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Code of practice for silk quality evaluation of silkworm cocoons

桑蚕茧蚕丝品质评定技术规程

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1 Scope

This document establishes the procedure for evaluating the silk quality of mulberry silkworm cocoons and sets out technical requirements for the preparation of the cocoon sample, floss removal and cocoon sorting, cocoon cooking, the reelability test, the neatness and cleanness tests, data processing, grading and the writing of the test report.

It applies to the evaluation of small-lot cocoon samples.

2 Normative references

The content of the following documents constitutes indispensable provisions of this document through normative reference in the text. For dated references, only the version corresponding to that date applies to this document; for undated references, the latest version, including all amendments, applies.

GB/T 1798 Test methods for raw silk; GB/T 8170 Rules for rounding off of numerical values and expression and judgement of limiting values; GB/T 9111 Test methods for mulberry dried cocoons; GB/T 9176 Mulberry dried cocoons; GB/T 15268 Mulberry fresh cocoons.

3 Terms and definitions

No terms and definitions are needed in this document.

4 Evaluation procedure

The procedure for evaluating the silk quality of mulberry silkworm cocoons is shown in Figure 1, entitled Flow chart of the procedure for evaluating the silk quality of mulberry silkworm cocoons.

5 Preparation of the cocoon sample

5.1 Numbering of the sample. A test number shall be written for each cocoon sample to be

tested, and the number tag shall be tied beside the mouth of the bag.

5.2 Check weighing of the sample. The requirements are as follows: a) weighing instrument: range 1 000 g, scale interval 0.1 g; b) weighing: weigh the mass of the cocoon sample to one decimal place and enter it in the corresponding check-weight column.

5.3 Drying of the sample. Carry this out in accordance with the relevant provisions of GB/T 15268.

6 Floss removal and cocoon sorting

6.1 Floss removal. Remove the floss with a floss-removing machine or by hand, keeping the bare cocoons and the floss separate.

6.2 Sorting inspection. 6.2.1 Equipment. The equipment for the sorting inspection comprises: a) a sorting table; b) a weighing instrument with a range of 1 000 g and a scale interval of 0.1 g; c) a cocoon counter. 6.2.2 Method of operation. In accordance with GB/T 9111, sort out the inferior cocoons, weigh the mass of the reelable cocoons, the inferior cocoons and the floss, and calculate the reelable cocoon percentage. 6.2.3 Operating requirements. Carry these out in accordance with the relevant provisions of GB/T 9111 and GB/T 15268. 6.2.4 Division of the test cocoons into zones. Divide them by the equal-number, equal-mass method according to the quantity of the sample, as follows: a) for a sample of 80 cocoons, take 50 cocoons for the reelability test and 20 cocoons for the neatness test; b) for a sample of 400 cocoons or more, or a sample of 1 kg, divide it equally into 2 zones, with 100 cocoons per zone for the reelability test, the remaining sample, not more than 500 g, being used for the neatness and cleanness tests.

7 Cocoon cooking

7.1 Equipment. Cocoon cooking apparatus, comprising the cooking pan, the penetration vessel, the water-absorption trough and the like.

7.2 Process conditions. The cooking process shall be set sensibly according to the quality of the cocoons and of the water so that proper cooking is obtained. Cocoon cooking shall meet the following conditions: a) high-temperature penetration: 98.5 plus or minus 1.5 degrees C; b) low-temperature water absorption: 60 plus or minus 5 degrees C; c) cooking-through temperature: 99 plus or minus 1 degrees C; d) temperature of the bucket bath: 40 plus or minus 3 degrees C; e) water quality: total hardness below 1.5 mmol/L and total alkalinity below 1.5 mmol/L.

7.3 Method of operation. Load each zone or sample separately into a cooking basket or bag, carry out high-temperature penetration for about 1 min and low-temperature water absorption for 10 min to 15 min, then cook the cocoons for a further 1 min to 1.5 min, take them out, tip them into the cocoon bucket and send them to the reeling machine.

8 Reelability test

8.1 Equipment. A sitting reeling machine with a stable and adjustable reel speed.

8.2 Process conditions. The process conditions for the reelability test are as follows: a) reel speed: 96 plus or minus 3.2 m/min; b) bath temperature: the reeling bath at 36 plus or minus 2 degrees C and the brushing bath at 84 plus or minus 2 degrees C; c) number of ends: 3 ends for a 50-cocoon test and 6 ends for a 100-cocoon test; d) number of cocoons per end: 8; e) pupa-skin percentage, that is the mass of the pupa skin as a percentage of the mass of the whole cocoon: 2.4 % to 2.8 % for spring cocoons and 2.8 % to 3.2 % for summer and autumn cocoons.

8.3 Method of operation. The method of operation for the reelability test is as follows: a) the 100-cocoon reelability test on the two zones is carried out by two reelers working as a pair; b) after the ends have been picked up, count the cocoons with an end and those without an end and check the number of test cocoons; c) start the ends to the prescribed number of ends and the prescribed number of cocoons per end; before starting, turn back 5 revolutions and set the number of cocoons per end exactly, then divide the ends and start the reels; in the 50-cocoon reelability test all the reels are started at once, whereas in the 100-cocoon reelability test 4 edge reels may be started first and 2 more added in turn until all are running; d) after starting, keep to the number of cocoons per end, feeding new and thin cocoons evenly and adding an end before pinching one off; avoid discarded silk and looped waste silk, and if there is not time to feed an end the reel may be stopped; e) when a cocoon has been reeled down to the point where the pupa skin wrinkles and is about to break, pinch it off deliberately; f) find the ends by hand; g) when the cocoons fed to an end are nearly used up, combine the ends, the first started being the first combined, combining them one after another, and when the last end can no longer hold 8 cocoons per end stop reeling, mark it properly and take the reel down; h) during the reelability test, measure the reel speed once a day, taking the second small reel from the left or right side as the measuring position.

8.4 Rules. If inferior cocoons are found during reeling to have been missed in sorting, the reelable cocoon percentage and the number of test cocoons shall be adjusted again. Cocoons that become over-cooked, cocoons pierced during brushing and cocoons left over from reeling that arise in the course of reeling shall not be deducted from the number or the mass of the test cocoons of that zone.

8.5 Determination of dropped-end cocoons. Carry this out in accordance with the relevant provisions of GB/T 9111.

8.6 Classification of the cocoons left after reeling. Carry this out in accordance with the relevant provisions of GB/T 15268.