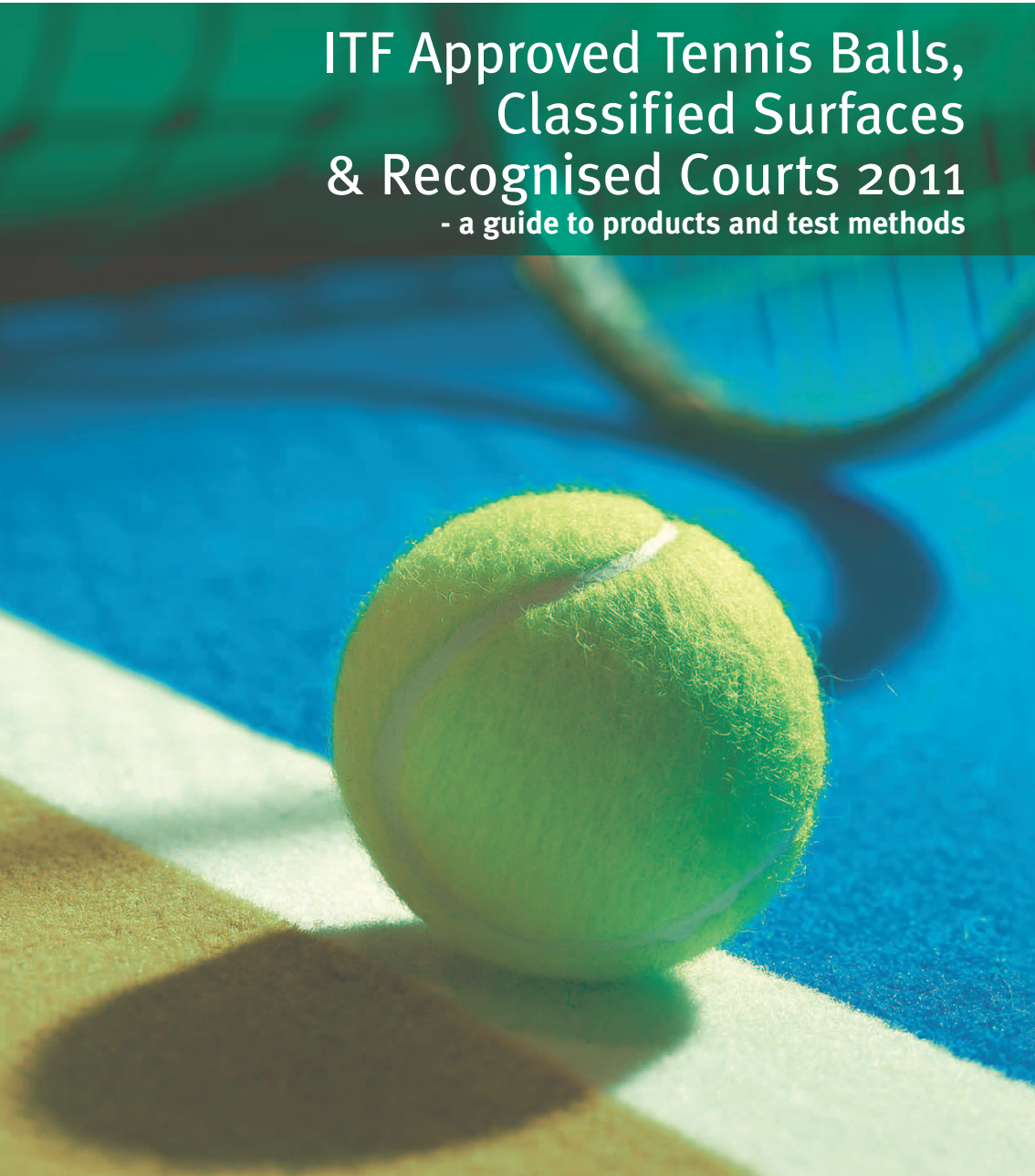
International Tennis Federation

ITF Approved Tennis Balls, Classified Surfaces & Recognised Courts 2011

- a guide to products and test methods

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ITF APPROVED TENNIS BALLS, CLASSIFIED SURFACES & RECOGNISED COURTS 2011
- a guide to products and test methods

Effective: 1 January to 31 December 2011

This list supersedes all previous lists of ITF Approved tennis balls and Classified surfaces

Next Revision: January 2012

as approved/classified by: International Tennis Federation

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What is the International Tennis Federation?

The International Tennis Federation (ITF) is the world-wide governing body of tennis and has the following broad areas of responsibility:

- administering and regulating the game.
- organising international competitions.
- structuring the game.
- developing the game.
- promoting the game.

The ITF Technical Commission is responsible for monitoring developments in equipment technology in order to protect the nature of the game of tennis at all levels. As custodians of the Rules of Tennis, the ITF has the sometimes difficult task of judging whether innovations in tennis equipment may bring about a benefit to those who play, or whether such developments constitute a threat to the nature of the game.

In 1997, the ITF created its own Technical Centre with a laboratory and staff whose task it is to carry out testing and research into all aspects of the game, and to provide support to the ITF Technical Commission and other ITF Committees on decisions relating to technical issues. This facility is now a world-leading tennis research and testing laboratory.

The mission of the ITF Technical Centre is:

> *to protect the nature of tennis by actively preserving the skills traditionally required to play the game, and, to encourage innovation and improvements which maintain the challenge of the game and make it more exciting to play and watch.*

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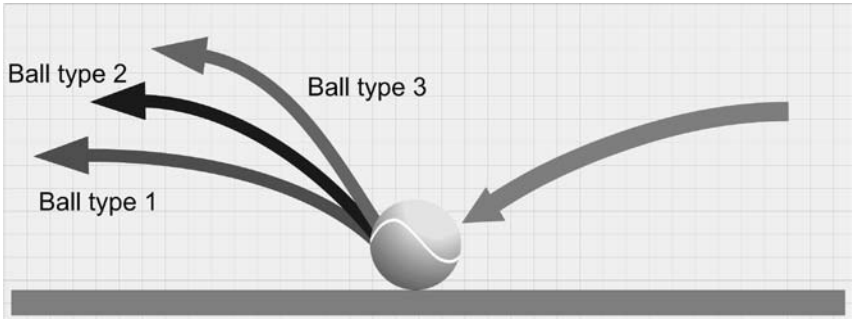
(i) INTRODUCTION

The official Rules of Tennis requires that any ball which is to be considered for use in any tournament which is played according to the Rules of Tennis, shall be named on the official list of balls which have been tested and approved as conforming to the specifications laid down in the Rules of Tennis and as issued by the International Tennis Federation (ITF).

Following a two-year experimental period, from 1 January 2002 the Rules of Tennis (see Rule 3 and Appendix I) were officially amended to allow new types of ball – a fast-speed ball (Type 1) and a slow-speed ball (Type 3). The two new types of ball are designed to have different performance characteristics derived from their dynamic and aerodynamic properties.

- Type 1 (fast-speed) is identical to the standard ball except that it is harder. A lower-bouncing, faster ball.
- Type 2 (medium-speed) is the standard ball and is identical to the specification that existed prior to 2000. A medium-bouncing ball.
- Type 3 (slow-speed) is identical to the standard ball except that it is approximately 6% larger in diameter. A higher-bouncing, slower ball.



It should be noted that the Type 3 ball is also permitted and recommended for play at High Altitude on any court surface type.

To help determine which ball should be used on which surface, the ITF introduced an official Court Surface Classification Scheme (CSCS) in 2000, which was superseded by the Court Pace Classification Programme (CPCP) from January 2008. As part of the assessment procedure, each surface product is awarded a Court Pace Rating, which classifies it as a slow (Category 1), medium-slow (Category 2), medium (Category 3), medium-fast (Category 4) or fast (Category 5) surface. This change follows a two-year research project by the ITF Technical Department, which led to the development of Court Pace Rating, which provides better agreement between theoretical measurements and player perception of pace than for the old Surface Pace Rating.

To enable the properties of equipment to be measured in accordance with accepted scientific standards using the SI system, all products are approved or assessed for conformity against the specifications and tolerances given or implied in the SI unit as stated in the 2011 Rules of Tennis.

Both the tennis ball approval ruling and the Court Pace Classification Programme have been introduced as part of an initiative to provide further understanding and international standardisation of the equipment used in tennis. They will be of significance to players, National Associations, Referees, tournament organisers and tennis ball manufacturers worldwide.

The ITF Technical Centre commenced its ball testing procedure for ITF Approval for the calendar year 2011 on 1 June 2010. The testing procedure for balls which are to be included on the official list of 2012 ITF Approved balls will commence on 1 June 2011.

The testing of court surface products is undertaken by ITF Accredited Laboratories. ITF Court Pace Classification is valid for a period of three years – the date of expiry is listed separately for each product.

All balls approved and surface products classified by 31 January 2011 are listed in this booklet. As more balls and surface products are tested and approved/classified, they will be included on the ITF web sites www.itftennis.com and www.itftennis.com/technical.

Companies requiring detailed information on the testing procedures for applying for, and receiving, ITF Approval for tennis balls, ITF Court Pace Classification and ITF Recognition should contact the ITF Technical Centre.

(ii) THE RULES OF TENNIS – RULE 3 AND APPENDIX I – THE BALL (Effective 1 January 2011)

Balls, which are approved for play under the Rules of Tennis, must comply with the specifications in Appendix I.

The International Tennis Federation shall rule on the question of whether any ball or prototype complies with Appendix I or is otherwise approved, or not approved, for play. Such ruling may be taken on its own initiative, or upon application by any party with a bona fide interest therein, including any player, equipment manufacturer or National Association or members thereof. Such rulings and applications shall be made in accordance with the applicable Review and Hearing Procedures of the International Tennis Federation (see Appendix VI).

The event organisers must announce in advance of the event:

a. The number of balls for play (2, 3, 4 or 6).
b. The ball change policy, if any.

Ball changes, if any, can be made either:

i. After an agreed odd number of games, in which case, the first ball change in the match shall take place two games earlier than for the rest of the match, to make allowance for the warm-up. A tie-break game counts as one game for the ball change. A ball change shall not take place at the beginning of a tie-break game. In this case, the ball change shall be delayed until the beginning of the second game of the next set; or
ii. At the beginning of a set

If a ball gets broken during play, the point shall be replayed.

Case 1: If a ball is soft at the end of a point, should the point be replayed?
Decision: If the ball is soft, not broken, the point shall not be replayed.

Note: *Any ball to be used in a tournament which is played under the Rules of Tennis must be named on the official ITF list of approved balls issued by the International Tennis Federation.*

APPENDIX I – THE BALL

For all measurements in Appendix I, SI units shall take precedence.

a. The ball shall have a uniform outer surface consisting of a fabric cover and shall be white or yellow in colour. If there are any seams they shall be stitchless.

b. More than one type of ball is specified. The ball shall conform to the requirements shown in the table below.

	TYPE 1 (FAST)	TYPE 2 (MEDIUM)[1]	TYPE 3 (SLOW)[2]	HIGH ALTITUDE[3]
MASS (WEIGHT)	56.0-59.4 grams (1.975-2.095 ounces)	56.0-59.4 grams (1.975-2.095 ounces)	56.0-59.4 grams (1.975-2.095 ounces)	56.0-59.4 grams (1.975-2.095 ounces)
SIZE	6.54-6.86 cm (2.57-2.70 inches)	6.54-6.86 cm (2.57-2.70 inches)	7.00-7.30 cm (2.76-2.87 inches)	6.54-6.86 cm (2.57-2.70 inches)
REBOUND	135-147 cm (53-58 inches)	135-147 cm (53-58 inches)	135-147 cm (53-58 inches)	122-135 cm (48-53 inches)
FORWARD DEFORMATION[4]	0.50-0.60 cm (0.197-0.236 inches)	0.56-0.74 cm (0.220-0.291 inches)	0.56-0.74 cm (0.220-0.291 inches)	0.56-0.74 cm (0.220-0.291 inches)
RETURN DEFORMATION[4]	0.67-0.91 cm (0.264-0.358 inches)	0.80-1.08 cm (0.315-0.425 inches)	0.80-1.08 cm (0.315-0.425 inches)	0.80-1.08 cm (0.315-0.425 inches)

Notes:

[1] This ball may be pressurised or pressureless. The pressureless ball shall have an internal pressure that is no greater than 7 kPa (1 psi) and may be used for high altitude play above 1,219 m (4,000 feet) above sea level and shall have been acclimatised for 60 days or more at the altitude of the specific tournament.

[2] This ball is also recommended for high altitude play on any court surface type above 1,219 m (4,000 feet) above sea level.

[3] This ball is pressurised and is an additional ball specified for high altitude play above 1,219 m (4,000 feet) above sea level only.

[4] The deformation shall be the average of a single reading along each of three perpendicular axes. No two individual readings shall differ by more than 0.08 cm (0.031 inches).

c. In addition, the ball shall conform to the requirements for durability as shown in the following table:

	MASS (WEIGHT)	REBOUND	FORWARD DEFORMATION	RETURN DEFORMATION
MAXIMUM CHANGE[1]	0.4 grams (0.014 ounces)	4.0 cm (1.6 inches)	0.08 cm (0.031 inches)	0.10 cm (0.039 inches)

Notes:

[1] The largest permissible change in the specified properties resulting from the durability test described in the current edition of *ITF Approved Tennis Balls, Classified Surfaces & Recognised Courts*. The durability test uses laboratory equipment to simulate the effects of nine games of play.

d. All tests for rebound, mass, size, deformation and durability shall be made in accordance with the Regulations described in the current edition of *ITF Approved Tennis Balls, Classified Surfaces & Recognised Courts*.

CLASSIFICATION OF COURT PACE

The ITF test method used for determining the pace of a court surface is test method ITF CS 01/02 (ITF Court Pace Rating) as described in the ITF publication entitled "ITF guide to test methods for tennis court surfaces".

Court surfaces which have an ITF Court Pace Rating of 0 to 29 shall be classified as being Category 1 (slow pace). Examples of court surface types which conform to this classification will include most clay courts and other types of unbound mineral surface.

Court surfaces which have an ITF Court Pace Rating of 30 to 34 shall be classified as being Category 2 (medium-slow pace), while court surfaces with an ITF Court Pace Rating of 35 to 39 shall be classified as being Category 3 (medium pace). Examples of court surface types which conform to this classification will include most acrylic coated surfaces plus some carpet surfaces.

