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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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GB/T 745-2026

Replacing GB/T 745-2003

Fibrous raw material and pulps - Determination of pentosan

造纸原料和纸浆 多戊糖的测定

Issued on: May 25, 2026 **Implemented on: December 1, 2026**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

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Foreword

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GB/T 745-2026 English version. Fibrous raw material and pulps - Determination of pentosan ICS

30 National Standards of the People's Republic of China Replaces GB/T 745-2003 and GB/T 2677.9-1994 Determination of pentosans in papermaking raw materials and pulp Published on 2026-05-

25 Implemented on December 1, 2026 State Administration for Market Regulation The State Administration for Standardization issued a statement.

1.Scope This document describes a method for determining pentosans in papermaking raw materials and pulp. This document applies to the determination of pentosans in various papermaking raw materials and pulps.

3.Terms and Definitions This document does not contain any terms or definitions that need to be defined.

4.Principles The sample was heated with 12% hydrochloric acid to convert the pentosaccharides in the sample into furfural, which was then determined by volumetric or

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colorimetric methods. The furfural content in the distillate was calculated and converted to pentosaccharide content. Volumetric methods include tetrabromination and dibromination. the tetrabromination method is performed at 20°C~25°C. The process is carried out at 0°C~2°C, where the distillate reacts with excess bromine for 1 hour, and 1 mol of furfural consumes

4.05 mol of bromine atoms; the dibromination method is carried out at 0°C~2°C. The reaction time is 5 minutes, and 1 mol of furfural consumes 2 mol of bromine atoms. The reaction formula is shown in Appendix A.

5.Reagents Unless otherwise specified, use only analytical grade reagents.

5.1 Water, GB/T 6682, Grade III.

5.2 Sodium chloride (NaCl).

5.3 Xylose (C5H10O5) standard. 5.4 95% ethanol.

5.5 Sodium bromide-sodium bromate (NaBr-NaBrO3) or potassium bromide-potassium bromate (KBr-KBrO3) mixed solution. Weigh 2.5g of sodium bromate and Dissolve 12g sodium bromide (or weigh out 2.8g potassium bromate and 15g potassium bromide) in water (5.1), then transfer the solution to a 1000mL volumetric flask and add water. (5.1) Dilute to the mark. 5.6 12% hydrochloric acid solution (HCl). Measure 307 mL of hydrochloric acid (rho20 =

1.19 g/mL), dilute with water (5.1) to 1000 mL, and then add acid. Or water, when the temperature is adjusted to 20°C, rho20 =

6 Instruments and Equipment

6.1 Furfural distillation apparatus (see Figure 1), its composition is as follows:

a) Round-bottom flask. 500mL;

b) Dropping funnel. with 30mL interval graduations;

c) Serpentine condenser;

d) Erlenmeyer flask. 500mL, graduated.

6.3 Burette. 50mL.

6.4 Pipettes. 100mL and 25mL.

6.5 Erlenmeyer flasks. 500mL and 1000mL, with ground glass stoppers.

6.6 Volumetric flasks. 50mL and 500mL.

6.7 Temperature-controlled electric furnace.

6.8 Constant temperature water bath.

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6.9 Spectrophotometer.

7 Sampling and Sample Preparation

7.1 Papermaking raw materials shall be sampled in accordance with GB/T 2677.1, and pulp shall be sampled in accordance with GB/T 740.

7.2 The sampling quantity for different categories of samples shall be in accordance with Table 1.

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8.1.1.1 Distillation of furfural Weigh a certain amount of sample (accurate to 0.0001

g) according to Table 1, and place it on clean, smooth weighing paper (at the same time, weigh another sample according to Table 1). (Determination of moisture content according to GB/T 2677.2 or GB/T 462), then transfer it to a 500mL round-bottom flask (6.1), add 10g of sodium chloride (5.2), 100 mL of 12% hydrochloric acid solution (5.6). Attach the condenser (6.1) and dropping funnel (6.1). The funnel should contain a certain amount of 12% hydrochloric acid solution. (5.6). Adjust the temperature of the temperature-controlled electric furnace (6.7) under the flask to bring the contents of the flask to a boil, and control the distillation rate to be every 10 minutes. Distill off 30 mL of distillate. Afterward, for every 30 mL of distillate distilled, add 30 mL of 12% hydrochloric acid solution (5.6) from the dropping funnel to the boiling water. In the bottle. After a total of 300 mL of distillate has been distilled, test whether the furfural has been completely distilled using an aniline acetic acid solution (5.10). That is, use a test... Collect 1 mL of distillate from the bottom of the condenser, add 1-2 drops of 0.1% phenolphthalein indicator (5.13), and then add 1 mol/L NaOH solution. Neutralize the solution (5.9) until it just turns a faint red, then add 1 mL of freshly prepared aniline acetate solution (5.10). After standing for 1 minute, if a red color appears... If the color is red, it indicates that the furfural has not been completely distilled and should continue to be distilled. If it does not turn red, it indicates that the distillation is complete.

