

INTERNATIONAL PICKLEBALL FEDERATION



EQUIPMENT STANDARDS MANUAL 2023

FIRST DRAFT - VERSION 1.0

Author

DR SUNIL N. PESHANE

PhD, DPATech

Executive Vice President (Equipment Certification)

CONTENTS

Sr. No.	Title	Page No.
1.00	Introduction / Preamble	3
2.00	Objectives / drivers / compelling motivation	4
3.00	The Game	5
4.00	Court Specifications	6
5.00	Net Specifications	8
6.00	Ball Specifications	10
7.00	Paddle Specifications	13
8.00	Equipment Certification, Approval, and Authorization Policy	16
Table 1	Pickleball Court Dimensions	6
Table 2	Pickleball Net Dimensions	8
Table 3	Pickleball Dimensions	10
Table 4	Performance Attributes for Pickleball	12
Table 5	Paddle Dimensions	13
Table 6	Performance Attributes for Paddle	15
Figure 1	Pickleball Court with Dimensions and Line Specifications	6 - 7
Figure 2	Pickleball Net Dimensions - Front View, Side View and Plan	8
Figure 3	Pickleball Design	10
Figure 4	Paddle Design and Dimension - Front View and Side View	13

Disclaimers

- 1) Figures are not to the scale and subject to copyrights.
- 2) New equipment specifications introduced for the first time or alterations suggested in the prevailing ones in this first draft of IPF Equipment Standards Manual are author's opinion and must be reviewed thoroughly before inclusion in final version.

1.00 INTRODUCTION / PREAMBLE

The sport of pickleball is becoming increasingly popular in the entire world, which is evident from the rapidly changing statistics. The number of players both amateur-enthusiasts and professionals are expected to rise exponentially in the coming years. Pocket-friendly and standard equipment for play, well curated courts, non-discriminatory guiding governance with an underlying philosophy of “no country left behind” will be a key to the bright future of the sport of pickleball.

Since its inception, The International Pickleball Federation (IPF) is rapidly working towards the goal of making it an Olympic sport. This document is a major step towards it. The initiative of IPF in conceiving this document is to develop and deploy unanimous equipment standards manual for pickleball community across the globe. Many regions in the world have starkly different microclimates. It's a scientifically well-established fact that the mechanical and viscoelastic properties of polymeric materials and composites are sensitive to climatic conditions and it has certain effect on performance of sports equipment made out of these materials. Taking into consideration this factor, it is important to set equipment standards which will match diverse microclimates across the globe and meet expectation of all the countries. In this context, we at IPF believe that it is important to modify standards and test parameters that were established in past taking into consideration climatic conditions of only one geographic region / continent.

One of the primary goals of IPF is to ensure that equipment manufactured for pickleball sport meets specifications and playing characteristics that strengthen the sport, provide consistent performance, and foster fair competition both in the market and on the court. This document describes the specifications to guide companies that are involved in the manufacturing / trading / marketing of pickleball equipment who seek certification of their products for usage in IPF sanctioned official tournaments, with those qualifying bearing the 'IPF Approved' seal.

2.00 OBJECTIVES / DRIVERS / COMPELLING MOTIVATION

By establishing and maintaining equipment standards, IPF wants to contribute to the integrity and growth of the sport by ensuring that equipment used in pickleball are of high quality, safe, and conducive to fair and competitive play. Such standards help to ensure consistent performance across various brands and types of equipment and thus discourage monopoly. Some of the key objectives are as follows -

- i) **Establishing Equipment Specifications** - Developing and maintaining clear and detailed specifications for pickleball paddles, balls, and other equipment used in the sport. These specifications include dimensions, weight limits, materials, and performance criteria.
- ii) **Testing and Certification** - Conducting testing and certification processes to ensure that equipment from different manufacturers complies with the established specifications. Equipment that meets the standards will be certified or approval from IPF.
- iii) **Enforcing Standards** - Enforcing the use of approved equipment in official tournaments and competitions which will ensure fair contest.
- iv) **Monitoring Technological Advancements** - Keeping an eye on technological advancements and innovations in equipment to assess their impact on the game. This will encourage periodic review and updating of equipment standards as needed to evolve the game with changing scenario.
- v) **Promoting Fair Competition** - Ensuring that equipment standards are designed to foster fair competition by preventing the use of equipment that could provide unfair advantages to certain players or styles of play.
- vi) **Consumer Awareness** - Educating players and consumers about the importance of using approved equipment and the potential consequences of using non-compliant equipment in official competitions.
- vii) **Market Regulation** - Working to regulate the market by encouraging manufacturers to adhere to the IPF equipment standards and by taking action against non-compliant products.

