DRAFT TANZANIA STANDARD

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First Edition

Leather - Volleyball — Specification

TANZANIA BUREAU OF STANDARDS

First edition 2023

Foreword

This Draft Tanzania Standard is being developed by the Leather and Leather Products Technical Committee under supervision of the Textile and Leather Division Standards Committee and it is in accordance with the procedures of the Bureau.

This Tanzania Standard has been prepared with assistance drawn from:

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IS 4191, Specification for leather for volleyball

1 Scope

This Draft Tanzania Standard specifies the requirements and test methods for volleyball made from leather or synthetic materials.

2 Normative References

The following referenced document is indispensable for the application of this standard.

TZS 4 Rounding of numerical values.

3 Terms and definitions

For the purposes of this standard, the following definitions shall apply.

3.1 polyurethane (pu) coated leather

leather with a coating of polyurethane

3.2 polyvinyl chloride (pvc) coated textiles

textiles with a coating of polyvinylchloride

3.3 synthetic materials

materials made of PU, PVC and other synthetic materials which are used as natural leather substitute

4 Requirements

4.1 General Requirements

The method of construction shall follow the principle applicable for that type of ball.

4.1.1 Material requirements

Volley balls may be made of stitched leather, stitched synthetic material or moulded material that shall comply with the requirements given in Table 1.

4.1.2 Finish

volleyball shall have a smooth surface finish.

4.1.3 Shape, dimensions and mass

Shape, dimensions and mass for volleyball shall be as given in Table 1.

Table 1 — Material characteristics and specific requirements for volleyball

SN	Characteristic	Materials and requirements					Test method
		size 5- indoor	size 5 - school volleyball	size 5 - kids Volleyball	Size 4 – Indoor Volleyball	Official size	
1	Mass, g	260-280	195-225	160-180	240-260	260-280	Annex A
2	Circumference, mm	650-670	650-670	645-665	620-640	660-680	Annex B
3	Sphericity,%, Max.	1.5	2	2	2	1.5	Annex B
4	Loss of pressure, max.	20	25	25	25	20	Annex C
5	Water absorption test a) Average water uptake of the initial mass of the tested balls, %, max. b) Water uptake per ball, %, max.	10 15	15 20	15 20	15 20	10 15	Annex D

6	Rebound at 20 °C, cm	120 – 165	120 – 165	110 – 160	110 – 160	120 – 165	Annex E
7	Rebound at 5 °C, cm, min.	120	120	120	110	120	Annex E
8	Difference between lowest and highest rebound per ball tested, mm, max.	10	10	10	10	10	Annex E
9	Shape and size retention test, including change of pressure (after 2 000 kicks)						
	a) Damage to seams and air valve	None	None	None	None	None	Annex F
	b) Increase in circumference, mm, max.	1.5	1.5	1.5	1.5	1.5	
	c) Deviation on sphericity	1.5	1.5	1.5	1.5	1.5	
	d)Change of pressure, bar, max.	0.1	0.1	0.1	0.1	0.1	

5 Marking

5.1 Each ball shall be legibly and indelibly marked with the following;

a) Name of the material;

b) Manufacturer's name, address and/or registered trade mark;

c) Month and year of manufacture;

d) Size of volleyball

e) Country of manufacture or country of origin; and

f) Batch number.

5.2 Each bale shall be legibly and indelibly marked with the following information:

a) Name of product;

b) Number of balls;

c) Name of manufacturer or local supplier's name and/or registered trade mark; and

d) Country of manufacture or country of origin.

Annex A
(normative)

Determination of weight

A.1 Principle
The weight of balls is very important to ensure consistence for the wind resistant.

A.2 Apparatus
An electronic balance, capable of measuring to the nearest 0.01 g.

A.3 Procedure
Select 3 pre-conditioned balls. Weigh them in an enclosed chamber to avoid wind flow. Record the mass to the nearest 0.01 g.

A.4 Results
Record the average mass of the three balls.