Court surfaces with an ITF Court Pace Rating of 40 to 44 shall be classified as being Category 4 (medium-fast pace), while court surfaces which have an ITF Court Pace Rating of 45 or more shall be classified as being Category 5 (fast pace). Examples of court surface types which conform to this classification will include most natural grass, artificial grass and some carpet surfaces.

Case 1: Which ball type should be used on which court surface?

Decision: 3 different types of balls are approved for play under the Rules of Tennis, however:

a. Ball Type 1 (fast speed) is intended for play on slow pace court surfaces

b. Ball Type 2 (medium speed) is intended for play on medium-slow, medium and medium-fast pace court surfaces

c. Ball Type 3 (slow speed) is intended for play on fast pace court surfaces

(iii) SPECIFICATIONS FOR STAGE 1, 2 AND 3 TENNIS BALLS

Tennis balls have been developed to increase the speed at which beginner and recreational children and adult players learn the game, which thus enhances their enjoyment of tennis. This has been achieved by the manufacture of tennis balls which are designed to be 'slower' and which therefore allow greater opportunity for players to rally.

Three such groups of balls have been introduced: Stage 3 (Red), Stage 2 (Orange) and Stage 1 (Green).

There are 3 sub-categories of Stage 3 (Red) ball:

1. Standard construction.
2. Cut foam.
3. Moulded foam.

With effect from January 2012, only these balls can be used in 10 and under competition, as described in Appendix VI of the 2011 Rules of Tennis.

With effect from January 2011, the specifications for introductory balls are:

	STAGE 3 (RED) FOAM	STAGE 3 (RED) STANDARD	STAGE 2 (ORANGE) STANDARD	STAGE 1 (GREEN) STANDARD
MASS (WEIGHT)	25.0-43.0 grams (0.882-1.517 ounces)	36.0-49.0 grams (1.270-1.728 ounces)	36.0-46.9 grams (1.270-1.654 ounces)	47.0-51.5 grams (1.658-1.817 ounces)
SIZE	8.00-9.00 cm (3.15-3.54 inches)	7.00-8.00 cm (2.76-3.15 inches)	6.00-6.86 cm (2.36-2.70 inches)	6.30-6.86 cm (2.48-2.70 inches)
REBOUND	85-105 cm (33-41 inches)	90-105 cm (35-41 inches)	105-120cm (41-47 inches)	120-135 cm (47-53 inches)
FORWARD DEFORMATION	-------	-------	1.40-1.65 cm (0.551-0.650 inches)	0.80-1.05 cm (0.315-0.413 inches)

All tests for rebound, mass, size and deformation shall be made in accordance with the regulations described in the current edition of *ITF Approved Tennis Balls, Classified Surfaces & Recognised Courts.*

Notes:
There is currently no specification for return deformation.
There is currently no limit on the difference between individual forward deformation readings.
These specifications are subject to review and may be changed at any time.

Information regarding approval of all introductory balls can be obtained from the ITF Technical Centre. The list of 2011 ITF Approved Stage 1, 2 and 3 tennis balls is published in Part A of this booklet.

(iv) ISO 9001:2008

All testing, administration and calibration procedures adopted by the ITF Technical Centre in testing tennis balls for ITF Approval, and court surfaces for ITF Classification, are carried out and managed according to ISO 9001:2008.

(v) FUTURE DEVELOPMENT OF TESTING METHODS, TENNIS BALL SPECIFICATIONS AND COURT PACE RATING VALUES

The ITF reserves the right to amend and update the information given in this document without prior notice. As a general rule, amendments will be made only after consultation with interested parties.

PART A – THE BALL

1. REGULATIONS FOR THE TESTING OF TENNIS BALLS FOR ITF APPROVAL

The properties of tennis balls are specified by the International Tennis Federation to generate uniformity, and consistency in performance. Special testing facilities and apparatus are necessary to accurately measure these properties, and this section details the required test conditions and procedures.

The following notes are provided as additional information for those involved in the testing or evaluation of tennis balls and should be read in conjunction with the specification for a tennis ball, as described in Rule 3 and Appendix I of the Rules of Tennis.

1.1 General Considerations

A tennis ball consists of a hollow rubber core (which may or may not be pressurised) covered by a textile material composed of wool, nylon and cotton. Because the properties of the rubber core and its internal gas are affected by temperature, the properties of the cover by atmospheric moisture and the effective internal pressure by the external atmospheric pressure, it is important that ball testing is carried out in a controlled atmosphere where at least temperature and humidity are standardised. It is not practical to control atmospheric pressure, which is primarily dependent on altitude and so it is desirable that any testing station should be at or near sea level so that test data are comparable. In any case, atmospheric pressure should always be recorded when ball tests are made.

The following conditions are specified for testing by the ITF (the "**controlled environment**"):

Temperature	20 ± 2°C (68°F)
Relative humidity	60 ± 5%
Atmospheric pressure	102 ± 3 kPa (30 inches Hg)

Other controlled environment standards may be fixed for localities where one or more of the average temperature, humidity and average barometric pressure at which the game is being played differ materially from 20º Celsius (68º Fahrenheit), 60% relative humidity and 102 kPa (30 inches Hg) respectively.

Applications for such adjusted standards may be made by any National Association to the ITF and, if approved, shall be adopted for such localities.

1.2 Environmental Conditions

To meet the controlled environment requirements noted above, a well-insulated room with double-glazed windows not exposed to sunshine, and a double-door 'air-lock' arrangement to reduce air leakage on entry and exit, are recommended.

Control of temperature and humidity should be provided by a temperature and humidity control unit of an appropriate specification with regard to thermal capability and control accuracy. Such a conditioner normally consists of two component parts: an internal fan unit and an external condenser unit with connecting piping.

The specification of this conditioning equipment is primarily related to removing excess heat and moisture generated within the environment by electrical equipment and the bodies of the technicians working there. Such equipment must be capable of controlling the testing environment within the tolerances set down in Section 1.1.

As well as controlling the environment, it should also be independently monitored, and so temperature and humidity recorders together with a barometer are necessary. A permanent record of environmental conditions during conditioning and test should be kept.

Balls selected for testing should be stored under such controlled conditions and exposed to circulating air for 'conditioning' for the required 24 hours prior to testing.

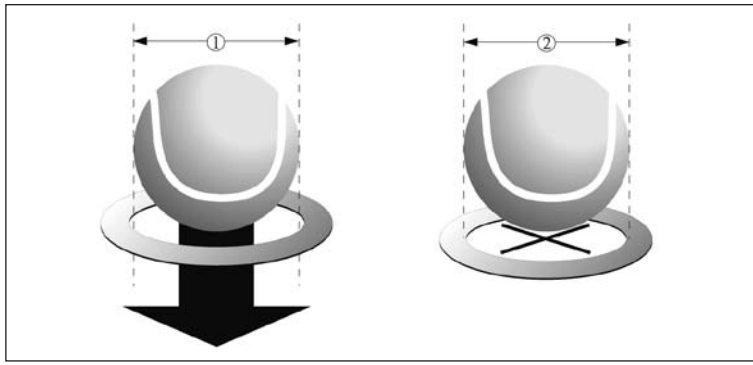
1.3 Laboratory and Test Equipment

Mass – Test Method ITF TB 01/01: An electronic laboratory balance measuring in grams to at least two decimal places, to a capacity of 100 grams.

Size – Test Method ITF TB 02/01: Equipment consists of two circular gauges defining the limits of ball diameter designated 'Go/No-Go' through which a ball will drop/not drop under its own weight. See Figure 1.

Deformation – Test Method ITF TB 03/01: This is measured using a 'modified' Stevens Machine.

Prior to deformation testing the ball must be pre-compressed three times on each of three perpendicular axes through a distance of 2.54 cm (1.0 inches) in order to remove any 'set' in the ball. One pre-compression should occur on each axis in succession, until nine pre-compressions in all are completed. This is carried out on a 'pre-compression jig'. See Figure 2.



Ball Type 1 and Type 2

(1) A ball must pass through a ring gauge with internal diameter 6.86 cm (2.70 inches) under its own weight.

(2) A ball must not pass through a ring gauge with internal diameter 6.54 cm (2.57 inches) under its own weight.

Ball Type 3

(1) A ball must pass through a ring gauge with internal diameter 7.30 cm (2.87 inches) under its own weight.

(2) A ball must not pass through a ring gauge with internal diameter 7.00 cm (2.76 inches) under its own weight.

Figure 1. Size – Test Method ITF TB 02/01.

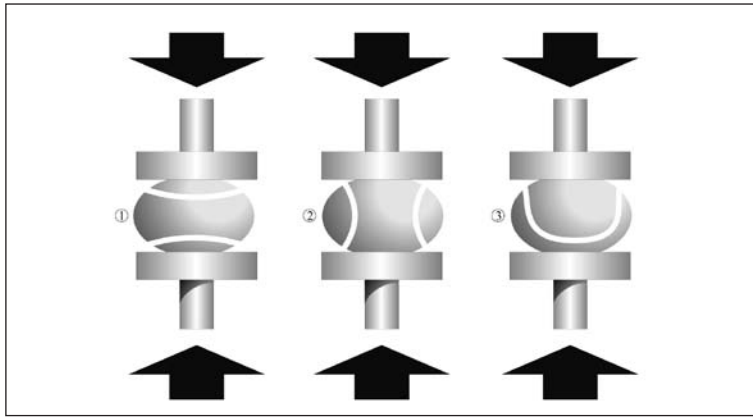


Figure 2. Pre-Compression – Test Method ITF TB 03/01.

An approved machine shall compromise of the following: A first rigid platen connected to a force-measuring device and a second identical and parallel platen which can move axially with respect to the first platen, such that when a ball is placed between them it

can be compressed and measurement taken of its deformation at a predetermined force. The platen design shall be as shown in Figure 3.

Note: The Stevens machine is regarded as compliant with the above.

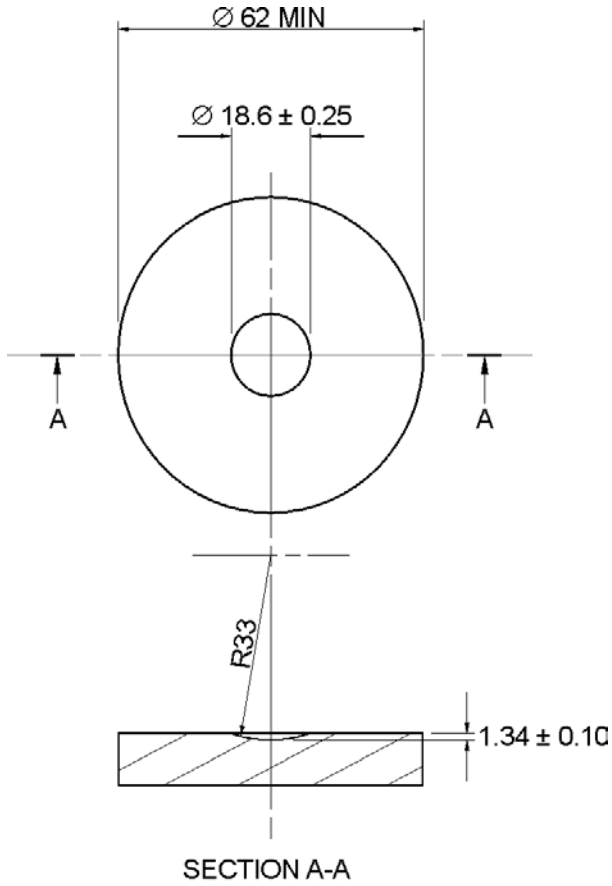


Figure 3. Deformation – Test Method ITF TB 03/01. Specification of platen design (to be used for both platens). All dimensions are given in millimetres.

Rebound - Test Method ITF TB 04/01: This consists of dropping a ball from a height of 254 ± 0.3 cm (100 ± 0.1 inches) (measured from the bottom of the ball) onto a smooth, rigid and horizontal block of high mass and measuring the rebound height (again measured to the bottom of the ball). See Figure 4.

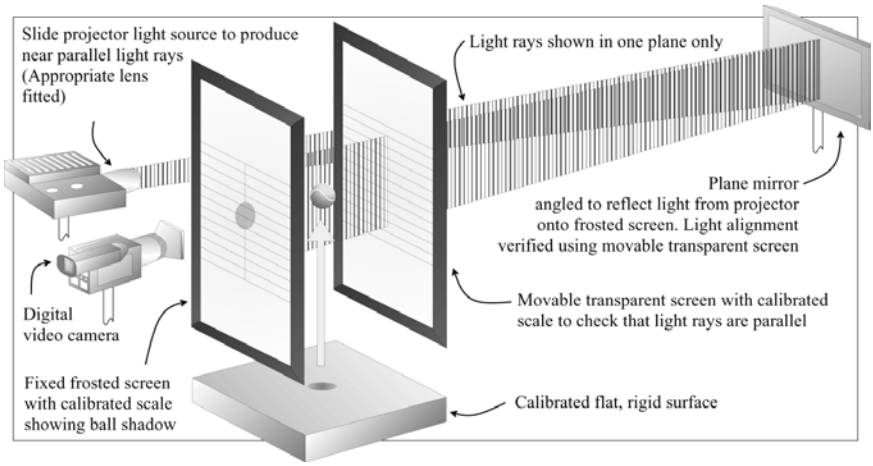


Figure 4. Rebound – Test Method ITF TB 04/01.

To ensure sufficient accuracy of the rebound measurement, a shadow of the ball produced by a parallel beam of light is cast onto a frosted screen incorporating a graduated calibrated scale. The images are captured by a video camera, and analysed by software that tracks the trajectory of the ball, recording its highest point with reference to the calibrated scale.

Durability test - Test Method ITF TB 05/01: The ball shall be projected such that it impacts a smooth, rigid surface mounted at 90 ± 10° to the trajectory of the ball at 40 ± 3 m/s with 0 ± 3 rev/s spin. This procedure shall be repeated until the ball has undergone 20 impacts. The ball shall then be placed in a felt-wearing device, with a second ball, for a period of 2 minutes. This wearing procedure (the "wearing regime") may be performed outside of the controlled environment. Following this procedure, the ball shall be conditioned in the controlled environment for a minimum of 24 hours and then retested for rebound, size, mass and deformation in accordance with the procedures described herein.

