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**Sanitary paper products - Determination of the resilience of
elastic components**

卫生用纸制品 弹性部件回弹性能的测定

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents". Drafting. Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed by the China National Light Industry Council. This document is under the jurisdiction of the National Technical Committee on Standardization of Paper Industry (SAC/TC141). This document was drafted by: King Hong Ye Paper Group Co., Ltd., Fujian Heng'an Household Products Co., Ltd., and China Pulp and Paper Research Institute. Yuanyuan Co., Ltd., Zhejiang Yiwei Personal Care Products Co., Ltd., Lulu Health Technology Co., Ltd., Beijing Procter & Gamble Technology Co., Ltd., Unicharm Daily Necessities (China) Co., Ltd., Zhejiang Zhenqi Nursing Products Co., Ltd., Qianzhiya (Jinhua) Technology Industry Co., Ltd., Hangzhou Reliable Nursing Products Co., Ltd. Lipin Co., Ltd., China Light Industry (Jinjiang) Hygiene Products Research Co., Ltd., and China Light Industry Paper Products Inspection and Certification Co., Ltd. The main drafters of this document are: Qiu Wenlun, Wu Xiaobiao, Tang Shengde, Liu Junjie, Xu Yong, Li Wenzheng, Nie Zhiqiang, Wang Jiajun, Tian Miao, and Kong Songhua. Xie Zhijuan, Yu Feiying, Ma Feiyue, Bo Wenfei, Luo Gai, Zhang Jianpo, Zhu Yunping, Liao Zhuhong, Liu Bing, Shi Yi, Zhang Chun'e, Shao Yu, Chen Kai, Xie Jinglei Sun Wengang, Liu Yang, and Feng Yafang. sanitary paper products Measurement of the resilience of elastic components

1. Scope This document describes a method for determining the resilience of elastic components in sanitary paper products. This document applies to the determination of the elasticity of the waistband and leg openings of sanitary paper products with elastic components, including diapers. Pants, waistband-type diapers, feminine hygiene pants, etc. This document does not apply to diapers with side ear flaps as elastic components.

4.Principles The elastic component to be tested is placed on the clamping device of the resilience performance tester. The instrument is used under fixed tensile force or fixed elongation conditions. Perform uniform stretching. Once the stretching force reaches a fixed value or the stretching length reaches a fixed elongation, pause for a period of time and then reset the instrument. Then... The specimen is moved back and forth a certain number of times within a specified displacement. Based on the recovery curve of the last movement, the time when the elastic component of the specimen returns to the specified displacement is read. The restoring force and length are determined, and the elastic recovery rate of the specimen after tension is calculated based on the length of the specimen when it is pre-stretched to the pre-tension.

5 Instruments

Rebound performance tester. vertical or horizontal, measuring range 0N~30N, capable of acquiring at least 20 effective force values per second during testing. The instrument is equipped with... It has a clamping device, which includes a pair of clamps (for testing tape-type diapers) and a pair of clamping rods (for testing pant-type diapers and feminine hygiene products). (For trousers), the clamp width is 20mm, the clamping rod diameter is 10mm, and the length is 250mm.

6.Sample collection and pre-test treatment For each sample, a sufficient number of specimens should be selected according to the test items, and the specimens should be taken from at least two sales packages. Tests to be conducted before testing. The sample should be treated for at least 4 hours under the conditions specified in GB/T 10739.temperature (23±1)°C and relative humidity (50±2)%. The experiment will be conducted below.

7.1 Determination of elastic recovery performance under constant stress

7.1.1 Set the instrument's tensile and recovery speeds, initial clamping distance, and tensile constant force. A tensile and recovery speed of 100 mm/min is recommended, but other speeds may be used. Select other stretching and recovery speeds; the initial clamping distance can be selected according to the recommended values in Table 1, and the tensile constant force can be selected according to the recommended values in Table 2. Alternatively, other initial clamping distances and tensile force values can be selected based on the specific product conditions (such as different specifications) or by mutual agreement.

7.1.2 Take a sample and place it on the clamping device of the testing instrument. When testing the elastic waistband's tensile resilience at a constant force, for trousers... For diaper or feminine hygiene products, place the entire elastic waistband on the two clamping rods at both ends of the testing instrument, with the front end of the sample facing the test. For the sample placement, the sealing lines on both sides are positioned at the clamping rods

at both ends, as shown in Figure

1. For waist-adhesive diapers, the back waist tabs are... The two end tabs (starting from the adhesive application point) are fixed to the two clamps of the testing instrument, and the sample clamping diagram is shown in Figure

2. Testing the elastic leg. When testing the elasticity of the diaper under tension, place the bottom of the leg opening of the pant-style diaper or feminine hygiene panty on the left (upper) clamping bar and the upper end on the right (lower) clamping bar. The sample is placed on the clamping rod, ensuring that the test area is the inner elastic component and not the leak-proof partition. A schematic diagram of the sample placement is shown in Figure

3. Horizontal rebound performance. The two clamping rods of the tester should be equipped with corresponding fixing devices to ensure that the sample is fixed and does not fall off after being placed.