Annex B
(normative)

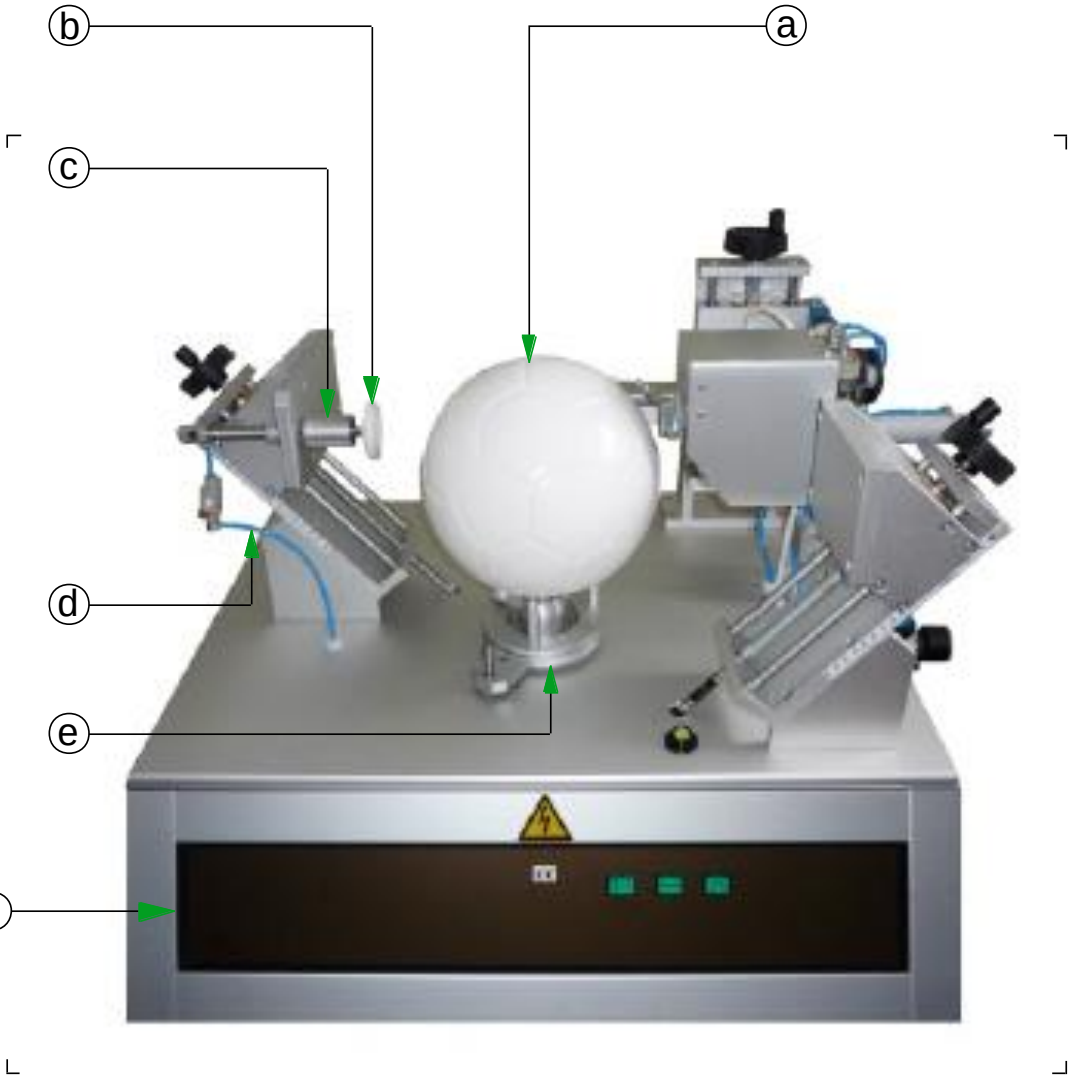
Determination of circumference and sphericity

B.1 Principle
The circumference test indicates the dimension of the ball as an average value measured from different axes. This test is critical to ensure the ball is the correct size for the game of volleyball.

B.2 Apparatus
Equipment capable of measuring circumference and sphericity (roundness) of volleyballs (see Figure B.1).

The equipment may be automated and connected to a PC monitor with measuring software capable of taking several radii of a ball and giving an average measurement of the circumference and sphericity or any other suitable equipment.

B.3 Expression of results
The results will be read off the monitor for automatic equipment or any other suitable equipment display.



KEY

a) Ball
b) Grippers
c) Tangential arms
d) Pressure pipe
e) Rotating arm
f) Control panel with display screen

Figure B.1 — A typical equipment for circumference and sphericity

Formula for sphericity

Insert,,,,,,,,,,,,,,,,,,,,,,,,,

Annex C
(normative)

Determination of loss of pressure

C.1Principle
This test measures the difference in pressure over time. The aim is to ensure that the ball does not deflate too quickly, even when not used.