3.00 THE GAME

Pickleball is a paddle sport played using a special perforated ball on a court of dimensions 20' x 44' with a net like tennis but lower in height. Pickleball is played outdoors and even indoors as singles, doubles or mixed doubles. This game can also be played adaptability for persons who are in wheelchairs. While it resembles tennis, badminton and table tennis, pickleball has specific rules, paddle and ball specifications and court dimensions. For more detailed description on rules for playing the game kindly refer to **IPF Rulebook 2023**.

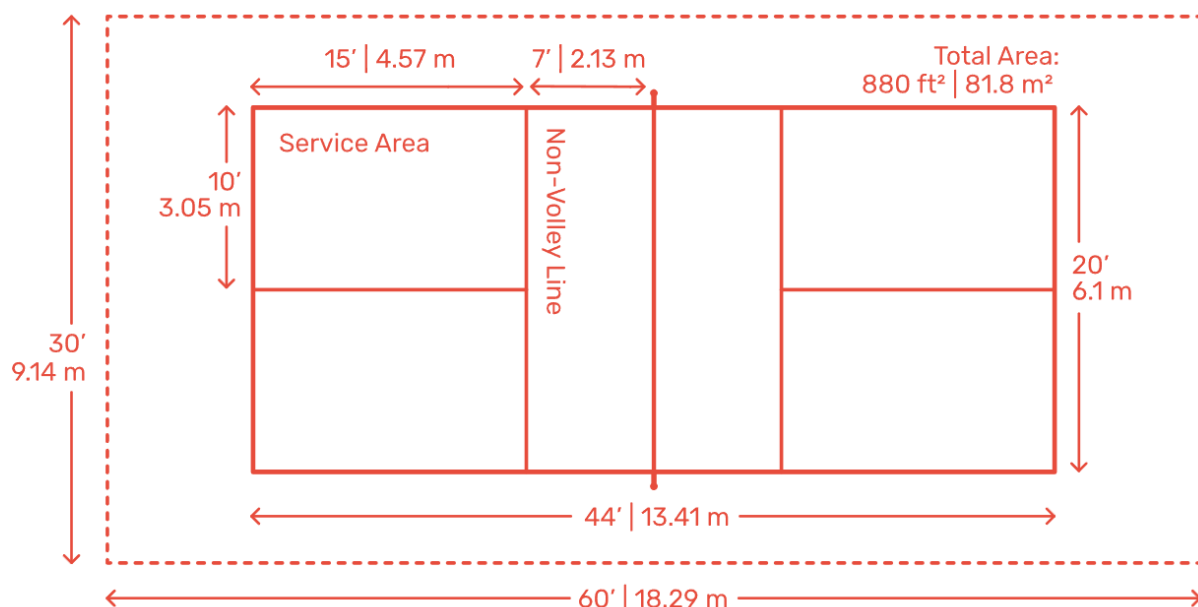
4.00 COURT SPECIFICATIONS

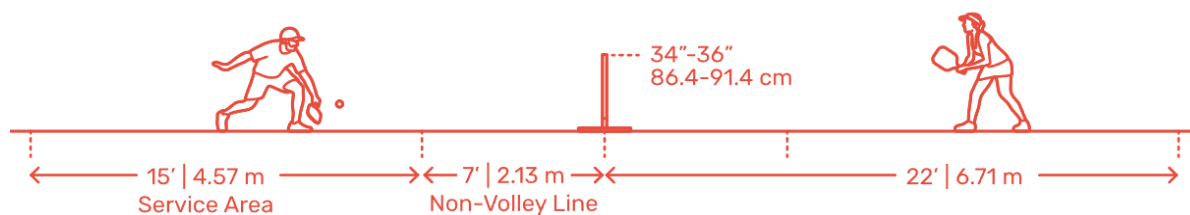
A pickleball court is a specifically designed and marked playing area for the sport of pickleball. Table 1 depicts pickleball court dimensions.