In all tests for durability, the felt-wearing device shall consist of a box lined with medium grade emery paper (obtained from the ITF), and inclined at 23° to the horizontal, with three rotating wooden spigots at the lowest point. The internal dimensions of the box shall measure 15 ± 1 cm by 15 ± 1 cm and 69 ± 1 cm in length. Each spigot shall measure 19 ± 1 cm in length and 2.0 cm in diameter, and shall be rounded at both ends with a radius of 1.0 cm. The angle between the spigots, measured about the centreline of the axle, shall be 60°. The distance between the centrelines of adjacent spigots shall measure 4.5 cm. Each spigot shall protrude 4.0 cm into the box, when parallel to the bottom end face of the box, and the centreline of the spigot shall measure 3.0 cm to the aforementioned face when in this position. The angular velocity of the spigots shall be 500 ± 50 rpm. See Figure 5.

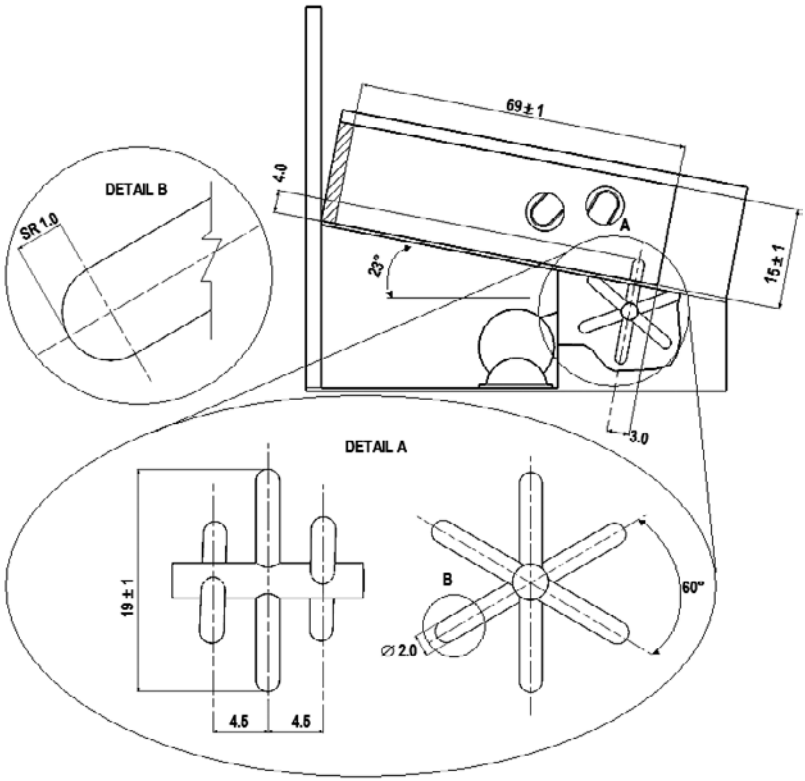


Figure 5. Durability – Felt wearing device for test method ITF TB 05/01. All dimensions are given in centimetres.

1.4 Test Procedure

From the 72 balls submitted for approval, the ITF randomly selects 24 for testing. The ball containers are opened and the balls are then stored on racks in the controlled environment for a minimum of 24 hours prior to testing. Each ball should be individually marked (preferably with a permanent marker) so that test results can be assigned to a particular ball.

Following visual inspection, the test procedure should be carried out on each ball in the following sequence:

i. **Pre-compression**. Apply to each of the three axes in succession, as described in Section 1.3. All tests are to be completed within two hours of pre-compression.

ii. **Mass.** Record the mass displayed and round to one decimal place for reporting purposes.

iii. **Size**. Use 'Go/No-Go' gauge across at least three mutually perpendicular diameters. Care should be taken to ensure that the ball relies only upon its own weight to pass through a ring. Record Pass/Fail.

In all tests for diameter, a ring gauge shall be used, consisting of a metal plate (preferably non-corrosive) of uniform thickness of 0.318 cm (0.125 inches). In the case of Ball Type 1 (fast speed) and Ball Type 2 (medium speed), balls there shall be two circular openings in the plate measuring 6.54 cm (2.57 inches) and 6.86 cm (2.70 inches) in diameter respectively. In the case of Ball Type 3 (slow speed) balls there shall be two circular openings in the plate measuring 7.00 cm (2.76 inches) and 7.30 cm (2.87 inches) in diameter respectively. The inner surface of the gauge shall have a convex profile with a radius of 0.160 cm (0.063 inches). For all ball types, the ball shall not drop through the smaller opening by its own weight in any orientation and shall drop through the larger opening by its own weight in all orientations.

iv. **Deformation.** Test once on each axis and record the results. Report the mean value, and the maximum difference between the three readings, for each ball (see also Section 1.3). The test measures the deformation of a ball under a load of 80.07 N (18.00 lbf) after a small initial load, of 15.57 N (3.50 lbf), has been applied to compress the fabric cover material. See Figure 6. The 'deformation' is measured in two senses:

a. When the load is first applied ("forward deformation").

b. Under the action of the load prior to it being removed and after the ball has been compressed further through a total distance of 2.54 cm (1.0 inches) ("return deformation").

The ball is placed in position so that neither platen of the machine is in contact with the cover seam. A contact load of 15.57 N (3.50 lbf) is applied and the displacement of the platens under this load becomes the datum for the deformation readings. A constant platen speed of 200 mm/min (7.87 inches/min) is then applied up to an additional load of 80.07 N (18.00 lbf). The total test load is therefore 95.64 N (21.50 lbf). The total test load is held for 5 seconds before the forward deformation reading is recorded. The constant platen speed is then resumed to produce a deformation of 2.54 cm (1.0 inch), and then immediately reversed until it reaches the test load (95.64 N). The test load is held for 10 seconds before the return deformation is recorded. The load is then completely removed at the constant platen speed. This procedure is repeated on each ball across the two diameters at right angles to the initial position and to each other.

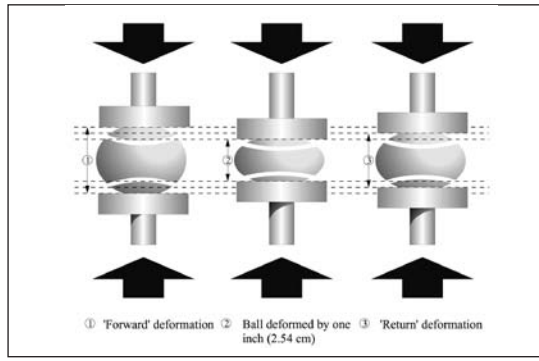


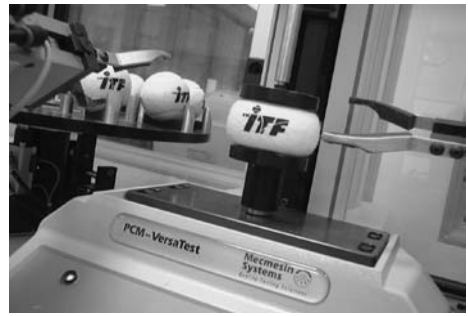
Figure 6. Deformation – Test Method ITF TB 03/01.

Automated compression machine

The automated compression machine (pictured below) has been developed by the ITF as an alternative to the Stevens machine for testing tennis ball deformation.

The computer-controlled machine replicates the operation of the Stevens machine, but provides the following improvements over the Stevens machine:

a. Elimination of operator error in speed of testing, timing, and results tabulation.
b. Reduction of backlash (unmeasured movements due to gaps between cog teeth).
c. Graphical display of useful comparative information such as hysteresis losses.
d. Carousel feed allowing up to 12 balls to be tested in three axes without operator assistance.
e. The machine can also be used to pre-compress balls according to the Rules of Tennis.



All of these advantages give the automated machine more functionality, accuracy and better reproducibility of results than the Stevens machine. For further information on automated compression machines, contact the ITF Technical Centre.

v. **Rebound.** Record four valid measurements per ball (disregarding obvious 'bad bounces') and report mean rebound height.

vi. **Internal pressure.**

a. Packaging. All sealed packaging is measured using a standard pressure gauge with needle attachment and rubber seal.

b. Ball. Four balls are tested. Measurements are taken using a standard pressure gauge with needle attachment.

vii. **Durability.** Select six balls at random from the sample that was tested for approval. Apply the wearing regime described in Section 1.3. Visually inspect the balls for signs of detachment of the fabric cover, and cracks or ruptures. Record the results for mass, size, deformation and rebound, as described in paragraphs (i) to (v) above. Report the change in the specified properties from the original results for each test.

1.5 Calibration

The apparatus used for the various tests must be regularly checked for accuracy of calibration as follows:

Size. The ring gauges should be checked for accuracy against a known traceable reference every two years. The tolerance on ring gauge diameter should be ± 0.0064 cm (0.0025 inches).

Mass. The weighing scales should be checked with calibration weights monthly and to traceable national standards. The accuracy of the scales should be ± 0.001 g.

Rebound. Where the 'video' system is used for measuring rebound, the horizontal alignment of the light beam must be checked at the beginning and end of each test sequence. The accuracy of drop height and the frosted and transparent scales should be checked monthly, to a tolerance of ± 0.3 cm (0.1 inches).

Pressure. Pressure gauges should be checked for accuracy against a known traceable reference annually. The tolerance of such devices should be ± 0.1 kPa (0.015 psi).

Deformation. The Stevens machine should be checked daily for beam balance with the contact weight removed. It should be checked also for accuracy of platen displacement twice per year using 60 mm slip gauges. The tolerance on the platen displacement should be ± 0.008 cm. The automated compression machine should be calibrated at six-month intervals using gauge blocks to the same tolerance as the Stevens machine.

Durability. The velocity and spin rate of ball projection should be checked annually. The angular velocity and size of the spigots in the felt-wearing device should be checked

annually. Tolerances are provided in the Durability Test Method above. The emery paper should be replaced using the following protocol (refer to Figure 7):

a. After 16 hours of testing, replace only the pieces labelled number 1 using new pieces of evenly-cut medium grade emery paper (obtained from the ITF) and adhesive spray applied to the reverse. Ensure that there is no overlap or gap between adjacent pieces.
b. After a further 16 hours of testing, replace only the pieces labelled number 2 as described above.
c. After a further 16 hours of testing, replace only the pieces labelled number 3 as described above.
d. After a further 16 hours of testing, replace only the pieces labelled number 4 as described above.
e. Return to step (a).

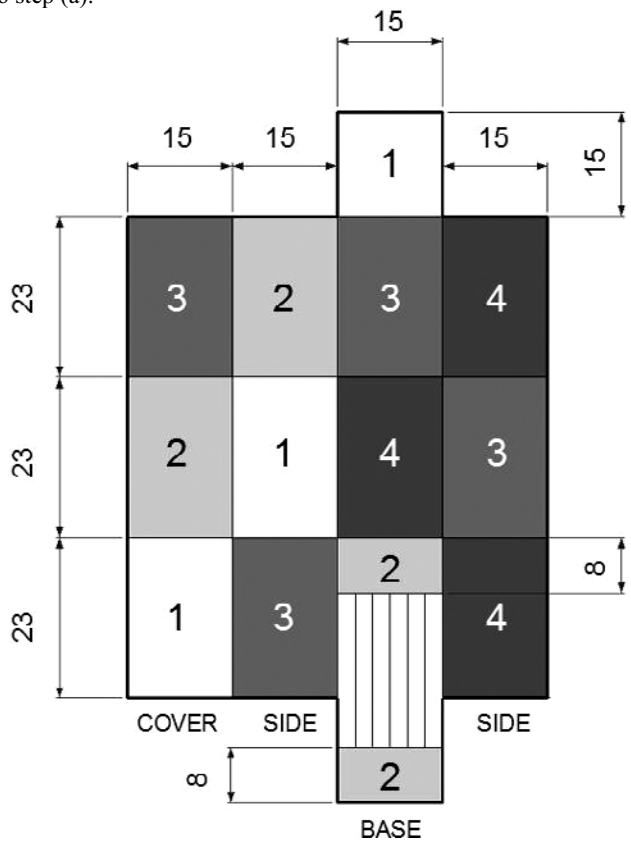


Figure 7. Schematic diagram of the locations of emery paper in the felt-wearing device (net drawing from above). All dimensions are given in centimetres.

1.6 Conditions for ITF Approval

A manufacturer who wishes their ball to be considered for inclusion in the list of ITF Approved tennis balls must submit a sample of balls for testing by the ITF in the manner described in detail above. The sample of balls submitted must be found to conform to the Rules of Tennis in all respects.

A ball which is granted ITF Approval is approved by the ITF only on the basis that it has been found to conform to the current Rules of Tennis and is therefore considered suitable for use in tournaments played according to the Rules of Tennis. ITF Approval does not imply any other form of approval.

The ITF reserves the right to withdraw ITF Approval from any tennis ball brand(s) at any time if it finds that balls are substantially different from the sample(s) submitted for approval or, in the opinion of the ITF Technical Commission, such balls are not designed to meet the specification laid down in the Rules of Tennis, or if the approved balls fail to meet a reasonable quality standard.

1.7 Market and tournament testing

The ITF has additional specific requirements for tennis balls which have been granted ITF Approval, to ensure that such balls continue to meet the standards laid down in the Rules of Tennis. Such balls may be obtained and tested from any source world-wide. ITF Approved balls are required to meet certain criteria, as described below, in order to retain ITF Approved status.

The minimum sample size for balls tested under this procedure is 12. A ball which fails to conform to one or more of the specifications laid down in the Rules of Tennis will be counted as a single failure.

The criteria by which samples of balls will be assessed is as follows:

No. of balls in sample	No. of balls failing to conform	Action
12	0-1 2-3 4 +	None Letter of warning Removal of ITF Approval
24	0-2 3-7 8 +	None Letter of warning Removal of ITF Approval
36	0-3 4-11 12 +	None Letter of warning Removal of ITF Approval

The above criteria are based on the normal distribution curve with action being taken in the form of either a warning letter to the manufacturer/distributor, or removal of ITF Approval at ± 1 and ± 2 standard deviations from the mean respectively. Criteria for other sample sizes are calculated accordingly.