C.2 Apparatus
A calibrated pressure gauge, capable of measuring 1.5 bar and an accuracy of ± 0.01 bar.

C.3 Procedure
C.3.1 Condition 3 volleyball samples for at least 24 hr in a standard atmosphere of temperature 20 °C ± 2 °C and relative humidity 65% ± 5%.

C 3.2 Measure the pressure in the balls to ensure that they comply with the recommended pressure before the test.

C.3.3 Keep the samples in the same standard atmosphere of temperature 20°C ± 2°C and relative humidity 65% ± 5% for 72 hr.

C 3.4 After this period, measure the pressure in the samples and note the difference.

C.4 Results
Calculate the pressure difference and report to the nearest 0.01 bar.

Annex D
(normative)

Determination of water absorption

D.1 Principle

The volleyball is placed in container filled with water. The ball is then compressed into the water by appropriate means and left to soak in the water. The ball is then weighed again after 250 compression cycles and compared to the original weight.

D.2 Apparatus

Equipment capable of turning the volleyball in various directions between the compressions thus, the complete volleyball comes in contact with the water during the test (see Figure D.1).

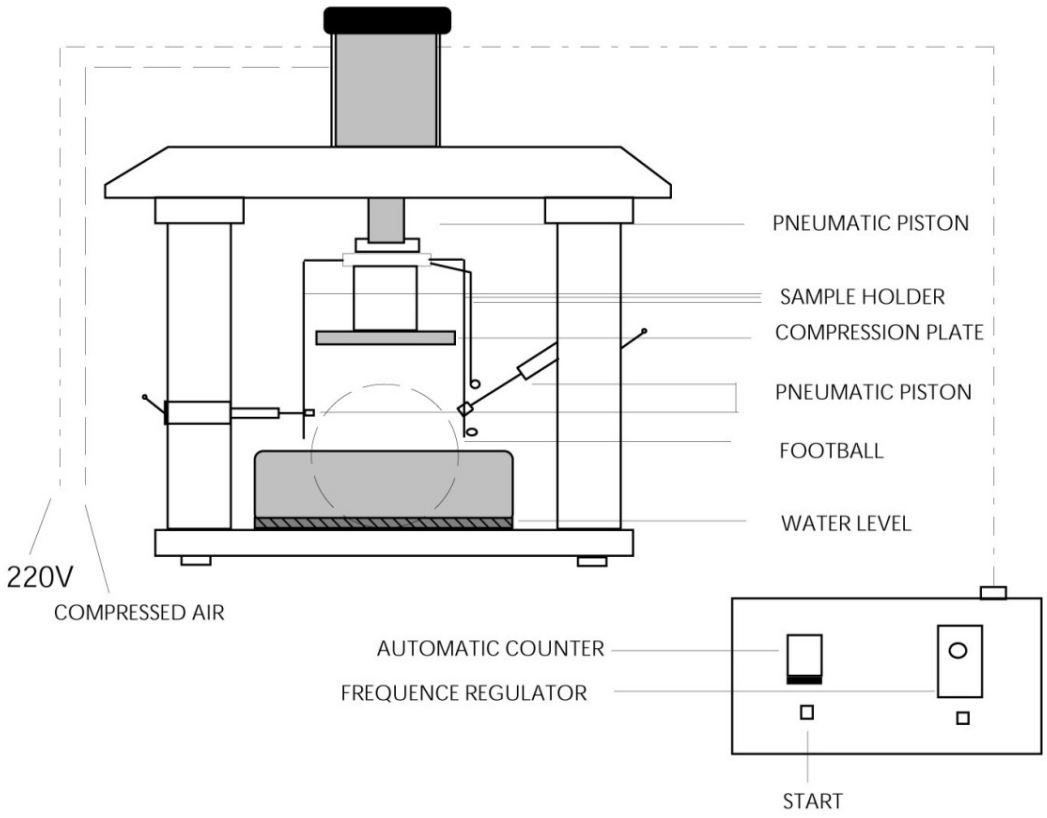


Figure D.1 — A typical water absorption equipment

D.3 Results

Calculate the weight difference between the initial and final weight

$$Y = \frac{M_2 - M_1 \times 100}{M_1}$$

Where

M_1	is the initial weight of the sample;
M_2	is the weight after water absorption; and
Y	is the % weight gain (amount of water absorbed).