Table 1 Pickleball Court Dimensions

Measurement	Dimension (in FPI Unit)	Dimension (in SI Unit)
Width of the Court	20'	6.10 m
Length of the Court	44'	13.41 m
Diagonally length of the Court	48' 4"	14.73 m
Non-Volley Line	7'	2.13 m
Service Area Length	15'	4.57 m
Service Area Width	10'	3.05 m
Line Width	2"	0.0508 m (5.08 cm)
Side Clearance	5'	1.52 m
End Clearance	8'	2.44 m
Area of the Court	880 ft ²	81.75 m ²
Area of NVZ (also called Kitchen)	70 ft ² (on each side of the net)	6.50 m ² (on each side of the net)
Overall Area (Clearance)	1800 ft ²	167.22 m ²

Figure 1 Pickleball Court with Dimensions and Line Specifications





- 4.10 Pickleball is played outdoors as well as indoors and dimensions of court (44' x 20') remains the same in either cases. Court will be rectangular with both the diagonals measuring 48' 4". All court measurements shall be made to the outside of the perimeter and non-volley zone lines.
- 4.20 Base Surface - Base material for pickleball court should be ideally concrete or asphalt for outdoor courts.
- 4.21 Topmost surface of outdoor court should be textured, anti-skid, heavy duty surface ideally coated with durable acrylic emulsion paint to avoid wear and tear of the court.
- 4.22 Anti-skid Additive - Sand (non-angular) with particle size 0.25 to 0.5 mm should be preferably used to make the surface anti-skid.
- 4.30 For indoor courts hardwood flooring, modular sport court tiles made of polypropylene, PVC flooring or any synthetic flooring offering specialized sports surface that provide the necessary traction and playing characteristics is acceptable if it meets the necessary standards for pickleball play.
- 4.40 Scoring Posts - If pickleball court is equipped with scoring posts or digital devices (display) to keep track of the score, such posts should be located near the net without obstruction in visibility.
- 4.50 Court Lighting - In case of indoor pickleball courts or outdoor courts used in the evening, lighting arrangement should be such that it ensure visibility during low light conditions. Uniform light intensity of minimum 20 to 30 foot-candle (fc) or 200 to 300 lux is required for visibility of ball and to continue the game.
- 4.60 Ideally 60 to 75 foot-candle (fc) or 600 to 750 lux light intensity with uniformity ratio 1.7 will be required for professional tournaments.
- 4.70 For indoor pickleball court CCT (Correlated Color Temperature) light of range from 4000 K to 5000 K is recommended. But it must not exceed 5000 K.
- 4.80 Glare from the lighting fixtures should be minimized to prevent discomfort and distraction for players. Proper shielding and positioning of lights should help reduce glare. Height of lamp post should be between 20' to 25'.

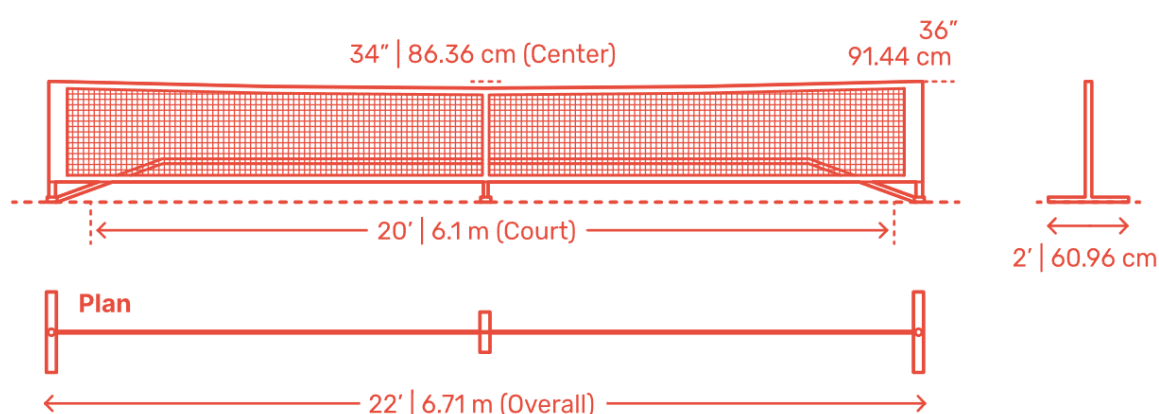
5.00 NET SPECIFICATIONS

Net is located at the centre which divides court into two equal halves and acts as a barrier between players and / or teams. Pickleball net is composed of a grid mesh with taped perimeters for rigidity and greater visibility. Because of gravity and the long span of the net, the centre of the net sags due to its own weight. Lowering of 2" at the centre is permitted and the net is often equipped with a centre post to hold the middle height at a desired minimum. The net is held by two structure posts on either sides that can be designed for permanent or temporary use. Table 2 depicts detailed dimensions of net used for pickleball court.

