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

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Replacing GB/T 20045-2005

Table tennis balls

乒乓球

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5 Requirements

5.1 Physical Properties The physical properties of a table tennis ball should conform to the specifications in Table 1.

5.2 Plasticizer Limits Table tennis balls contain dibutyl phthalate (DBP), butyl benzyl phthalate (BBP), and di(2-ethylhexyl) phthalate. The total content of (DEHP) should comply with the provisions of

4.5 in GB 21027-2020.

6 Test Methods

6.1 State Adjustment The sample was conditioned at $(23\pm 2)^{\circ}\text{C}$ for at least 72 h and then tested under these conditions.

6.2 Seamless Sphere Reference Circle Drawing Draw a reference circle on the seamless sphere sample as specified in Appendix A.

6.3 Appearance Quality Visually inspect the product under fluorescent or standard light source (illuminance of 600 lx), with the distance between the eye and the product being 200 mm to 300 mm. Ten samples were tested one by one, and all of them should meet the appearance quality requirements in section 5.1.

6.4 Ball weight

6.4.1 Quality Using an analytical balance with an accuracy of not less than 0.001g, each of the 10 samples was weighed, and the result was taken as the arithmetic mean, accurate to 0.01g.

6.4.2 Standard Deviation of Quality The standard deviation of the quality is calculated according to formula (1).

6.5 Jump Use a metal ruler conforming to GB/T 9056 as a background; the metal ruler should be perpendicular to the standard steel plate. Release the sample using a mechanical device. On the standard steel plate, the distance between the bottom of the sample and the standard steel plate is (305 ± 1) mm, and the sample should not rotate during release. A sampling frequency greater than [missing value] is used. The process of the sample bouncing off a standard steel plate was filmed using a high-speed camera at 240fps or equivalent. Based on the video footage, readings were made using a metal ruler. Take the rebound height of the sample. The results of high-speed camera testing should take into account the effect of parallax error. This can be addressed by calibrating the camera lens and the sample, depending on the equipment characteristics. By adjusting positions and other methods, parallax errors can be eliminated or reduced. Ten samples were tested, and each sample was tested three times. The arithmetic mean of the results was taken as the test result for a single sample, accurate to 1 mm. The arithmetic mean of the samples is used as the final result of the test, accurate to 1 mm. The standard steel plate material is No. 45 steel, with a surface roughness $Ra \leq 1.0 \mu m$ and $R_{max} \leq 7.5 \mu m$, and its minimum size is 200mm x 200mm x 8mm.

6.6 Roundness

6.6.1 Diameter The measurement is performed using a dial indicator with an accuracy class of

0. During the test, the seam line (or red circle) of the sample is kept horizontal until the dial indicator... The measuring axis is perpendicular to the highest point of the sphere, and the dial gauge reading D1 is recorded. This value represents the diameter of the two tops of the sample. Then, the sample is smoothly rotated 90° and re-weighted. Repeat the above measurement steps and record the dial gauge reading D

2. This value is the diameter of the sample seam (or the red circle). Take the arithmetic progression of D1 and D2. The average value is used as the test result for a single sample, accurate to

0.01 mm. Ten samples were tested, and the results were taken as the arithmetic mean, accurate to

0.01 mm.

6.6.2 The diameter difference between the two tops and the seam (or the red circle). The diameter difference between the two tops and the seam (or the red circle) is calculated according to formula (2). D_2

---Diameter of the seam/red circle, in millimeters (mm).

6.6.3 Standard deviation of diameter and standard deviation of diameter difference The standard deviation of the diameter and the standard deviation of the diameter difference are calculated according to formula (1).