Annex E
(normative)

Determination of ball rebound

E.1 Principle

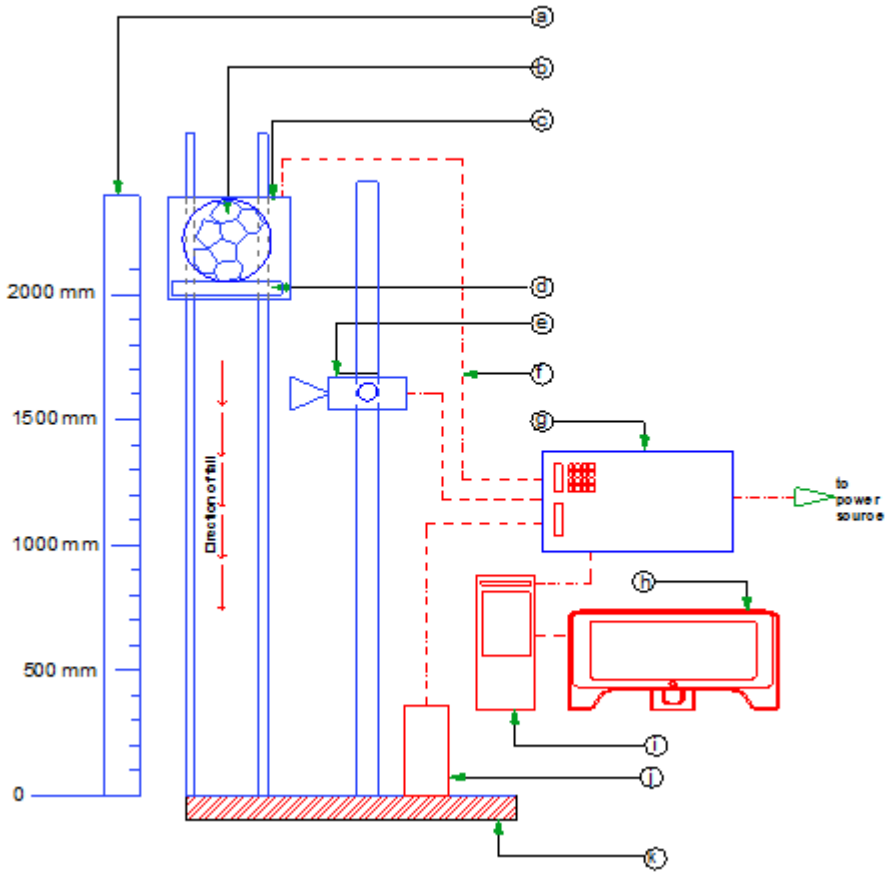
The sample ball is dropped in a guided free fall with a defined velocity on to a fixed plate. The ball hits the surface at specific points in the middle of the panels, distributed over the surface of the ball. The panels will be selected such that the number of testing points is evenly distributed on the different panel shapes.

E.2 Apparatus

Equipment capable of allowing for the ball to free fall vertically from a height of 2.00 m ± 0.01 m (measured from the bottom of the ball) without imparting any impulse of spin. The surface that the ball is to rebound on shall be metal for outdoor and beach soccer balls (see Figure E.1).

E.3 Results

The ball rebound height of any tested sample is the mean of 10 from the 10 performed from each ball in ambient conditions. The mean value of each of the three samples must fall within the requirements. In addition, the difference between the highest and lowest means shall be compared and shall also fall within the respective requirement.



KEY

a) Vertical scale
b) Ball
c) Guidance system
d) Ring
e) Video camera
f) Connecting cables
g) Control panel complete with switches
h) Display screen
i) Digital recording system
j) Sensor (for determining time of impact)
k) Metal surface

Figure E.1 — A typical vollyball rebound test equipment

Annex F
(normative)

Determination of shape and size retention

F.1 Principle

The ball is repeatedly shot against a metal surface automatically (or otherwise stated) before being returned into the shooting device. The number of cycles simulates use over a period of time. The worn samples can then be re-checked for size, weight and shape in order to ensure they do not change significantly with use.

F.2 Apparatus

Equipment capable repeatedly throwing a ball (2000 times) against a specified surface automatically or otherwise stated (see Figure F.1).