Table 2 Pickleball Net Dimensions

Measurement	Dimension (FPI Unit)	Dimension (Metric Unit)
Overall length of the net	22'	6.71 m
Height of the net (at the poles)	36"	91.44 cm
Height of the net (at the center)	34"	86.36 cm
Mesh size	1" x 1"	2.54 cm x 2.54 cm

Figure 2 Pickleball Net Dimensions - Front View, Side View and Plan



- 5.10 Material - Pickleball nets should be constructed using durable materials to withstand the rigors of play. Materials should have good strength, durability, and resistance to wear and tear. Nylon, polyester and polypropylene can be a good choice of material although there is no restriction on material of net.

- 5.20 Mesh size should be preferably 1" x 1" (2.54 cm x 2.54 cm) or it should be small enough to prevent the pickleball from passing through the net during play and also must not obstruct visibility through net.
- 5.30 Top Cable - The top of the net should be supported by a steel or metal cable that runs along the entire length of the net. This cable is essential for maintaining the proper height and tension of the net.
- 5.40 Side Tapes - The sides of the net should be reinforced with strong fabric tapes, which help secure the netting and provide additional durability. Side tapes (all sides) must not be broader than 2" (5.08 cm) and should be white in colour.
- 5.50 Bottom Tape - At the bottom of the net, there should be a thicker fabric tape or a vinyl strip to maintain the net's shape and add stability.
- 5.60 Net Posts - Net posts (poles) are an integral part of the net setup and provide the necessary support for the net. They should be made of steel or any suitable material. Diameter of net post should be ideally 3" (7.62 cm).
- 5.70 Portable Net - Portable nets can also be used, which can be easily set up and taken down by making use of lightweight yet sturdy materials for the posts. This is allowed for non-professional tournaments as long as net specifications mentioned in Table 2 are met.
- 5.80 Tensioning Mechanism - Some pickleball nets come with a tensioning system, such as a ratchet or a bungee cord, to help ensure that the net is properly tensioned and at the correct height. Having tensioning mechanism will be preferable but not compulsory.

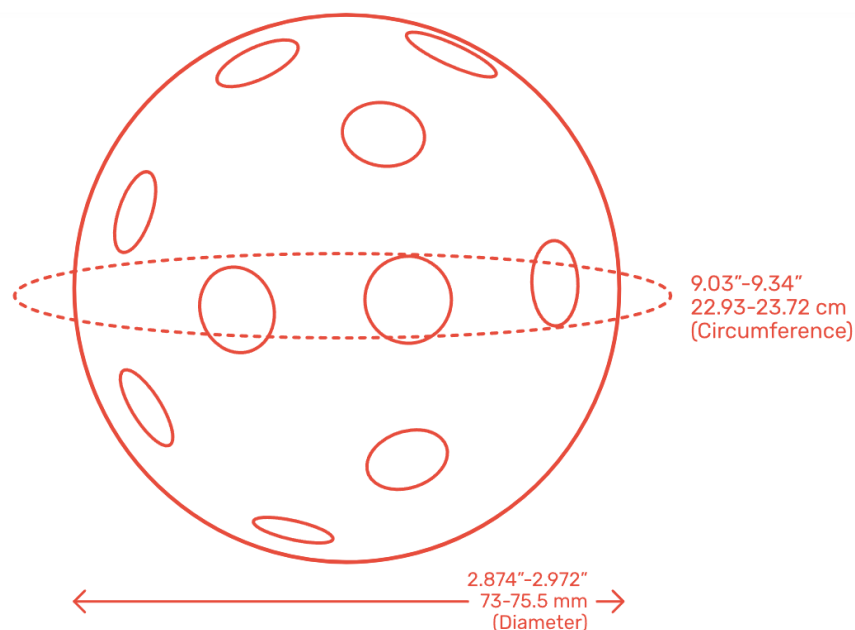
6.00 BALL SPECIFICATIONS

A Pickleball is a hollow ball constructed of hard plastic with 26 to 40 holes. A Pickleball is categorized by being either for indoor or outdoor use. The biggest difference between indoor and outdoor pickleball is the quantity and size of holes. Indoor balls typically have 26 larger holes while outdoor usually have 40 smaller holes. Maintaining the consistency and flight trajectory is crucial and hence the design specifications of the ball. Table 3 depicts detailed dimensions of pickleball.