Removal of ITF Approval is at all times at the sole discretion of the ITF. Such action is normally only taken based on the results of more than one sample of balls from a market or tournament. The ITF reserves the right to withdraw ITF Approval from any ball at any time during the next 12 months.

2. 2011 ITF APPROVED TENNIS BALLS

The following balls have been approved by the ITF for the calendar year 2011. Contact information for the ball manufacturers can be found in the next chapter, by cross-referencing against the address code given below.

All balls are Type 2 and pressurised unless indicated otherwise.

Balls approved by the ITF after the publication of this booklet are listed on the ITF web sites www.itftennis.com and www.itftennis.com/technical.

Brand and Ball name	Country of origin	Address Code
adiComp xL	Thailand	2
adiTeam	Thailand	2
adiTour xP	Thailand	2
Artengo 820	Thailand	3
Artengo 920	Thailand	3
Babolat Academy (pressureless)	Thailand	4
Babolat French Open	Thailand	4
Babolat French Open All Court	Thailand	4
Babolat Germany	Thailand	4
Babolat Gold	Thailand	4
Babolat Team	Thailand	4
Babolat Trophy	Indonesia	4
Babolat VS	Thailand	4
Bridgestone XT8	Thailand	5
Cleanskin Tennis	Thailand	6
Cosco Championship	India	7
Crane Sports	Indonesia	8
Crivit Sport All Court	Philippines	18
Diadora Multi Court	Thailand	9
Diadora Pro Circuit	Thailand	9
Donnay Championship	Philippines	10
Donnay Competition	Philippines	10
Dunlop A Player Elite Hard Court	Philippines	11
Dunlop Championship All Court	China	11
Dunlop Championship All Surface	Philippines	11
Dunlop Championship Doubles All Surface	Philippines	11
Dunlop Championship Hard Court	Philippines	11
Dunlop Club All Court	Philippines	11
Dunlop Club Championship	Philippines	11
Dunlop Extra Life (pressureless)	Philippines	11
Dunlop Fort	Thailand	35
Dunlop Fort (white)	Thailand	35
Dunlop Fort All Court	Philippines	11

Brand and Ball name	Country of origin	Address Code
Dunlop Fort All Court Swiss	Philippines	11
Dunlop Fort Clay Court	Philippines	11
Dunlop Fort Elite	Philippines	11
Dunlop Fort Tournament	Philippines	11
Dunlop Fort TP All Court	Philippines	11
Dunlop Grand Prix	Philippines	11
Dunlop Grand Prix All Surface	Philippines	11
Dunlop Grand Prix Hard Court	Philippines	11
Dunlop Match	Philippines	11
Dunlop Max Fort TP KNLTB	Philippines	11
Dunlop Perry Sport	Philippines	11
Dunlop Power	Philippines	11
Dunlop Pro Series	Philippines	11
Dunlop Pro Team	Philippines	11
Dunlop Pro Tour	Philippines	11
Dunlop Pro Tournament	Philippines	11
Dunlop Roland Garros Clay Court	Philippines	11
Dunlop Tour Brilliance	Philippines	11
Dunlop Tour Comfort	Philippines	11
Dunlop Tour Performance	Philippines	11
Dunlop Volley	Philippines	11
Gamma Championship All Court	China	13
Gamma Championship All Court	Indonesia	13
Gamma Pro Tour Extra Duty	Indonesia	13
Gamma Pro Tour Regular Duty	Indonesia	13
Head ATP	China	15
Head Championship	China	15
Head Instinct	China	15
Head No. 1	China	15
Head Pressureless (pressureless)	China	15
Head Pro	China	15
Head Pro Blue	China	15
Head Pro T/S – China Open	China	15
Head Radical	China	15
Head Silver	China	15
Hema Drukloos (pressureless)	Indonesia	16
Hema Gas Gevuld	Indonesia	16
Isospeed Pulse	Indonesia	21
Isospeed Tournament	Indonesia	21
ITF	Philippines	-
Karakal Ace	Indonesia	22
Karakal Club	Indonesia	22

Brand and Ball name	Country of origin	Address Code
MANTIS Tour	Thailand	24
Nassau Championship Pro	Indonesia	25
Nassau Czar Plus	Indonesia	25
Nassau Patriot	Indonesia	25
Nassau Patriot Plus	Indonesia	25
Nassau Tournament	Indonesia	25
Olipa Championship	China	41
Olipa Pro Tour	China	41
Olipa All Court	China	41
Pacific Pro Tour	Thailand	26
Penn ATP Extra Duty	China	15
Penn ATP Regular Duty	China	15
Penn Championship Extra Duty	China	15
Penn Championship Premium	China	15
Penn Championship Regular Duty	China	15
Penta Elite One	Thailand	27
Play2Help	China	28
Prince	Thailand	14
Prince Championship Extra Duty	China	29
Prince Championship Extra Duty	Thailand	29
Prince Championship Regular Duty	Thailand	29
Prince Futures	Thailand	29
Prince NX Tour Extra Duty	Thailand	29
Prince Tour Extra Duty	Thailand	29
Prince Tour Regular Duty	Thailand	29
Pro Kennex Championship	Indonesia	30
Pro Kennex Premium	Indonesia	30
Pro Supex Gold	Thailand	1
Pro Supex Tour	Thailand	1
Singa Tournament	Taiwan	12
Slazenger Centre Court	Philippines	11
Slazenger Championship Grasscourt Hi Vis	Philippines	11
Slazenger Championship Hardcourt Ultra Vis Hydroguard	Philippines	11
Slazenger Championship Hi Vis	Philippines	11
Slazenger Championship Hydroguard	Philippines	11
Slazenger Constant Pressure (pressureless)	Philippines	11
Slazenger Open	Philippines	11
Slazenger Tie Break	Philippines	11
Slazenger Tournament	Philippines	11
Slazenger Winbledon Extra Life	Philippines	11
Slazenger Wimbledon Ultra Vis	Philippines	11

Brand and Ball name	Country of origin	Address Code
Slazenger Wimbledon Ultra Vis Hydroguard	Philippines	11
Slazenger Wimbledon Ultra Vis Swiss	Philippines	11
Sphera Club	Indonesia	33
Sphera Race	Indonesia	33
Sportastic Premium	Indonesia	34
Srixon	Thailand	35
Star Dacos Plus	China	31
Tecnifibre Champion One	Thailand	23
Tecnifibre Club	Thailand	23
Tecnifibre Tour One	Thailand	23
Tecnifibre XLD (pressureless)	Thailand	23
Tecnifibre X-One	Thailand	23
Tecnifibre X-One DTF	Thailand	23
Tecno Pro Championship	Indonesia	20
Teloon Pound Court	China	36
Teloon Pound Pro	China	36
Teloon Pound Tour	China	36
Teloon Power	China	36
Teloon Regular	China	36
Teloon X-Tour	China	36
Teloon Z-Court	China	36
Teloon Z-Pro	China	36
Teloon Z-Tour	China	36
Topspin	China	38
Tretorn Championship	Thailand	39
Tretorn Micro X (see note)	Thailand	39
Tretorn Plus (pressureless)	Thailand	39
Tretorn SERIE+	Thailand	39
Tretorn SERIE+ control	Thailand	39
Tretorn Stockholm Open	Thailand	39
Tretorn Tournament	Thailand	39
Tyger Force 2	Thailand	37
Tyger SQ-Clay (pressureless)	Thailand	37
Tyger SQ-Grass (pressureless)	Thailand	37
Tyger X-Force	Indonesia	37
Voit Pressurized	China	19
Wilson Australian Open	Thailand	40
Wilson Australian Open (2-ball)	China	40
Wilson Australian Open Grass Court	Thailand	40
Wilson Championship (pressureless)	Thailand	40
Wilson Championship All Court	China	40
Wilson Championship All Court	Thailand	40

Brand and Ball name	Country of origin	Address Code
Wilson Championship Extra Duty	China	40
Wilson Championship Extra Duty	Thailand	40
Wilson Championship Regular Duty	China	40
Wilson Championship Regular Duty	Thailand	40
Wilson Team Practice	China	40
Wilson Team Practice	Thailand	40
Wilson Tour Clay Germany	Thailand	40
Wilson Tour Club	Thailand	40
Wilson Tour Davis Cup	Thailand	40
Wilson Tour Team Germany	Thailand	40
Wilson US Open Extra Duty	China	40
Wilson US Open Extra Duty (2-ball)	China	40
Wilson US Open Extra Duty	Thailand	40
Wilson US Open Extra Duty (CTS)	Thailand	40
Wilson US Open Extra Duty Swiss Tennis	Thailand	40
Wilson US Open Regular Duty	China	40
Wilson US Open Regular Duty (2-ball)	China	40
Wilson US Open Regular Duty	Thailand	40
Wilson US Open Regular Duty Grass Court (white)	Thailand	40
Wilson US Open Regular Duty Grass Court	Thailand	40
Yonex Power (pressureless)	Thailand	42
Yonex TMP 80	Thailand	42
Yonex Tour	Thailand	42

Note: These balls are not pressurised balls. The balls are filled with a micro-cellular material that is designed to replace and simulate the effect of the increased internal pressure of a pressurised ball.

HIGH ALTITUDE TENNIS BALLS

Brand and Ball name	Country of origin	Address Code
Dunlop Fort All Court High Altitude	Philippines	11
Penn ATP Extra Duty High Altitude	China	15
Penn Championship Extra Duty High Altitude	China	15
Prince Championship Extra Duty High Altitude	China	29
Prince Championship Extra Duty High Altitude	Thailand	29
Prince Tour Extra Duty High Altitude	Thailand	29
Slazenger Wimbledon Ultra Vis High Altitude	Philippines	11
Wilson Championship All Court High Altitude	Thailand	40
Wilson US Open High Altitude	Thailand	40

Note: Pressureless Type 2 and pressurised Type 3 balls are also recommended for play at high altitude. See Rules of Tennis, Appendix I.

STAGE 1, 2 AND 3 TENNIS BALLS

Brand and Ball Name	Country of origin	Address code
STAGE 1 (Green)		
Artengo 720	Taiwan	3
Babolat Mid	Indonesia	4
Dunlop Stage 1 Green	Philippines	11
Head T.I.P. Green	China	15
Karakal Mid (Green)	Indonesia	22
Nassau Cool	Indonesia	25
Pacific X Play Stage 1	Thailand	26
Penn Control Plus Green	China	15
Prince Play+Stay Stage 1	Indonesia	29
Slazenger Intro Tennis	Philippines	11
Sportastic Stage 1	China	34
Tecnifibre Soft	Thailand	23
Teloon Mid	China	36
Topspin Play+Stay Stage 1	China	38
Tretorn Academy Green	Taiwan	39
Tyger Stage 1	Thailand	37
Wilson Starter Play	Thailand	40
Zsig Green Dot	China	43
Zsig Link Green	China	43
STAGE 2 (Orange)		
Artengo 710	Taiwan	3
Babolat Kid	Indonesia	4
Dunlop Stage 2 Orange	Philippines	11
HEAD T.I.P. Orange	China	15
Karakal LoBo (Orange)	Indonesia	22
MBT Soft	China	17
Nassau Mini Cool	Indonesia	25
Pacific X Play Stage 2	Thailand	26
Penn QST 60 Orange	China	15
Prince Play+Stay Stage 2	Indonesia	29
Quicksand	China	32
Slazenger Mini Tennis Orange	Philippines	11
Sportastic Stage 2	China	34
Tecnifibre Mini Tennis	Taiwan	23
Teloon Mini	China	36
Topspin Play+Stay Stage 2	China	38
Tretorn Academy Orange	Taiwan	39
Tyger Stage 2	Indonesia	37
Wilson Starter Game Ball	Taiwan	40

Brand and Ball Name	Country of origin	Address code
Zsig SloCoach	China	43
STAGE 3 (Red)		
Artengo 700 (standard construction)	Taiwan	3
Artengo Foam Blue (moulded foam)	Italy	3
Artengo Foam Green (moulded foam)	Italy	3
Artengo Foam Orange (moulded foam)	Italy	3
Artengo Foam Pink (moulded foam)	Italy	3
Artengo Foam Yellow (moulded foam)	Italy	3
Babolat B-Ball (cut foam)	Taiwan	4
Dunlop Stage 3 Red (standard construction)	Taiwan	11
Head T.I.P. Red (standard construction)	China	15
Pacific X Play Stage 3 (standard construction)	Thailand	26
Penn QST 36 Foam (cut foam)	China	15
Penn QST 36 Red (standard construction)	China	15
Prince Play+Stay Stage 3 (cut foam)	Taiwan	29
Prince Play+Stay Stage 3 (standard construction)	Taiwan	29
Sportastic Stage 3 (standard construction)	China	34
Tecnifibre My Ball (cut foam)	Taiwan	23
Tecnifibre My New Ball (standard construction)	Taiwan	23
Teloon Stage 3 (standard construction)	China	36
Topspin Play+Stay Stage 3 (standard construction)	China	38
Tretorn Academy Red felt (standard construction)	Taiwan	39
Tretorn Academy Red Foam (cut foam)	Taiwan	39
Wilson Starter Easy Ball (standard construction)	China	40
Wilson Starter Foam Ball (cut foam)	Taiwan	40
Zsig SloCoach Big (Red) (standard construction)	China	43