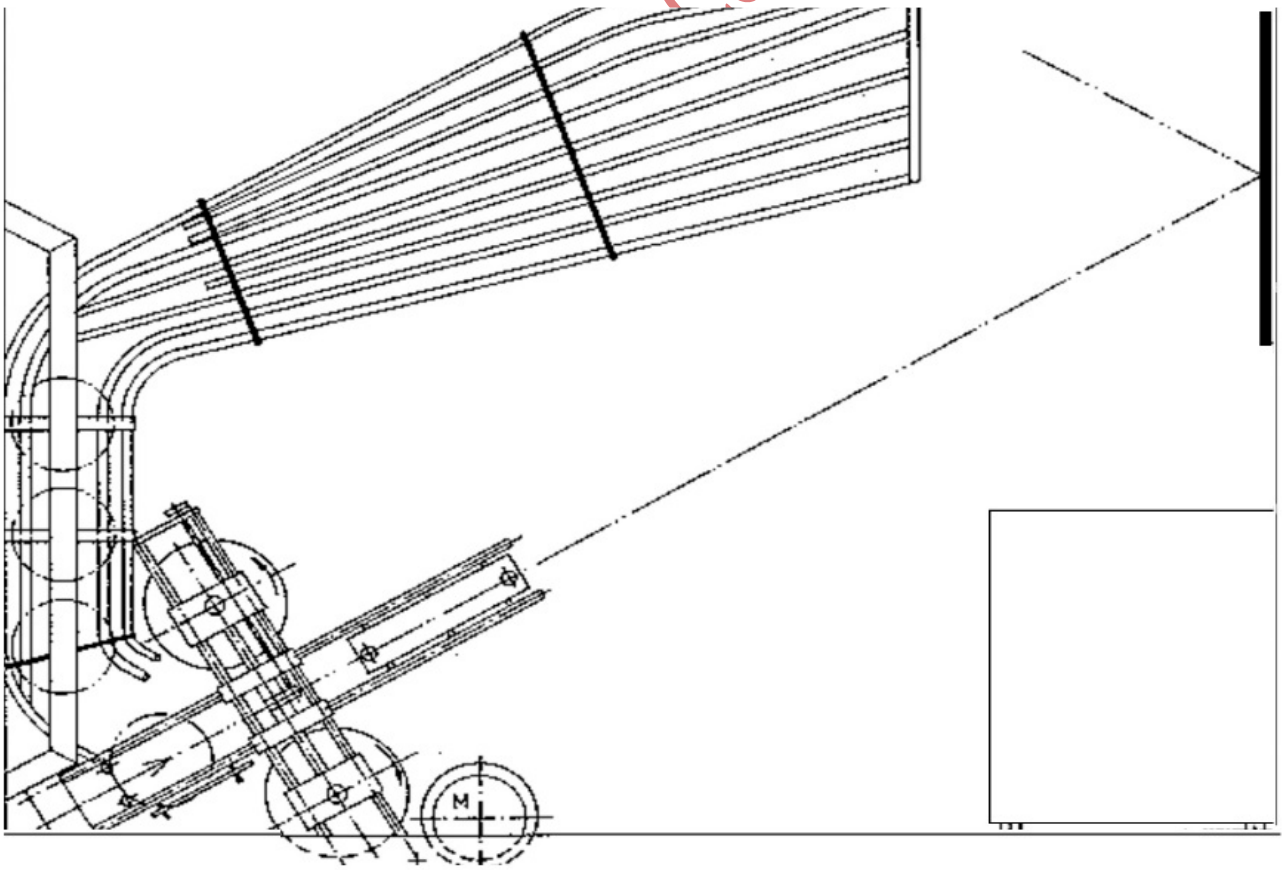


Figure F.1 — A typical Device for throwing balls

F.3 Calculation and expression of results

The results from the tests performed after the 2000 cycles are noted as follows:

a) Initial pressure of the samples (before shooting) minus pressure after shooting gives

b) Pressure loss expressed in bar with 2 decimal places; example -0.02 bar.

c) Visual inspection of any damage.

d) Change in circumference results as per the prescribed test method.

e) Change in sphericity results as per the prescribed test method.

The values of circumference, sphericity and pressure are compared to the values from the previous tests. The difference between the value obtained after the shooter test and prior to the test, is denoted as an an absolute increase/decrease for circumference and pressure and a percentage.