Table 3 Pickleball Dimensions

Measurement		Dimension (FPI Unit)	Dimension (Metric Unit)
Diameter of the pickleball		2.874" - 2.972"	73 - 75.5 mm
Circumference of the pickleball		9.03" - 9.34"	22.93 - 23.72 cm
Mass of a pickleball		0.78 - 0.935 oz	22 - 26.5 g
Number of holes	(Indoor)	26 holes	26 holes
	(Outdoor)	40 holes	40 holes
Avg. Diameter of Holes	(Indoor)	0.43" $\pm$ 0.039"	10.9 mm $\pm$ 1 mm
	(Outdoor)	0.28" $\pm$ 0.019"	7.1 mm $\pm$ 0.5 mm

Figure 3 Pickleball Design



- 6.10 Material - Pickleball is typically made of plastic. The material of construction should be a hard, durable plastic that can withstand the impacts and abrasions associated with the game. The specific type of plastic may vary by manufacturer, but thermoplastic material should be preferred for the ease of recycling of end of the use balls.
- 6.11 Materials with noise reduction and better acoustic noise dampening properties should be encouraged provided they meet specifications.
- 6.20 The most common color for an outdoor pickleball is yellow while for indoor pickleball it is typically neon green. In market pickleball with different colors such as orange, pink, midnight blue, black etc. are available. The color of a pickleball should be chosen in accordance to what color will stand out in a court. It will be a call of tournament director.
- 6.30 Number of Holes - A standard indoor / outdoor pickleball should have exactly 26 or 40 circular holes in its surface. These holes should be evenly distributed across the ball's surface to maintain consistent play and aerodynamics.
- 6.40 Diameter of Holes - The diameter of holes on a pickleball changes drastically by brand and model, and certainly between indoor and outdoor balls. The average diameter of holes in outdoor pickleball must be $0.28'' \pm 0.019''$ (7.1 mm $\pm$ 0.5 mm). The average diameter of holes in indoor pickleball must be $0.43'' \pm 0.039''$ (10.9 mm $\pm$ 1 mm).
- 6.50 Perfect roundness of ball matters a lot and hence “out of round variance” should not be greater than 0.02” (0.50 mm).
- 6.60 For outdoor play pickleball with 40 holes should be used since additional holes provide good aerodynamics and allow players to have better control over their shots, including spin. Pickleball with 40 holes has less effect of wind and other environmental factors that can affect the flight of the ball.
- 6.61 For indoor play although pickleball with 26 holes is common, pickleball with 40 holes can also be used due to better control over shots, and spin than 26 holes pickleball.

- 6.70 The seam of a pickleball is the line or ridge that runs around the circumference of the ball, where the two halves of the ball are joined together during the manufacturing process. The seam is a natural result of the ball's construction, and it can vary in its appearance and feel depending on the specific brand and model of pickleball. In most cases, the seam of a pickleball has a minimal impact on the ball's performance. Seam should be unobtrusive as possible to ensure that it doesn't affect the ball's bounce, spin, or flight characteristics.
- 6.80 The surface texture of a pickleball is an important characteristic that can significantly affect its performance on the court. In market pickleball with smooth surface suitable for indoor courts (less noisy), with rough surface for outdoor courts and with dimple and pimple surface for windy conditions are available. Tournament director should take this call of which ball is to be used for play.
- 6.90 The ball must have a manufacturer's name or logo printed or embossed on the surface, in addition to the IPF Approval seal or text for identification and authentication purpose.

Table 4 Performance Attributes for Pickleball

Performance Test	Tolerance Range
Bounce (Dropped from 78" or 198 cm)	$75 \text{ cm} \leq B_{\text{avg}} \leq 85 \text{ cm}$
Coefficient of Restitution	0.61 to 0.65 (On granite slab)
Low bounce balls	0.70 to 0.80
Medium bounce balls	0.83 to 0.85
High bounce balls	0.86 to 0.90
Compression	$C_{\text{avg}} = 45 \text{ lbf (20 kgf)}$
Low compression balls	40 to 45 lbf (18.14 to 20.41 kgf)
Medium compression balls	45 to 50 lbf (20.41 to 22.67 kgf)
High compression balls	50 to 55 lbf (22.67 to 24.94 kgf)
Hardness (Shore D)	$40 \leq H_{\text{avg}} \leq 50$
	40 to 45 (for indoor balls)
	45 to 50 (for outdoor balls)

