotating it in the barrel for a further 5 h.

After four wears, new wear media shall be replaced.

4.5.2 Attachment of test items

Attach the items inside the retaining assembly so that they cannot come into contact with each other or collide with the barrel walls or other parts that could cause damage during tumbling.

25 shall be free of nickel.

5.2.1 Deionized and aerated water: Fill a tall-form 2-L-beaker with deionized

water, specific conductivity ≤ 1 uS/cm. Attach a gas distribution tube to a cork and position