7.1.3 After placing or clamping the sample, zero the force value, start the test, and pre-stretch one end of the sample until the force value reaches 0.3N pre-tension. At this time, the instrument automatically records the length L_1 of the specimen between the two clamping devices. The specimen continues to be stretched until the force reaches the set constant force value, at which point the stretching stops. The tension is stopped and held for 30 seconds. The instrument automatically records the length L_2 of the sample between the two clamping devices at this time. After 30 seconds, the clamping devices return to their initial positions. Set, pause for 30 seconds.

7.1.4 The instrument begins the reciprocating tensile test, with one end of the clamping device moving from the initial clamping distance (50mm, 100mm, or 180mm, etc.) to a displacement L_2 . The device reciprocates (stretch-recovery) between its positions three times. Based on the third recovery curve, the two clamps are read when the recovery force is 0.3N. The length L_0 of the specimen between the two clamping devices, the restoring force (TP20) when the specimen is displaced between the two clamping devices by $L_2 \times 80\%$, i.e., 20% effective recovery, and the specimen... The recovery force (TP30) is measured when the displacement between the two clamping devices is $L_2 \times 70\%$, i.e., 30% of the effective recovery. The sample recovery force can also be read as needed. The restoring force at other displacements.

7.1.5 Report the tensile recovery force TP20, recovery force TP30, and elastic recovery rate of the specimen under constant force.

7.2 Determination of elastic recovery performance under constant elongation tension

7.2.1 Set the instrument's tensile and recovery speeds, initial clamping distance, and constant elongation value. The recommended tensile and recovery speed is 100 mm/min,

but other values are also acceptable. Choose other tensile and recovery speeds; select the initial clamping distance according to the recommended values in Table 1, and the constant elongation can be selected according to the recommended values in Table 3, or according to... Depending on the specific product (e.g., different specifications) or by mutual agreement, other initial clamping distances and fixed elongation values may be selected.

7.2.2 Take a sample and place it on the clamping device of the testing instrument. When testing the elastic waistband's elastic recovery performance at a constant elongation, for trousers... For disposable diapers or feminine hygiene products, place the entire elastic waistband on the two clamping rods at both ends of the testing instrument, with the front of the sample facing the tester and the sides... The sealing line or adhesive joint is placed at the clamping rods at both ends, as shown in Figure 1; for waist-adhesive diapers, the back waist tab is placed... The two end tabs (starting from the adhesive application point) are fixed to the two clamps of the testing instrument, and the sample clamping diagram is shown in Figure

2.Elasticity test. When adjusting the leg circumference for stretching and rebound performance, place the bottom of the leg circumference of the pant-style diaper or feminine hygiene panty on the left (upper) clamping bar and the upper end on the right. (Below) On the clamping rod, ensure that the test area is the inner elastic component and not the leak-proof partition. The sample placement diagram is shown in Figure

3.Horizontal rebound The two clamping rods of the performance testing instrument should be equipped with corresponding fixing devices to ensure that the sample is fixed and does not fall off after being placed.

7.2.3 After the sample is placed or clamped, the force value is zeroed, the test is started, and one end of the sample is pre-stretched until the force value reaches 0.3N pre-tension. At this time, the instrument automatically records the length L_4 of the specimen between the two clamping devices. The specimen continues to be stretched until the length of the specimen between the two clamping devices reaches... When the elongation is set to L_5 , stop stretching and hold for 30 seconds. Then, return the clamping device to its initial position and hold for another 30 seconds. Example. If a constant elongation of 100% is used, then $L_5 = 2L_4$; if a constant elongation of 50% is used, then $L_5 = 1.5L_4$.

7.2.4 Begin the reciprocating tensile test, with one end of the clamping device moving from the initial clamping distance (50mm, 100mm, or 180mm, etc.) to a displacement L_5 . The device reciprocates (stretch-recovery) between its positions three times. Based on the third recovery curve, the two clamps are read when the recovery force is 0.3N. The length L_3 of the specimen and the restoring force when the specimen is displaced between the two clamping devices by $L_5 \times 80\%$, i.e., 20% of its effective recovery position. (TP20), the restoring force (TP30) when the specimen is displaced by $L_5 \times 70\%$ (30%) between the two clamping devices and effectively returns to its original position. (TP20) Yes, it is also possible to read the restoring force when the sample returns to its position at other