6.7 Eccentricity The sample is placed on an inclined groove plate with an effective length of (100 ± 0.5) mm and an angle of $14^\circ \pm 30'$ with the horizontal plane, and allowed to roll freely down to the test surface. Test platform (see Figure 1). The landing point of the specimen after rolling off the inclined groove plate should coincide with the center line of the test platform, and then the specimen rolls along the center line of the platform. When the rolling distance reaches (1000 ± 10) mm, the rolling action should leave the table surface. The rolling process should be controlled within the range of 3.0s to 3.2s. The eccentricity of the sample is determined by observing the scale line it touches when it rolls off the platform. Ten samples were tested one by one. If the number of samples with eccentricity was greater than one, the eccentricity test result was deemed unqualified. The sewn ball should roll along the seam line once, and the inspection result should meet the eccentricity requirements specified in Table 1; the seamless ball should roll along the red circle, green circle, and blue circle respectively. Each test should be performed once, and at least two out of the three test results should meet the eccentricity requirements specified in Table 1. The surface roughness of the test platform should be $R_a \leq 1.0 \mu\text{m}$ and $R_{\text{max}} \leq 7.5 \mu\text{m}$. A center line should be clearly marked on the platform, and a section should be placed to the left of the center line. The right sides are marked with scale lines at a distance of (175 ± 0.5) mm and (305 ± 0.5) mm from the center line.

6.8 Hardness Place the sample on the circular ball seat. Adjust the sample so that the seam line (or red circle) is horizontal with the plane of the ball seat, and press the sample with the pressure plate. Apply a pressure of (50 ± 0.5) N and hold for 15 s. Measure the downward displacement A of the pressure plate after pressure is applied using a dial indicator with an accuracy class of 0 (see figure). 2) Then rotate the sample smoothly 180° and repeat the above measurement steps to measure the displacement value B; finally, adjust the sample so that the seam line (or red circle) is aligned. Perpendicular to the plane of the ball seat, repeat the above measurement steps to measure the displacement value C. This value represents the pressure depression at the joint of the specimen (or the red circle). depth.

6.9 Impact resistance The sample was placed on a ring-shaped ball seat with an impact shaft diameter of (15 ± 1) mm and an impact indentation depth of (1.5 ± 0.1) mm. The impact point was... Impact the specimen continuously at a frequency of 95 to 100 times per minute along the seam line (or red circle) of the specimen. After each impact, [the specimen is

then...]. Rotate the sample along the seam line (or red circle) for 3mm to 5mm, repeating this cycle until the sample breaks or after 700 impacts, then stop the impact. Three samples were tested one by one, and all of them should meet the impact resistance requirements in section 5.1.

6.10 Color difference Measure white Munsel N

9.5 or orange Munsel using an integrating sphere spectrophotometer (light source D65/10°). The lightness value L, red-green value a, and yellow-blue value b of 7.5YR8/10. Four white (or orange) samples were selected, and an integrating sphere spectrophotometer (light source D65/10°) was used to measure one point at the seam of each sample. Measurements should be taken at two points on the surface of the sphere (excluding the trademark area). During measurement, the sample should be covered with a black velvet hemisphere to prevent light leakage. After the measurement is completed, the arithmetic mean of L, a, and b of the four samples is taken as the L, a, and b values of the sample. Compare the L, a, and b values of the white (or orange) sample with the L, a, and b values of the white Munsell N9.5 (or orange Munsell

7.5 YR8/10). Subtracting the values yields the lightness difference ΔL , the red-green lightness difference Δa , and the yellow-blue lightness difference Δb .

Note. For seamless balls, measure the color difference at three independent locations other than the trademark or other markings before marking the red, blue, and green circles.

6.11 Plasticizer Limits Perform the test according to the test method described in

5.5 of GB 21027-2020.

7.1 Factory Inspection

7.1.1 Products shall be inspected by the manufacturer's inspection department before leaving the factory, and only those that meet the requirements of this document may be shipped out.

7.1.2 Factory inspection shall be conducted according to the special inspection level S-3 and normal inspection single sampling plan in GB/T 2828.1-2012, and the inspection sample shall be... Products should be drawn from the same package.

7.1.3 Factory inspection items and Acceptable Quality Limit (AQL) values are shown in Table 2.

7.2 Type Testing

7.2.1 Type testing shall be conducted annually, but also in the following circumstances.

---When changes in design, process, or materials may affect product quality;