3. CONTACT DETAILS FOR TENNIS BALL SUPPLIERS

Code	Supplier	Address	Tel/Fax/Email
1	A Sport BVBA	Lichtaartseweg 216/1, 2100 Herentals, Belgium	T: +32 14 233296 E: info@prosupex.be www.prosupex.be
2	Adidas AG	Adi-Dassler-Platz 1-2, Postfach 1120, 91074 Herzogenaurach, Germany	T: +49 9132 84 0 F: +49 9132 84 2241 www.adidas.com/tennis
3	Artengo	4 Blvd de Mons. BP 299, 59 665 Villeneuve D'Ascq Cedex, France	T: +33 3 62 72 23 50 F: +33 3 20 19 83 34 E: adrien.magnier@artengo.com www.artengo.com
4	Babolat VS S.A.	93 rue André Bollier, 69007 Lyon, France	T: +33 4 78 69 78 69 F: +33 4 78 69 78 79 www.babolat.com
5	Bridgestone Sports Co., Ltd.	Omori Bellport E-bldg. 6-22-7, Minami-Oi, Shinagawaku, Tokyo 140-0013, Japan	T: +81 3 5763 2528 F: +81 3 5763 2553 www.bs-sports.co.jp
6	Cleanskin Tennis	110 Running Creek Road, North Arm, Queensland, 4561, Australia	T: +61 7 5446 7961 E: moorem@bigblue.net.au www.cleanskintennis.com
7	Cosco (India) Ltd.	2/8 Roop Nagar, Delhi, 110 007 India	T: +91 11 23843000 F: +91 11 23846000 E: mail@cosco.in www.cosco.in
8	Crane Sports	Postfach 10 01 52, D-45401 Mülheim a.d. Ruhr, Germany	
9	Diadora Racquet Division	25/21 Eugene Terrace, Ringwood, Vic, 3124 Australia	T: +61 3 9870 2340 F: +61 3 9870 3970 E: hogben@bigpond.com www.diadora.com.au
10	Donnay International NV/SA	Leopold Straat 79, B-2800 Mechelen, Belgium	T: +32 15 446585 F: +32 15 446585 ddk@brandsandfashion.com
11	Dunlop Slazenger International Ltd.	Brook Park, Meadow Lane Shirebrook, Mansfield, Notts. NG20 8RY, UK	T: +44 870 838 7310 F: +44 870 838 7311 www.dunlopsport.com www.slazenger.com

Code	Supplier	Address	Tel/Fax/Email
12	Fu Jen Chemical Co., Ltd.	No. 127, Sec.4, Ming-Sheng Road, Taya Hsiang, Taichung Hsien, Taiwan	T: +886 4 25665175 F: +886 4 25665196 E: makegood@ms12.hinet.net
13	Gamma Sports	200 Waterfront Drive, Pittsburgh, PA 15222, USA	T: +1 412 323 0335 F: +1 412 323 0317 E: lab@ gammasports.com www.gammasports.com
14	Globeride, Inc.	3-14-16 Maesawa, Higashikurume-shi, Tokyo, Japan	T: +81 424 79 7779 F: +81 424 79 7790 E: nori@globeride.co.jp www.prince.globeride.co.jp
15	HEAD/Penn Racquet Sports	306 S. 45th Avenue, Phoenix, Arizona 85043, USA	T: +1 800 289 7366 F: +1 888 329 7366 E: MBoyle@us.head.com www.head.com www.pennracquet.com
16	Hema b.v.	PO Box 37110, NL-1030 AC Amsterdam, The Netherlands	T: +31 20 311 4411 F: +31 20 311 4000 E: info@hema.nl
17	High Power SRL	Via Tonso Di Gualtiero, 56 Faetano, Repubblica Di San Marino	T: +378 0549 950 078 F: +378 0549 870 168 E: marketinghp@area51.sm www.max-beach-tennis.com
18	IBML	120 New Cavendish Street, London W1W 6XX, UK	T: +44 845 129 9291 F: +44 845 129 9288
19	Industrias Voit, S.A. de C.V.	Poniente 128 #579, Colonia Industrial, Vallejo, C.P. 02300, México D.F., México.	T: +52 55 5333 6070 F: +52 55 5368 0472 E: ccolumbo@voit.com www.voit.com
20	Intersport International Corporation	Woelfistrasse 2 CH-3006 Berne, Switzerland	T: +41 31 930 7817 F: +41 31 930 7890 www.intersport.com
21	Isosport Verbundbauteile GmbH	Industriestrasse 2-9, A-7000 Eisenstadt, Austria	T: +43 2682 703 0 F: +43 2682 703 4312 E: tennis@isosport.com www.isosport.com
22	Karakal UK	The Old Tanks, Penpole Lane, Shirehampton, Bristol, BS11 0EA, UK	T: +44 117 982 9057 F: +44 117 982 9004 E: lyn@karakal.com www.karakal.com

Code	Supplier	Address	Tel/Fax/Email
23	Major-Sports	Route Departementale 307, B.P. No. 5, 78810 Feucherolles, France	T: +33 1 3054 9710 F: +33 1 3054 9739 E: lblary@tecnifibre.com www.tecnifibre.com
24	MANTIS Sport International Ltd.	7 Larchwood Glade, Camberley, Surrey, GU15 3UW, UK	T: +44 7983 343 069 E: info@mantis-sport.com www.mantis-sport.com
25	Nassau Co., Ltd	156-1, Nae-Dong, Ojeong-gu, Bucheon-Si, Gyeonggi-do, 421-806, Korea	T: +82 32 327 7070 F: +82 32 326 2570 E: mshwang@nassau.co.kr www.nassau.co.kr
26	Pacific Entermark GmbH	Porschestrasse 4-6, 73269 Hochdorf, Germany	T: +49 7153 9839-0 F: +49 7153 9839 599 E: mail@pacific.com www.pacific.com
27	Penta Tennis	Warmonderweg 5, 2171 Sassenheim, Holland	T: +31 252 219107 F: +31 252 218502 E: guido@tennisdirect.nl www.tennisdirect.nl
28	Play2Help	290 Turnpike Road, Suite 6, #391, Westborough, MA 01581, USA	T: +1 508 789 6030 F: +1 888 879 3387 E: support@play2help.org www.play2help.org
29	Prince Sports Inc.	One Advantage Court, Bordentown, NJ 08505, USA	T: +1 800 283 6647 F: +1 609 291 5900 www.princetennis.com
30	Pro Kennex International Co. Ltd	Room D, 10Fl., No.388-9, Beituen Road, Taichung City, 406 Taiwan	T: +886 4 2249 3536 F: +886 4 2249 3542 E: amy@prokennex.com.tw www.prokennex.com
31	Qingdao Synsheen Sporting Goods Co., Ltd	High Scientific & Technical Garden, No. 18 Haier Road, Zhonghan-Cun Bei, Qingdao City, Shandong-Sheng, 266-101 China	T: +86 532 8870 3554 F: +86 532 8870 1824 E: yongchang@starsports.co.kr www.starsports.co.kr

Code	Supplier	Address	Tel/Fax/Email
32	Quicksand s.r.l.	Via Diego, Valeri 7 00143, Rome, Italy	T: +39 33 9816 5627 E: beachtennisproshop@libero.it www.quicksand.it
33	Sphera Tennis System	Via Divisione Julia 21, Brendola 36040, Vicenza, Italy	T: +39 0444 371150 F: +39 0444 371150 E: anna.ongaro@spherats.com www.spherats.com
34	Sportastic GmbH	Gewerbepark 73, A-9710 Feistritz, Austria	T: + 43 4254 40 000 F: + 43 4254 40 000-11 E: office@sportastic.at www.sportastic.at
35	SRI Sports Ltd	6-9, 3-chome, Wakinohama-cho, Chuo-ku, Kobe 651-0072, Hyogo, Japan	T: +81 78 265 3129 F: +81 78 265 3131 E: keizo-yabuno@sri-sports.co.jp www.sri-sports.co.jp
36	Teloon Tennis Ball Co., Ltd	No. 4 Qianpan Road, Zhuangyuan, Wenzhou Zhejiang, 325011 China	T: +86 577 8638 9999 F: +86 577 8635 1838 E: teloon@teloon.com www.teloon.com
37	TennisPlanet International	Torenallee 20, 5617 BC Eindhoven, The Netherlands	T: +31 40 402 11 08 E: Info.Int@TennisPlanet.com www.TennisPlanet.com
38	Topspin GmbH	Grosmanstr. 4 50354 Hürth, Germany	T: +49 2233 700167 F: +49 2233 78125 E: krumm@topspin.to www.topspin.to
39	Tretorn Sweden AB	Garnisonsgatan 51, Box 931, SE-251 09 Helsingborg, Sweden	T: +46 42 19 71 48 F: +46 42 19 71 20 E: joakim.appelqvist@tretorn.se www.tretorn.com
40	Wilson Sporting Goods, Co.	8750 W. Bryn Mawr Avenue, Chicago, Illinois 60631, USA	T: +1 773 714 6715 F: +1 773 714 4582 www.wilsontennis.com
41	Wuxi Olipa Sporting Goods Co., Ltd	10 Huayuan Road, Wuxi, Jiangsu, 214124, China	T: +86 510 85625166 F: +86 510 85625160 E: chenjinzhu@olipa.com www.olipa.com
42	Yonex Co., Ltd	3-23-13 Yushima, Bunkyo-ku, Tokyo, Japan	T: +81 3 3836 1201 F: +81 3 3832 0583 www.yonex.com

Code	Supplier	Address	Tel/Fax/Email
43	Zsig Sports Ltd	No. 7, Chadkirk Business Park, Vale Road, Romiley, Stockport, Cheshire, SK6 3NE, UK	T: +44 161 484 5000 F: +44 161 427 8000 E: jeff@zsig.com www.zsig.com

PART B – ITF GUIDE TO TEST METHODS FOR TENNIS COURT SURFACES

1. INTRODUCTION

Tennis is played on a variety of surfaces, more so perhaps than any other sport. The properties of each surface influence the style of play and affect the quality of performance.

The following notes seek to outline and quantify the key properties that affect play, with the aims of:

- Establishing a minimum level of quality and encouraging high-quality workmanship.
- Improving standards, based on what is currently achievable by experienced contractors using quality materials and conventional methods at reasonable cost.
- Enabling comparisons between courts, giving court constructors, suppliers and end-users a common language to describe different products.
- Protecting contractors against unreasonable demands.

This section is intended to provide a guide to tests suitable for tennis courts for end-users, tournament organisers and court proprietors, in addition to acting as a manual for test houses, suppliers and constructors. The methods described herein will be particularly applicable to surface testing in:

- Venues for elite-level tennis tournaments, such as the Davis Cup.
- National/regional tennis centres.
- Other tennis facilities where the standard of play demands the specification of precise playing characteristics.
- Research and development laboratories.

The ITF has identified 'definitive' and 'predictive' methods for testing the key properties of a surface. Definitive methods are recommended for laboratory testing and on-site testing of courts for professional competition. Predictive methods provide a more economical means of on-site testing.

IMPORTANT NOTE: Whilst these test methods are recommended by the ITF, they are not mandatory.

This section is a revision of *An Initial ITF Study on Performance Standards for Tennis Court Surfaces*, published in June 1997. Further developments are anticipated, and consequently this section is supported by a web-based resource to communicate such changes. The latest version can be found at: www.itftennis.com/technical.

The properties of court surfaces are known to change over time, due to factors such as ambient conditions, use and maintenance. Unless otherwise stated, this section refers to newly-installed court surfaces, which have been given sufficient time to stabilise (as advised by the contractor or supplier).

Disclaimer: *This section does not intend to, nor does it in fact, establish any binding rules or regulations relating to acceptable standards for tennis courts. This section is not part of the Rules of Tennis. The ITF cannot be held responsible for, and accepts no liability for, the failure of any product or service manufactured, produced or provided according to the information given in this section or for any acts or omissions made in reliance upon it or in connection with it. In relation to the contents of this section and/or any act or omission made in reliance upon it or in connection with it, the ITF accepts no liability for any loss of income or revenue, loss of business, loss of profits or contracts, loss of anticipated savings, or for any indirect or consequential loss or damage of any kind however arising and whether caused by tort (including negligence) breach of contract or otherwise, even if foreseeable. Furthermore, the ITF cannot be held responsible for, and accepts no liability for, any injury sustained during the testing of surfaces using the methods described herein, nor for any injury sustained while playing on a court that meets any guideline or recommendation in this section.*

2. KEY PROPERTIES

The key properties of a court surface are as follows:

Friction: The resistance to relative movement between the ball and the court surface. The coefficient of friction (COF) is the ratio of the horizontal force resisting sliding and the vertical force of the ball normal to the surface. A rougher surface has a greater COF, causing a greater reduction in the horizontal velocity and the surface to play 'slower'.

Energy restitution: The energy returned by the surface (and ball) following impact. A decrease in energy return is manifested as a reduction in vertical velocity of the ball after impact. The coefficient of restitution (COR) is the ratio of the vertical velocity after the bounce to that before impact. A surface that yields a higher COR is typically perceived to play slower, because the player has more time to reach the ball.

Topography and dimensions: The geometric regularity of the surface (evenness); the gradient (slope) and planarity designed to assist drainage; and the relative locations of court markings.

Consistency: The uniformity of surface properties over the entire playing area and their stability with time, use and maintenance.

3. GENERAL CONSIDERATIONS

It is preferred that surfaces are tested *in-situ*, although it is accepted that the testing of samples in a laboratory may be more practical (and effective) in some cases. The test method for court pace (ITF CS 01/02) is applicable to both laboratory and on-site testing.

On-site testing

Following installation, on-site tests should not be carried out until the court surface has been given sufficient time to stabilise. Typically, the playing surface of an acrylic court requires a week to stabilise, whereas clay or artificial grass may need several months. Factors that affect stabilisation time include: surface type, site conditions, e.g. climate and shade, usage and maintenance. The stabilisation time should be agreed with the contractor in advance of testing. Prior to testing, the court must be prepared using the manufacturer's, supplier's and/or contractor's procedures.

Testing commences with a visual inspection of the court. At a minimum, the court should have a uniform appearance, with no gaps between joins or cracks, and straight court markings.

During testing, the prevailing environmental conditions should be recorded, including:

- Maximum and minimum temperature of the air, surface and test balls.
- Maximum and minimum relative humidity.
- Maximum and minimum atmospheric pressure.
- Condition of the surface, i.e. dry, damp, etc.

Unless the surface is designed to be damp/wet when in its optimum condition, tests should be made when the surface is dry. To minimise the effects of changes in ambient conditions, the test should be completed as soon as is reasonably possible. Tests for court pace (ITF CS 01/02) should not be initiated if the average temperature of the test balls cannot be maintained within the range 10-30°C.

Tests conducted at above 1,219 m (4,000 feet) should use balls recommended for play at high altitude as defined in the Rules of Tennis.

Tests for court pace (ITF CS 01/02) and ball rebound should be carried out in at least four different locations. Recommended locations – representative of high, medium and low usage areas, and court markings – are shown in Figure 1 (the arrowheads indicate the location and direction of testing).

Note: In addition to the recommended locations, any area of particular concern, such as joins between modular systems, should be tested.