8.1.1.2 Volume Adjustment of Distillate After furfural distillation, the distillate was transferred to a 500 mL volumetric flask (6.6), and the conical flask was rinsed with a small amount of 12% hydrochloric acid solution (5.6). Next, pour all the washing solution into a volumetric flask, then add 12% hydrochloric acid solution (5.6) to make up to the mark, stopper tightly and shake well.

8.1.1.3 Measurement Use a pipette (6.4) to draw.200 mL of distillate and place it in a 1000 mL conical flask (6.5) with a ground glass stopper. Add 250 g of [unclear text - possibly a conical flask or liquid] Crushed ice made with water (5.1). When the temperature of the solution in the conical flask drops to 0°C, accurately add sodium bromide-sodium bromate mixture using a pipette (6.4). Add 25 mL of the mixture (5.5). Then quickly seal the bottle tightly, place it in the dark, and time it for 5 minutes using a timer (6.2), while keeping the

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solution temperature at 0°C. After the specified time has elapsed, add 10 mL of 10% KI solution (5.8) to the conical flask, tighten the stopper, shake well, and place in the dark for 5 minutes. Then, the precipitated iodine was titrated with

0.1 mol/L sodium thiosulfate standard solution (5.11). When the solution turned pale yellow, 2 mL of solution was added. Add 3 mL of 0.5% starch solution (5.12) and continue titrating until the blue color disappears. Take another.200 mL of 12% hydrochloric acid solution (5.6) to replace the distillate and conduct a blank test.

8.1.2 Tetrabromide method

8.1.2.1 Distillation of furfural Same as 8.1.1.1.

8.1.2.2 Volume Adjustment of Distillate Same as 8.1.1.2.

8.1.2.3 Measurement Use a pipette (6.4) to draw.200 mL of distillate and place it in a 500 mL Erlenmeyer flask with a ground glass stopper. Add sodium bromide-bromic acid. Add 25 mL of sodium mixture (5.5), then quickly seal the bottle and let it stand in the dark for 1 hour. The room temperature should be 20°C~25°C at this time. After the specified time has elapsed, add 10 mL of 10% KI solution (5.8) to the conical flask, tighten the stopper, shake well, and let stand in the dark for 5 minutes. The precipitated iodine was then titrated with

0.1 mol/L sodium thiosulfate standard solution (5.11). When the solution turned pale yellow, 2 mL to 3 mL of solution was added. Add a 0.5% starch solution (5.12) and continue titrating until the blue color disappears. Take another.200 mL of 12% hydrochloric acid solution (5.6) to replace the distillate and conduct a blank test.

8.2 Colorimetric Method

8.2.1 Distillation of furfural Same as 8.1.1.1.

8.2.2 Measurement Pipette 5 mL of distillate and 25 mL of 3,5-dihydroxytoluene solution (5.7) into 50 mL volumetric flasks (6.6). Shake well, place in a constant temperature water bath at (25±1)°C, remove after (60±5) min, add 95% ethanol (5.4) to the mark, and place in a constant temperature water bath at (25±1)°C. Cool the volumetric flask in a constant temperature water bath at (25±1)°C. When the temperature of the volumetric flask drops to (25±1)°C, add an appropriate amount of 95% ethanol (5.4) and make up to the mark. Starting from the first addition of ethanol, after (60±5) min, use a spectrophotometer (6.9) at 630 nm, and adjust the instrument with blank solution. The absorbance is zero, then the absorbance of the test solution is measured. To prevent acid mist from corroding the instrument, the colorimetric cell must be covered during measurement. A blank test was conducted using 5 mL of 12% hydrochloric acid solution (5.6) instead of the distillate.

8.2.3 Plotting the Standard Curve Weigh approximately 40 mg, 80 mg, 120 mg, 160 mg, and.200 mg of xylose (5.3), accurate to

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