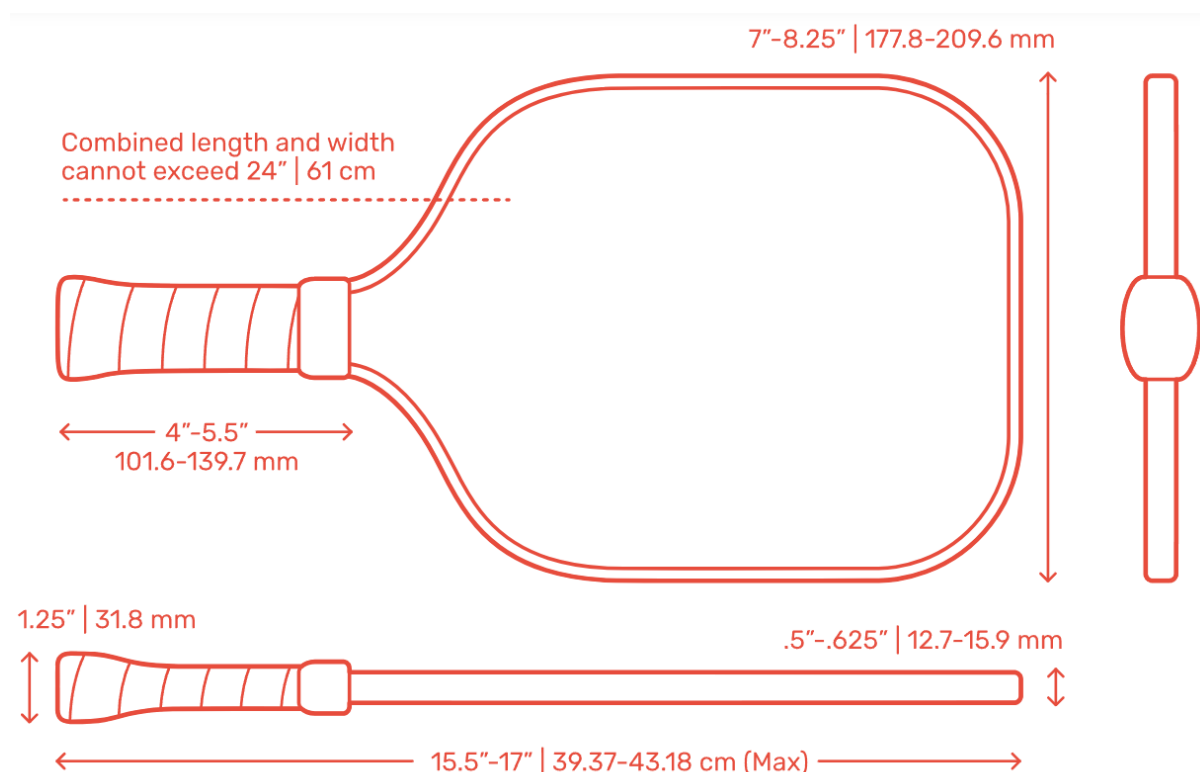
7.00 PADDLE SPECIFICATIONS

The paddle is used to hit a perforated plastic ball over a net, and the objective is to score points by getting the ball to land in the opponent's court without them returning it. Table 5 depicts details of paddle dimensions.

Table 5 Paddle Dimensions

Measurement	Dimension (in FPI Unit)	Dimension (in SI Unit)
Width of the Paddle	7" - 8.25"	177.8 - 209.6 mm
Length of the Paddle (Max)	15.5" - 17"	39.37 - 43.18 cm
Total Length + Width of Paddle	≤ 24"	≤ 61 cm
Surface Area (One Side)	75 - 85 inch ²	484 - 548 cm ²
Depth of the Paddle Handle	1.25" (Max)	31.8 mm (Max)
Weight of the Paddle	6 - 14 oz	170 - 397 g
Paddle Thickness	0.5" - 0.625"	12.7 - 15.9 mm
Handle Length	4" - 5.5"	101.6 - 139.7 mm
Grip Circumference	4" - 4.5"	101.6 - 114.3 mm

Figure 4 Paddle Design and Dimension - Front View and Side View



Pickleball paddles are available in a wide range of materials, designs, colors, and brands. Players will have freedom to choose their paddles based on their skill level, playing style, and personal preferences.