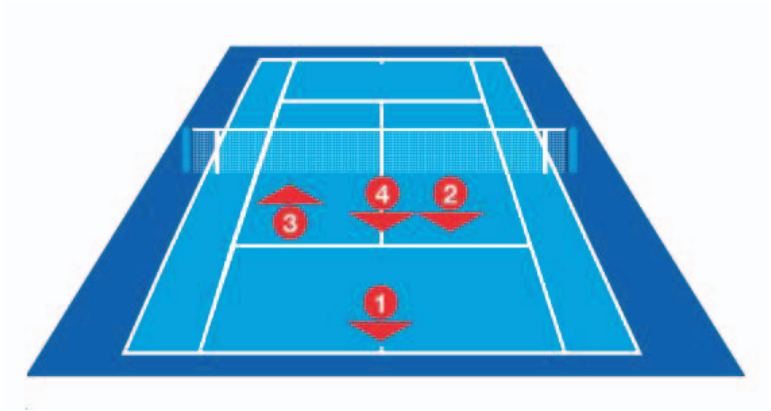


Figure 1. Recommended locations (and test directions) for on-site testing.

Laboratory testing

For tests in the laboratory, the test specimen must be conditioned at the test temperature for a minimum of 3 hours. Unless otherwise specified, the test temperature should be 23 ± 2°C.

Test specimens for laboratory testing should be flat and have minimum dimensions of 0.5 m × 0.5 m, and include any relevant supporting layers or aggregate used in construction.

Note: Loose-laid specimens should be anchored at the edges.

Test balls

A high-specification ball is required for court testing to reduce the effect of ball properties on the measurement of surface characteristics (see Table 1).

Type of ball	Pressurised
Mass	57.6 ± 0.3 g
Diameter	6.60 ± 0.05 cm (2.598 ± 0.020 inches)
Forward deformation	0.64 ± 0.04 cm (0.252 ± 0.016 inches)
Return deformation	0.94 ± 0.14 cm (0.370 ± 0.055 inches)
Rebound	141 ± 1 cm (55.5 ± 0.4 inches)
Woven cloth	55 ± 5% wool, 45 ± 5% nylon

Table 1. Ball specification for surface testing.

For all tests, balls should be kept in their pressurised cans at 23 ± 2°C prior to testing, and pre-compressed before use. Pre-compression is intended to remove temporary 'set' in the ball, which may occur during prolonged storage. Pre-compression consists of compressing the ball by approximately 2.5 cm on each of three diameters at right angles to one another in succession; this routine is carried out three times (nine compressions in all)[1].

Balls should not be subjected to more than 12 impacts each, excluding any pre-compression impacts, to ensure that their original properties are retained throughout testing.

Average ball temperature should be recorded for each test location/sample using an infrared thermometer, calibrated to ± 1°C.

Test reports

Each test performed requires a report to document the results and conditions. The test report should contain all relevant information, including:

- Reference to the ITF test method and code.
- Identification and detailed description of the surface composition, including supporting layers, and its condition.
- Information on the test environment: temperature; humidity; atmospheric pressure; altitude; venue.
- Statement of the ball brand name and country of manufacture.
- All results.
- Overall result, typically the average and variation of the measurements (for comparison against the category or recommendation).

[1] Firing the ball three times at an oblique angle onto a smooth, rigid surface using a ball projection device at 30 ± 2 m/s is an optional means of applying pre-compression.

4. COURT PACE (ITF CS 01/02)

The ITF Court Pace Rating (CPR) measures the effect of ball-surface interaction. This concept includes: friction, which primarily determines the reduction in the horizontal component of post-impact ball velocity, and, vertical restitution, which determines the time between successive bounces.

CPR is derived from a theoretical model of a ball-surface impact that assumes that the ball and surface are rigid during the impact and that the ball slides throughout contact with the surface. These assumptions necessitate that the ball impacts the surface with negligible spin and at a particular speed and angle.

Apparatus

Test apparatus consists of:

- A means of projecting a ball at the specified speed and angle onto the surface without imparting spin of greater than 3 rev/s, such as a compressed air-powered ball cannon.
- A means of monitoring the trajectory of the ball before and after impact such that its horizontal and vertical speeds can be measured with a maximum uncertainty of ± 0.05 m/s (see Figure 2).
- A minimum of three high-specification balls (see Table 1).

Note: Angle of travel can be deduced from the vertical and horizontal speeds.

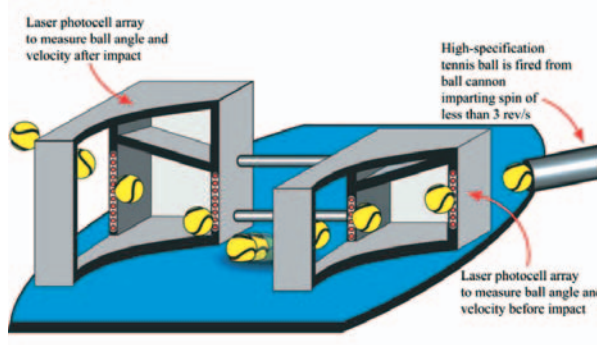


Figure 2. Test apparatus for measuring court pace.

Calibration of apparatus

The reference test devices are those belonging to the ITF, and all other devices are calibrated with respect to them. Calibration of test devices is achieved using standard surfaces every two years.

Note: The spin rate of the ball can be checked using a high-speed video camera or stroboscope photography.

Test procedure

1. Adjust the ball-projecting apparatus to deliver the ball at an incident angle of 16 ± 2° and speed of 30 ± 2 m/s. If possible, avoid using the test location(s) and balls during this preparation stage.

2. Project each of the three test balls onto the test surface three times (nine impacts in total), moving impact location for each shot. If the surface is disturbed or damaged by the test (e.g. movement of clay particles), restore the surface before the next shot.

3. For any surfaces that have an inherent directional pattern – such as natural or artificial grass – test shots should be fired in the typical directions of play, i.e. parallel to the length of the court.

Calculation of results

Include the following results in the test report for each impact:

v_{ix} = horizontal inbound velocity (m/s)
v_{iy} = vertical inbound velocity (m/s)
v_{fx} = horizontal outbound velocity (m/s)
v_{fy} = vertical outbound velocity (m/s)
e = coefficient of restitution (COR)
μ = coefficient of friction (COF)
T = mean ball temperature for test location/sample (°C)
c = temperature coefficient (0.003)
e_T = adjusted COR for temperature T
a = pace perception constant (150)
b = mean coefficient of restitution for all surface types (0.81)
CPR = court pace rating

where:

$$e = \frac{v_{fy}}{v_{iy}} \qquad \mu = \frac{v_{ix} - v_{fx}}{v_{iy}(1+e)} \qquad e_T = e + \mathrm{c}(23 - T) \qquad \mathrm{CPR} = 100(1-\mu) + \mathrm{a}(\mathrm{b} - e_T)$$

The test value is the mean CPR for all impacts, excluding court markings. The variation is given by the maximum difference in the mean CPRs for each location, excluding the court markings.

Classification

Surfaces are categorised as follows:

Category	CPR
Slow	≤ 29
Medium-slow	30-34
Medium	35-39
Medium-fast	40-44
Fast	≥ 45

Table 2. Court Pace Rating categories.

Court surface construction is an inexact science. As a guide, the tolerance in the mean CPR value for a court installed by experienced contractors using quality materials and conventional methods at a reasonable cost is ± 5 CPR from the quoted value. This tolerance applies to a new court as/unless specified by the end-user. The maximum variation in CPR between the test location means, excluding the court markings, should be ≤ 10 CPR.

Note: CPR may vary depending on the nature of the materials that support the uppermost playing surface of a court.

The coefficients of friction and restitution of a surface are categorised as follows:

Category	COR	COF
High	≥ 0.85	≥ 0.71
Medium	0.79-0.84	0.56-0.70
Low	≤ 0.78	≤ 0.55

Table 3. Coefficient of restitution and friction categories.

Surfaces with a COR of less than 0.70 are not recommended for use as tennis courts. The maximum variation in COR between the test location means, excluding the court markings, should be ≤ 0.05. The maximum variation in COF between the test location means, excluding the court markings, should be ≤ 0.05.

Figure 3 illustrates how friction (COF) and vertical restitution (COR) are combined to give CPR, using the equation on page 42. Surfaces are typically perceived to play 'faster' as CPR increases, which can result from a decrease in friction and/or restitution.

e \ μ	0.88	0.86	0.84	0.82	0.8	0.78	0.76	0.74	0.72	0.7	0.68	0.66	0.64	0.62	0.6	0.58	0.56	0.54	0.52	0.5	0.48	0.46	0.44	0.42	0.4
0.98												9	11	13	15	17	19	21	23	25	27	29	31	33	35
0.96											10	12	14	16	18	20	22	24	26	28	30	32	34	36	38
0.94										11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41
0.92									12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44
0.9								13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47
0.88							14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
0.86						15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53
0.84					16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56
0.82				17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59
0.8			18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62
0.78	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	
0.76	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68
0.74	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71
0.72	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74
0.7	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75	77

Figure 3. Court Pace Rating conversion chart.

5. BALL REBOUND (PREDICTIVE METHOD)

Although the rebound height of a ball is affected by its incident angle, a vertical drop can provide an indication as to the suitability of a surface for tennis.

To minimise the effects of environmental conditions and ball properties, the test surface is measured relative to the rebound height on a reference surface.

Apparatus

Test apparatus consists of:

- Standard ball.
- Reference surface, which shall be smooth, rigid and horizontal, e.g. polished granite block.
- A means to measure rebound height, calibrated to ± 1%, such as a measuring staff and video camera.

Calibration of apparatus

Check the height-measuring accuracy of the apparatus against a known standard prior to testing.

Test procedure

1. Drop the ball from a known height (at least 127 ± 1 cm) onto the reference surface five times and measure the rebound height (BHT) on each occasion, ensuring that there is no parallax error in the measurement.

2. Repeat step (1) on the test surface.

Note: The ball should be dropped in a manner that does not impart any impulse or spin.

Calculation of results

The Relative Percentage Rebound (RPR) is given by:

$$RPR = 100\left(\frac{BHT_{test}}{BHT_{ref}}\right)$$

where:

BHT_{test} = rebound height on the test surface
BHT_{ref} = rebound height on the reference surface

The test value is the mean RPR for all impacts. For on-site tests, the variation is given by the maximum difference in the mean RPR for each location.

Recommendations

The preferred value for Relative Percentage Rebound is ≥ 80. The maximum variation in RPR between the test location means should be ≤ 10.

6. EVENNESS (ITF CS 02/02)

The court surface should be free from any imperfection that causes an inconsistent ball bounce, allows the collection of water, or significantly increases the risk of injury to players.

Undulations in the court are measured relative to a rigid straight edge placed on the surface.

Apparatus

Test apparatus consists of:

- 3 m straight edge, made from box-section aluminium or equivalent.
- Wedge approximately 25 mm wide and 200 mm long, with marked height increments of 1 ± 0.25 mm.
- Two supports for the straight edge, of equal height ± 0.25 mm.

Calibration of apparatus

Devices used for evenness measurements should be calibrated annually. Surveying-quality straight edges in serviceable condition are deemed appropriate. The straight edge can be checked by hanging a plumb line against the bottom edge. The wedge increments and supports can be measured using a calliper, calibrated against a known standard. Check for any damage to the straight edge and wedge prior to testing.

Test procedure

1. Lay the straight edge on the surface, parallel to the net, and look for deviations that warrant measurement, i.e. exceed the recommended limit in Table 4.

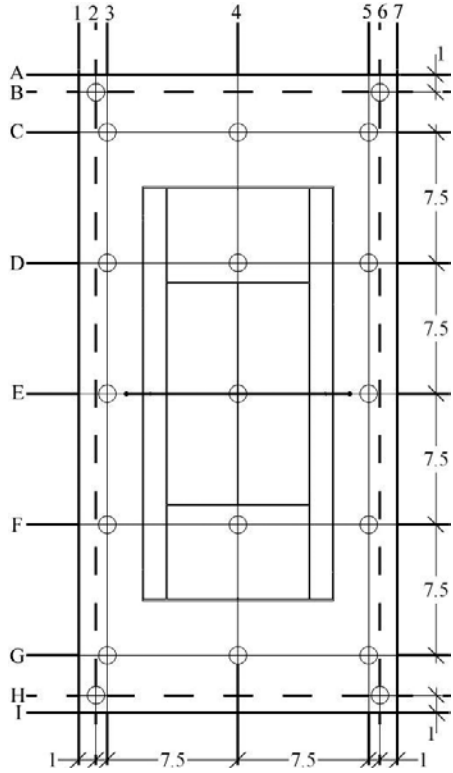
2. If there are any hollows, measure the point of maximum deviation from the underside of the straight edge using the graduated wedge (see Figure 5). Ensure that the straight edge is resting on the court surface either side of the hollow.

3. If there are any isolated bumps or ridges, suspend the straight edge above the peak of the bump using supports at either side (see Figure 5). Measure the point of minimum deviation from the underside of the straight edge using the wedge and subtract this value from the height of the supports. This gives the height of the bump.

4. Measure the length of the deviation by moving the straight edge either side of the maximum point, parallel to the net, until the deviation no longer exceeds the recommended limit in Table 4.

5. Move the straight edge to an adjacent location and repeat steps (1) to (4), making sufficient measurements to inspect the Total Playing Area (TPA) of the court (see Figure 4).

6. Repeat steps (1) to (5) with the straight edge at right angles to the net.



Notes:
a. The points A1, A7, I1 and I7 define the perimeter, which is typically kerbed.
b. The Total Playing Area (TPA) is defined by B2, B6, H2 and H6, which are located 1 m inside the perimeter of the court. Where there is no perimeter, these points will be halfway between the court being measured and the neighbouring court, and not less than 7.5 m wide of the middle of the net.
c. The Principal Playing Area (PPA) is 15.0 m wide (parallel to the net) and 30.0 m long. The middle of the net shall coincide with the centre of the PPA. The PPA is defined by C3, C5, G3 and G5.

Figure 4. Plan view of a court showing recommended locations for measuring slope and planarity. All dimensions are given in metres.

