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

SN/T 5233-2020

**Import and export textile raw materials, determination of
moisture regain of raw cotton, near infrared spectroscopy**

进出口纺织原料 原棉回潮率测定 近红外光谱法

(English Translation)

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed and managed by the General Administration of Customs of the People's Republic of China.

Drafting organization of this standard. Nanjing Customs of People's Republic of China.

1 Scope

This standard specifies the test method for rapid determination of moisture regain of raw cotton by near infrared spectroscopy.

This standard applies to raw cotton with a moisture regain in the range of 6% to 15% after the seed cotton is processed by a sawtooth gin or a top roller gin.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated

reference documents, the latest version (including all amendments) is applicable to this document.

GB/T 6102.1 Test method for moisture regain of raw cotton Oven method SN/T 3702.2 Sampling method for quality conformity evaluation of import and export textiles Part 2: Textile raw materials

3 Terms and definitions

The following terms and definitions apply to this document.

Quantitative model

A mathematical model of the relationship between the near-infrared spectrum of the sample and the concentration of the corresponding substance established by the method of chemometrics.

Monitor samples

A uniform and stable sample of the same variety used to monitor the stability of the daily work of the near-infrared analyzer.

4 Principle

In the near-infrared region, water molecules have a very characteristic combined frequency absorption band, and near-infrared spectroscopy can be used to determine the water content in a substance.

Using the chemometric method, establish a mathematical model between the oven method test results of the raw cotton moisture regain and its near-infrared spectrum, that is, the quantitative model type. Through the quantitative model, quickly determine the moisture regain of raw cotton.

5.1 Near-infrared spectrometer

Fourier transform type near infrared spectrometer or raster scanning type fiber spectrometer.

Note: Fourier transform near infrared spectroscopy needs to be equipped with a sample rotating device and a sampling bottle. The sampling bottle is made of quartz.

5.2 Monitoring samples

The monitoring sample of Fourier transform infrared spectroscopy is a raw cotton sample with a known moisture regain value, sealed in the same specification and material as the sampling bottle can be used for monitoring; the monitoring sample of the raster scanning fiber spectrometer is a raw cotton sample with a known moisture regain value, sealed in

quartz in a flat-bottomed container made of material, the bottom area of the container should be larger than the sampling spot, which can be used for monitoring.

6.1.1 Instrument conditions

Because the test results are closely related to the instruments used, and there are many types of near-infrared spectroscopy instruments, it is impossible to give near-infrared spectroscopy.

General parameters of spectrometers. Near-infrared spectrometers that meet the following instrument conditions have been proven to be suitable for testing.

- a) Light source. halogen tungsten lamp, wavelength range of 4 000 cm⁻¹~10 000 cm⁻¹;
- b) Signal-to-noise ratio. 10 000.1;
- c) Resolution. 8 cm⁻¹;
- d) Detector. InGaAs sensor with temperature control;
- e) If the near-infrared analysis model of the moisture regain of raw cotton is successfully transmitted, it should meet the requirements of A.2.3 in Appendix A, see B.2.1 in Appendix B.

6.1.2 Instrument preparation

As follows.

- a) Preheating of the instrument. more than 0.5 h;
- b) Instrument stability automatic test. linear system, noise system, temperature system and wavelength accuracy system adaptability system self-test.

6.1.3 Extraction of samples

Sampling shall be carried out according to the sampling method for moisture regain inspection specified in SN/T 3702.2. The sampling volume is not less than 50 g.

6.1.4 Model monitoring

Use the monitoring sample to determine the NIR spectroscopy analysis model, and the maximum deviation of the multiple measurement results of the same monitoring sample is not big it is less than 1.0%, and the absolute error between the near-infrared measurement result and the moisture regain content of the raw cotton marked on the monitoring sample is not more than 0.5%.

6.1.5 Determination

In order to avoid errors caused by uneven samples, three samples of raw cotton were collected on the front side, the back side, and the inner layer. Raw cotton Place the sample in the sampling bottle, compress the sample with a metal accessory with a flat surface, place the sampling bottle on the rotating device, and take the flat surface that rotates once.

The average spectrum is used as the spectrum data for one measurement. Take care to avoid weeds and foreign fibers when sampling.

Take the average value of the spectrum of 3 parts and calculate the result according to the quantitative model of raw cotton moisture regain (see Appendix B, B.2.1). each each sample is tested twice.

6.2.1 Instrument conditions

Because the test results are closely related to the instruments used, and there are many types of near-infrared spectroscopy instruments, it is impossible to give near-infrared spectroscopy.

General parameters of spectrometers. Near-infrared spectrometers that meet the following instrument conditions have been proven to be suitable for testing.

- a) Light source. halogen tungsten lamp, wavelength range of 1 000 nm to 1 800 nm;
- b) Signal-to-noise ratio. 30 000.1;
- c) Resolution. 10 nm;
- d) Wavelength accuracy. better than 0.2 nm;
- e) Wavelength stability. better than 0.02 nm;
- f) InGaAs sensor with temperature control;
- f) If the near-infrared analysis model of the moisture regain of raw cotton is successfully transmitted, it should meet the requirements of A.2.3 in Appendix A, see B.2.2 in Appendix B.

6.2.2 Instrument preparation

As follows.

- a) Preheating of the instrument. more than 0.5 h;
- b) Automatic test of instrument stability. automatic test of dark current noise, spectral capability, absorbance noise, absorbance and wavelength accuracy.