- 7.10 Material of Paddle - Pickleball paddles should be made of lightweight materials such as wood, aluminum, polymer composites, graphite, carbon fiber, fiberglass, aramid (Nomex) etc. Paddle material can be solid or have a honeycomb or polymeric structure.
- 7.11 Noise and Vibration Dampening - Paddles with features like noise-reducing cores or materials to dampen vibrations, should be encouraged provided they meet specifications.
- 7.20 Size and Shape - Surface of pickleball paddles should be flat and rigid with a specific size and shape. Paddle must have a total length (including the handle) not exceeding 17" (43.2 cm), and the width not exceeding 8.25" (20.96 cm). Total of length and width should be $\leq 24"$ (≤ 60 cm)
- 7.30 Surface Area - The paddle's hitting surface is the portion of the paddle that players use to strike the ball. While there was no specific limit defined for the surface area of the hitting face earlier, it should be limited to 75 - 85 inch² (484 - 548 cm²) to prevent paddles from becoming excessively large, which could give players an unfair advantage.
- 7.40 Weight - Paddles come in various weights to cater to different playing styles and preferences. Lighter paddles are often favored for better control and maneuverability, while heavier paddles can provide more power. Earlier there was no limit for weight of the paddle, however, it should be strictly between 170 to 397 g and should not exceed the upper limit to avoid unfair advantage to the players using heavy paddles.
- 7.50 Grip - Although there is no restriction on the material of grip used on paddle handle, grip circumference should be in the range of 4" to 4.5" and must not exceed the upper limit. Players can choose a cushioned grip that feels comfortable in their hand.

- 7.60 Edge Guard - Many paddles have an edge guard or rim around the edge to protect the paddle from damage during play and to maintain the paddle's structural integrity. Although edge guard's size and shape are not explicitly defined by dimensions but are expected to enclose the paddle's edges to provide protection without exceeding the paddle's maximum allowable dimensions.
- 7.61 Rounded Corners - The edge guard should have rounded or beveled corners to avoid sharp edges that could pose a safety risk to players.
- 7.70 Surface Texture - The surface of the paddle may have a textured or smooth finish. Texture can affect the spin and control of the ball.
- 7.80 Alterations - No aftermarket graphics, alterations in dimensions of paddle or changes in surface profile (texture), edge guard modification, any tampering with paddle surface or in the interior core to facilitate extra spin and bounce to the ball are allowed for paddles, except grip modification.
- 7.81 Handwritten pen marks, pictures are although allowed, they should be non-objectionable. However, IPF do not encourage such practices.
- 7.90 Paddle must have manufacture's name or logo, model name or model number in addition to the IPF Approval seal or text for identification and authentication purpose.

Table 6 Performance Attributes for Paddle

Performance Test	Tolerance Range
Surface Coefficient of Friction	Average $\mu_k \leq 0.1875$
Paddle Deflection	Avg. Deflection ≤ 0.005 inch (0.127 mm)
Surface Light Reflection (Gloss)	Maximum Gloss ≤ 80 GU
Surface Roughness	Average R_z Reading ≤ 30 μm Average R_t Reading ≤ 40 μm

8.00 Equipment Certification, Approval, and Authorization Policy

- 8.10 The testing, certification approval and of authorization of equipment for sanctioned tournaments shall be made by the IPF Board of Directors acting on recommendations of the Equipment Authorization Committee (EAC) / Executive Vice-President (Equipment).?
- 8.20 Approval and authorization of a specified model, brand, design, or type of equipment may be revoked by the Board of Directors upon 18 months' notice on the IPF website, official newsletter or other acceptable means of communication, if the specified equipment is found to be changed by the manufacturer in terms of material, design or any alteration that results into change in performance attributes.
- 8.30 Manufacturers are subject to compliance testing to ensure that products as produced and sold are compliant with equipment standards manual of IPF from time to time.
- 8.40 IPF approved paddle and ball list, updated from time to time, will be posted on IPF website.
- 8.50 Violation of equipment standards (not meeting specifications) at any point of time during the tournament by player(s) will attract penalties as follows.
- 8.51 If the violation is identified prior to the match starting, the player may switch to a paddle listed in IPF approved paddle list without penalty.
- 8.52 If the violation is identified after the match has started, the player or team forfeits only the match being played.
- 8.53 If the violation is observed after the match has concluded, the match results stand.

* * * * *