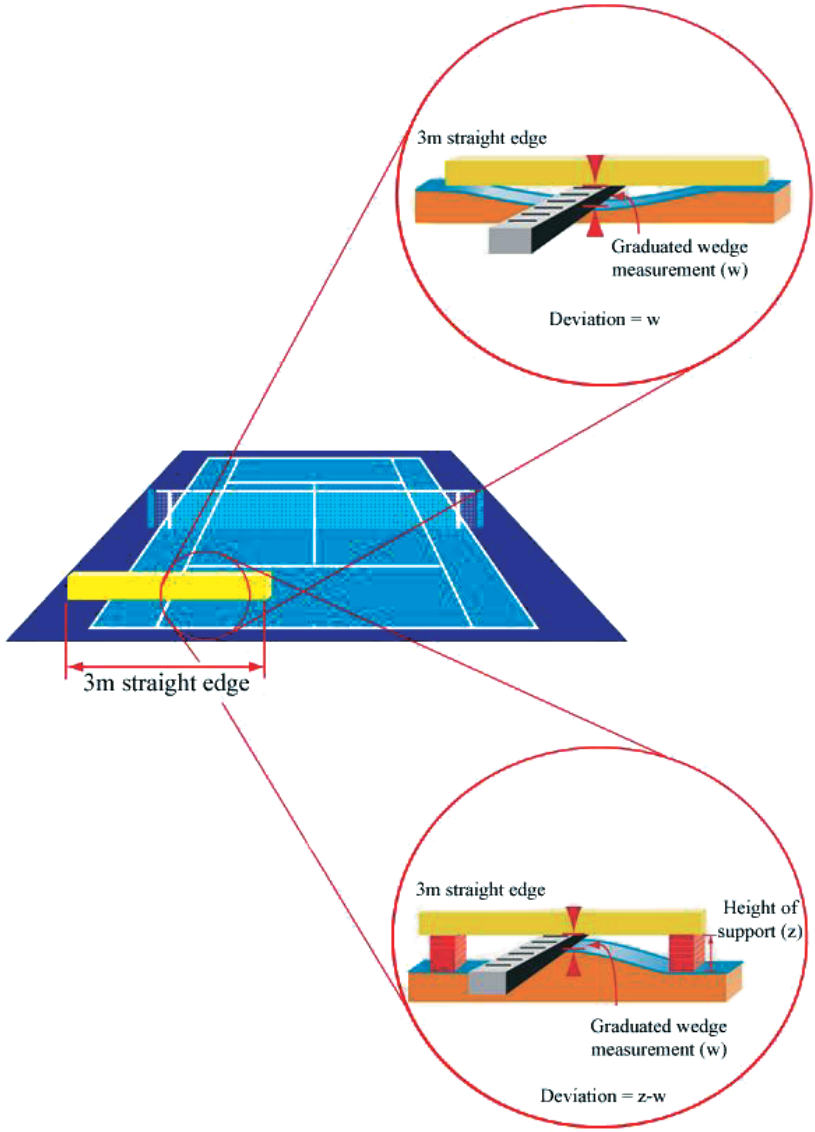


Figure 5. Schematic of method for measuring a hollow, or a bump or ridge.

Calculation of results

Record the location, magnitude and direction of all deviations outside the recommended limits. If any such deviation occurs in both test directions (parallel to and at right angles to the net), then it should only be counted once. Deviations exceeding 1 m in length shall be counted per metre, e.g. a deviation (above the recommended limit) 2.5 m long shall equate to three deviations. The test value is the number of deviations outside the recommended limits for the surface type.

Recommendations

Refer to Table 4.

<table>
<tr><th></th><th>Acrylic</th><th>Artificial clay/grass; carpet</th><th>Asphalt/ concrete; other[1]</th><th>Clay</th><th>Grass</th></tr>
<tr><td>Evenness</td><td colspan="2">6 mm</td><td>8 mm</td><td colspan="2">6 mm</td></tr>
<tr><td>Deviations[2]</td><td colspan="2">2 (PPA)/4 (TPA)</td><td>4 (PPA)/
8 (TPA)</td><td colspan="2">N/A[3]</td></tr>
<tr><td>Slope (max)</td><td>1:100 (1.00%)</td><td colspan="2">1:120 (0.83%)</td><td colspan="2">1:200 (0.50%)</td></tr>
<tr><td>Planarity[4]</td><td colspan="5">± 15 mm from true (PPA)
± 30 mm from true (TPA)</td></tr>
</table>

Notes: PPA = Principal Playing Area; TPA = Total Playing Area.

[1] Specifications are for porous constructions. For impervious constructions, see ‘acrylic’.

[2] In no instance should any imperfection exist that could cause the ball to deviate significantly from its path on a perfectly level surface, or expose a player to a significantly increased risk of injury within the perimeter of the court.

[3] Deviations on clay or grass over 6 mm should be corrected where possible.

[4] Unless design, specification or construction necessitate otherwise.

Table 4. Evenness, slope and planarity recommendations for a tennis court.

7. SLOPE AND PLANARITY (ITF CS 03/03)

Ideally, a tennis court should be a flat surface lying in a single horizontal plane. The court may be sloped for drainage, but the single plane of the surface should always be maintained.

The slope should be oriented to minimise its effect on play. Thus, where a court must be sloped for drainage, a slope from side-to-side is preferred (see Figure 6).

The slope is determined by measuring the ratio of change in elevation to horizontal distance. Planarity is measured relative to a hypothetical plane parallel to the slope of the court.

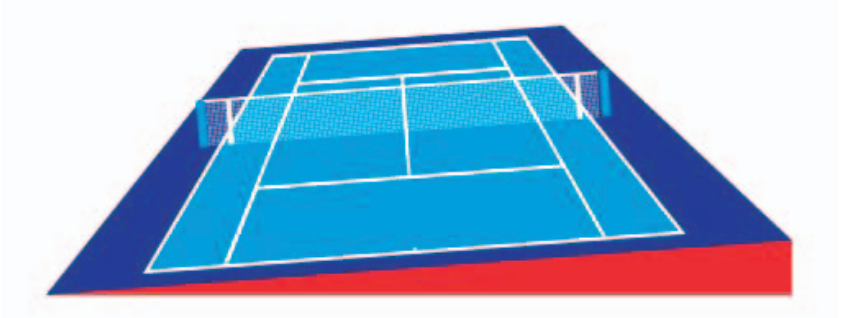


Figure 6. Preferred orientation of slope (side-to-side), if necessary.

Apparatus

Test apparatus consists of:

- A distance-measuring device, calibrated to ± 0.05%, such as a laser distance meter or a steel tape.
- A surveyor's level, calibrated to ± 1 mm/10 m, and a measuring staff, calibrated to ± 0.25 mm. The level may be either a self-levelling rotary laser, which sweeps out a horizontal plane with a beam of visible or infrared light, or an optical level, where the plane is defined by the horizontal axis of the instrument.

Calibration of apparatus

The distance-measuring device and measuring staff must be checked against known standards. This should be carried out at appropriate intervals (typically annually) or if there is any reason to suspect that the device is inaccurate and/or has been damaged (e.g. if a laser distance meter has been dropped or left in the rain, or a steel tape has become kinked).

A surveyor's level can be checked using the standard 'two-peg' method: Place the level midway between two pegs at different heights 10 m apart and read the staff on each peg. Calculate the height difference between the pegs. Move the level 1 m past one of the pegs and read the staff on each peg and calculate the height difference again. The difference in the height differences is the collimation error in mm/10 m.

Test procedure

1. Using the distance-measuring device, find the *x*- and *y*-coordinates of the corners of the TPA (B2, B6, H2 and H6 in Figure 4). Temporarily mark a 7.5 m grid on the court surface (e.g. using coins or plastic tile spacers). The centre point of the grid will be at the midpoint of the net, and the perimeter of the grid encloses the PPA (C3, C5, G3 and G5 in Figure 4).

2. Using the surveyor's level, establish a horizontal reference plane using a fixed datum, e.g. by placing the level near the centre of the court. Measure the vertical distance between the surface and the horizontal reference plane at the four corners of the TPA and each of the 15 points of the PPA grid (19 points in total) using the measuring staff.

3. Repeat the measurements in reverse order. Check any measurement for which the discrepancy between the two values exceeds 1 mm.

4. Measure the evenness of the court at the 19 points (refer to method ITF CS 02/02).

Calculation of results

Slope

1. Calculate the height difference for each pair of points along the two sides of the PPA (C3 and C5; D3 and D5, etc., in Figure 4) and take the mean of these five values.

2. Divide the mean by the width of the PPA (i.e. 15.0 m) to give the side-to-side slope.

3. Repeat this method to determine the end-to-end slope (using the points along the ends of the PPA, divided by 30.0 m) and the two corner-to-corner diagonal slopes (using the corner points of the PPA).

4. The maximum of these four gradients is the test value for slope.

Planarity

1. Calculate the mean of all the level measurements in the PPA to give the height of the centre of a hypothetical plane parallel to the court.

2. Calculate the heights of this hypothetical plane at each of the PPA and TPA points using the side-to-side and end-to-end slopes.

3. Use the evenness measurements from step (4) of the test procedure to correct the height, i.e. add the depth of a hollow, or subtract the height of a bump.

4. Calculate the height difference between the surface and the ideal plane at each measurement point. The maximum difference is the test value for planarity.

Note: A spreadsheet into which the measured coordinates and staff readings can be entered to calculate slope and planarity can be found at:
www.itftennis.com/technical.

Recommendations

Refer to Table 4.

Note: A steeper maximum gradient is given for acrylic, impervious asphalt and concrete courts to prevent water from collecting on the court. In the case of clay and grass, a shallower gradient is required to minimise the erosion of the top dressing.

8. DIMENSIONS (ITF CS 04/02)

The court markings define the playing area of the surface and provide consistency with the Rules of Tennis and between courts.

The position of the court markings and net are checked using a distance-measuring device.

Apparatus

Test apparatus consists of:

- Distance-measuring device, calibrated to ± 0.05%, such as a laser distance meter or a steel tape.

Calibration of apparatus

Check the distance-measuring accuracy of the apparatus against a known standard prior to testing.

Test procedure

1. Using the calibrated device, measure each of the distances listed in Table 5 (refer also to Figure 7). Follow the same procedure on both sides of the net to complete the court.
2. Repeat the measurements in reverse order. Check any measurement for which the discrepancy between the two values exceeds half of the applicable tolerance.

Note: All measurements of court markings should be made to the outside edge of lines, except those made to the centre serviceline and the centre mark, which are made to the centre of those lines. Measurements from the net should be taken using a plumb line hung from the top of the net, or a line tensioned between the centres of the net post holes.

Calculation of results

Calculate the mean of the two values measured for each distance. The tolerance for each test value (measured distance) corresponds to 0.1% of the distance measured, with a minimum tolerance of ± 5 mm. 10 mm is added to the tolerance for measurements involving the net, due to the thickness and movement of the net and the uncertainty in the measurement of the net posts.

Recommendations

Refer to Table 5.

Measurement	Description	Criterion (m)	Tolerance (mm)	Range (m)
DC	Distance between doubles sidelines	10.973	11	10.96-10.98
Dd, Cc	Doubles sidelines to singles sidelines	1.372	5	1.37-1.38
dJ	Singles sideline to centre mark	4.115	5	4.11-4.12
dc, GF	Distance between singles sidelines	8.233	8	8.22-8.24
GH	Singles sideline to centre serviceline	4.115	5	4.11-4.12
ad, bc	Net to baseline	11.887	22[a]	11.87-11.91
aG, bF	Net to serviceline	6.401	16[a]	6.38-6.42
dd', cc'	Distance between baselines	23.774	24	23.75-23.80
GG', FF'	Distance between servicelines	12.802	13	12.79-12.81
NN'[b]	Length of net	12.802	23[a]	12.78-12.82
XN[b,c]	Middle of net to net post	6.401	16[a]	6.38-6.42
DC', CD'	Full-court diagonal (doubles)	26.184	26	26.16-26.21
C to backstop	Baseline to backstop	≥ 6.40[d]	N/A	N/A
C to sidestop	Baseline to sidestop	≥ 3.66[e]	N/A	N/A

Notes: Movement of grass during the application of court markings shall be taken into account when assessing the results.
a. 10 mm added to the tolerance for measurements involving the net.
b. N is measured from the centre of the net posts.
c. In cases where the position of X cannot be located precisely, for instance due to anchoring of the centre strap, use a reference point midway across the centre serviceline.
d. Applies to international competition. For recreational and club play, the recommended minimum distance is 5.48 m.
e. Applies to international competition. For recreational and club play, the recommended minimum distance is 3.05 m.

Table 5. Recommended tolerances for dimensions of a tennis court.

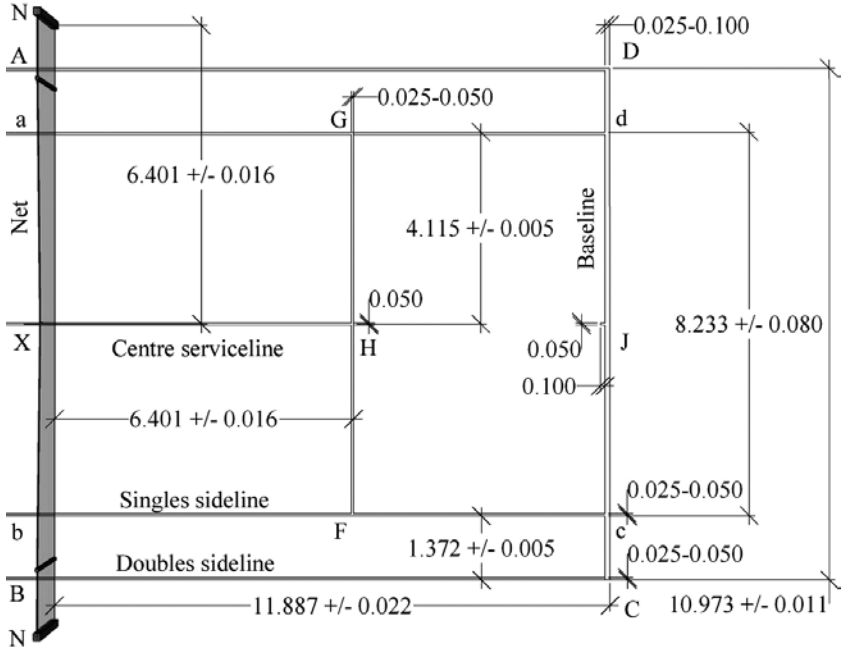


Figure 7. Plan view of half-court. All dimensions are given in metres.

PART C – COURT PACE CLASSIFICATION

1. COURT PACE CLASSIFICATION PROGRAMME

1.1 Introduction

The ITF Court Pace Classification Programme has been developed to assist purchasers of tennis surface products to determine the type and speed of surface most suited to their requirements. As described in Part B, the ITF classifies surfaces into five categories according to court pace:

Category 1 (slow)
Category 2 (medium-slow)
Category 3 (medium)
Category 4 (medium-fast)
Category 5 (fast)

A surface product included on the list of ITF Classified Surfaces is classified purely on the basis of its court pace rating. ITF Classification listing does not imply any form of ITF approval or endorsement.

Any manufacturer, contractor or facility owner may apply for classification and inclusion on the ITF list. The ITF reserves the right to refuse an application for classification of a surface that it deems is not suitable for the game of tennis.

All ITF Classified tennis surface products are valid for 3 years, whilst the classifications of individual courts tested on-site are valid for 1 year.

1.2 Application to an ITF Accredited Laboratory

To have a product assessed for inclusion on the ITF list of classified surfaces, a company shall appoint an ITF Accredited laboratory to undertake Court Pace measurements on the surface, either on-site on a court which is less than 4 months old, or in the laboratory. Contact details for ITF Accredited laboratories can be found in Section 2.

When commissioning the Court Pace assessment the company requesting the tests shall provide a detailed specification of the court/surface construction and samples of the surface, including any loose particulate materials, to the ITF Accredited laboratory. The laboratory requires either three samples at a minimum size of 0.5 m × 0.5 m square, or (in the case of infilled and carpet surfaces) one sample which is a minimum of 1 m × 1 m square. In addition one sample shall be sent to the ITF Technical Centre, which, if necessary, shall be tested by the

ITF to confirm the result of the ITF Accredited laboratory. The ITF Accredited laboratory and/or the ITF may refuse to test samples which are damaged or badly prepared.

Tests on the surface shall be conducted in accordance with test method ITF CS 01/02 described in Part B, Section 4 of this document. Unless the surface is designed to be damp/wet when in its optimum condition, tests shall be made with the surface in a dry condition. For any surfaces that have an inherent directional pattern – such as natural or artificial grass – test shots should be fired in the typical directions of play, i.e. parallel to the length of the court. Where samples are used, the supplier shall indicate the direction the surface should be laid on court.

Upon completion of the test, and receipt of payment of the testing fee, the ITF Accredited laboratory will submit a test report to the ITF and subsequently to the customer.

1.3 Application for ITF Classification Listing

Upon receipt of a test report, the customer may apply to the ITF Technical Centre by email (technical@itftennis.com) for an ITF Classification application form and an invoice for the classification fee.

The uncertainty in the pace rating obtained from test method ITF CS 01/02 is ± 2 CPR points, established from 'round-robin' laboratory testing of samples between ITF Accredited laboratories. Therefore, if the mean CPR value for the test lies within 2 points of an adjacent category, the customer will be given the choice between the two categories. A final report will then be issued to the customer containing the original and amended category.

The classification fees are shown below, including discounts available to members of the ITF Foundation[2].

Type of classification	**Fees per product brand**	**Discounted fees for ITF Foundation**	
		General Member	Supporting Member
Brand of surface	US$ 2500	US$ 1500	US$ 1200
One court (facility)	US$ 500	---	---

For a classified product to be listed under a different brand name, the full ITF Classification fee shall apply.

[2] Information on membership of the ITF Foundation can be obtained on request to the ITF Technical Centre.

Upon receipt of payment of the classification fee the surface will become ITF Classified and a certificate will be issued. The surface will be listed on the ITF website www.itftennis.com/technical and also published in the ITF annual publication entitled "ITF Approved Balls, Classified Surfaces & Recognised Courts" booklet.

ITF Classification of court surface products is valid for 3 years from date of listing. If a company wishes a product to remain on the ITF Classified list, it shall arrange for the product to be reassessed by an ITF Accredited laboratory within 6 months prior to expiry.

For individual courts which have been tested on-site, classification will be valid for 1 year, with the classification only being listed on the ITF website.

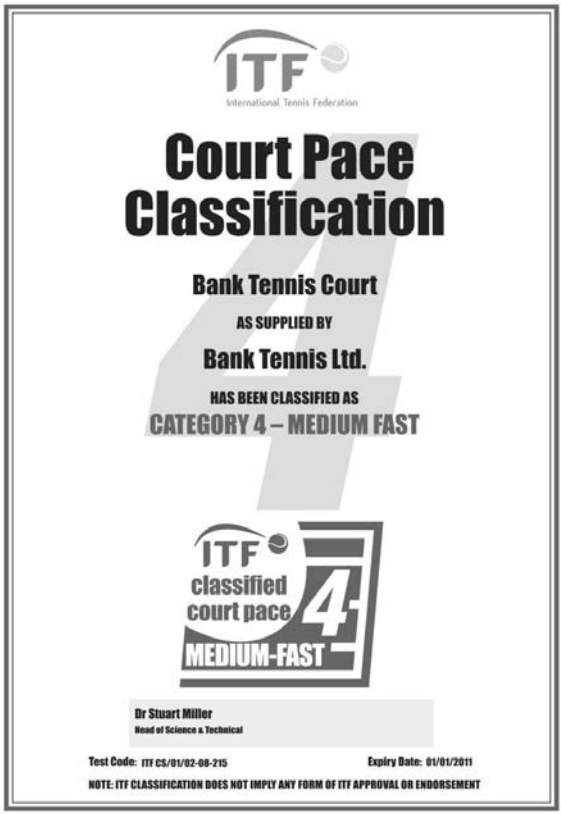


Figure 1. Example of ITF Classification Certificate.

2. ITF ACCREDITED LABORATORIES

The ITF has accredited the following laboratories to undertake court pace testing in accordance with ITF test method ITF CS 01/02.

Centre for Sports Technology Ltd	*Contact:* Mr James Cooper
Unit 3, Greenwich Centre Business Park, 53 Norman Road, London, SE10 9QF UK	Tel: +44 20 8293 6655 Fax: +44 20 8269 0440 Email: info@cst-global.com Web: www.cst-global.com

Fugro Technical Services Ltd	*Contact:* Mr Felix Chan
Fugro Development Centre, 5 Lok Yi Street, 17 M.S. Castle Peak Road, Tai Lam, Tuen Mun, N.T. Hong Kong	Tel: +852 2450 8233 Fax: +852 2450 6138 Email: matlab@fugro.com.hk Web: www.materialab.com.hk

IBV	*Contact:* Ms. Sonia Gimeno Peña
Instituto De Biomecanica De Valencia Universidad Politécnica de Valencia Edifcio 9C, Camino de Vera s/n E-46022 Valencia Spain	Tel: +34 96 387 91 60 Fax: +34 96 387 91 69 Email: sonia.gimeno@ibv.upv.es Web: www.ibv.org

ISA Sport	*Contact:* Mr. Gert-Jan Kieft
Papendallaan 7 NL-6816 VD Arnhem The Netherlands	Tel: +31 26 483 46 37 Fax: +31 26 483 46 30 Email: info@isa-sport.com Web: www.isa-sport.com

Labosport Ltd	*Contact:* Mr. Alastair Cox
Unit 3, Heanor Gate Road, Heanor, Derbyshire, DE75 7RJ UK	Tel: +44 1773 765007 Fax: +44 1773 765009 Email: alc@labosport.co.uk Web: www.labosport.com

Labosport SARL	*Contact:* Mr. Eric Faivre D'Arcier
Technoparc du Circuit des 24 Heures Chemin aux Boeufs 72100 Le Mans France	Tel: +33 2 43 47 08 40 Fax: +33 2 43 47 08 28 Email: contact@labosport.com Web: www.labosport.com

MPA	*Contact:* Rainer Wellhäuβer
Universität Stuttgart Section 55150 "Sports surfaces; sports facilities" Pfaffenwaldring 32 70569 Stuttgart Germany	Tel: +49 711 685 63379 or 63370 Fax: +49 711 685 62765 Email: rainer.wellhaeusser@ mpa.uni-stuttgart.de Web: www.mpa.uni-stuttgart.de

3. ITF CLASSIFIED SURFACES

The descriptions in the table below can be cross-referenced with the classified court surfaces to identify the generic court surface type associated with each product in the list. The descriptions relate only to court construction, and not to performance characteristics.

Surface code	Type	Description
A	Acrylic[1]	Textured, pigmented, resin-bound coating.
B	Artificial clay[2]	Synthetic surface with the appearance of clay.
C	Artificial grass[2]	Synthetic surface with the appearance of natural grass.
D	Asphalt[3]	Bitumen-bound aggregate.
E	Carpet	Textile or polymeric material supplied in rolls or sheets of finished product.
F	Clay[4]	Unbound mineral aggregate.
G	Concrete[3]	Cement-bound aggregate.
H	Grass	Natural grass grown from seed.
J	Other	E.g. modular systems (tiles), wood, canvas.

Notes:

All surfaces may be porous or non-porous, with the exception of 'Clay' and 'Grass', which are always porous.

[1] Normally forms only the uppermost few millimetres of a court.

[2] "Appearance" relates only to the form of the uppermost surface material and not other characteristics (e.g. colour). These surfaces are typically composed of a carpet matrix dressed with clay, sand and/or rubber aggregate.

[3] Used only when the material itself forms the playing surface. When used as a base for other surfaces (e.g. acrylic), reference will be made only to the playing surface.

[4] This term denotes a class of surface that is constructed from naturally-derived materials, and includes a fine gritty material as the uppermost (playing) layer, e.g. fast-dry. The integrity of the surface shall not be reliant on the addition of a carpet or membrane layer to the structure.

The following tennis court surface products have been classified by the ITF and awarded pace ratings which fall into five categories:

Category 1 (slow)
Category 2 (medium-slow)
Category 3 (medium)
Category 4 (medium-fast)
Category 5 (fast)

Note: ITF Classification does not imply any form of ITF approval or endorsement.

CATEGORY 1

Name of surface product	Surface code	Address code	Expiry date
120 Tennis Clay (sand-filled)	C	88	08.01.12
AC Coating Tennis System	A	65	25.10.13
ClayTech (clay-dressed)	B	37 / 91	30.09.12
Co-Tech Cushion System	A	17	04.08.12
G-Clay (sand-dressed)	B	57	30.05.11
Konygreen TN1500H (sand-filled)	C	44	26.10.12
Konygreen TN1500M (sand-filled)	C	44	26.10.12
NewGrass T6 15 (sand-filled)	C	49	07.07.12
NewGrass T6 9 (sand-filled)	C	49	07.07.12
Perfect K Court	A	54	02.09.12
Play-Flex	A	59	21.09.12
Rebound Ace HSA Club “S”	A	64	06.11.11
Rebound Ace Pro International “S”	A	64	06.11.11
RoyalClay Pro (clay-dressed)	B	72	02.06.11
Sit-In Sport Cepiemme Red Brick 15 (clay-dressed)	B	63	13.11.11
Sportflex	E	52	26.10.13
Tennis Force	F	6 / 75	07.12.12
Top Clay (clay-dressed)	B	59 / 91	30.09.12
Trucourt	E	43	02.09.13

CATEGORY 2

Name of surface product	Surface code	Address code	Expiry date
AllSport	A	11	13.11.11
Bross-Clay (clay-dressed)	B	10	13.01.14
Changhe SPU-Cushion Polyurethane System 2	A	41	30.11.13
Chaoda Tennis Court	A	5	30.11.13
Clayrite (sand-dressed)	B	60	18.02.13
CushionMaster Pro-2	A	76	15.07.12
Fast Track 10 (sand-filled)	C	40	07.07.12
Grand Clay 12 (sand-dressed)	B	42	03.12.11
Ground Master	A	45	27.05.13
Konygreen CL1900 (sand-filled)	C	44	26.10.12
Konygreen TN1900 (sand-filled)	C	44	01.04.12
Latex-ite Medium-Slow	A	47	03.08.13
Matchplay II (sand-filled)	C	60	10.11.13
Olympus (sand-filled)	C	26	10.11.13

Name of surface product	Surface code	Address code	Expiry date
Optimal XT 23 (sand-filled)	C	26	28.04.13
Pe-Ba Champion Tennis (sand-filled)	C	58	12.08.13
Pe-Ba Premium Tennis (sand-filled)	C	58	12.08.13
Plexipave IW	A	11	29.01.13
Proflex	A	77	29.04.12
Proflex Hardcourt	A	77	31.08.13
Red Plus (sand & clay-dressed)	B	53	01.09.13
RuKortHard	A	19	14.01.14
Sit-In Sport Tennis 15 S (sand-filled)	C	63	09.02.12
Somclay (clay-dressed)	B	69	20.01.14
Surface Evolution	A	12	01.02.13
TigerTurf Baseline (sand-filled)	C	86	25.06.13
TigerTurf Commercial Grand Prix (sand-filled)	C	86	09.06.13
TigerTurf Crown (sand-filled)	C	86	19.03.12
Top Slide	E	91	30.09.12

CATEGORY 3

Name of surface product	Surface code	Address code	Expiry date
170 Grip (sand-filled)	C	88	26.06.12
AC Hi-Court	A	15	16.04.11
Acryflex T Cushion Plus	A	9	07.06.13
Advantage III	A	3	23.09.12
Aries Multipurpose Resilience Sport (2009)	A	14	18.01.13
Champward CA-101 System	A	13	17.08.12
Champward CA-102 System	A	13	03.12.12
Champward CW-301 System	A	13	17.08.12
Classic Turf System	A	16	29.01.13
Confosport	A	12	01.12.13
Courtsol Comfort	A	4	26.02.12
Courtsol Pro	A	4	26.02.12
Courtsol Standing	A	4	26.02.12
Courtsol Tournament	A	4	26.02.12
Cushion Master Pro - 3	A	76	05.02.13
DecoTurf	A	11	28.04.13
Desso Grand Slam (sand-filled)	C	22	29.01.13
Edel Advantage Red Court (sand-dressed)	B	24	30.09.11
Edel Elite Paddle Pro (sand-filled)	C	24	03.02.14
Edel Elite Supersoft (sand-filled)	C	24	03.02.14
Epufloor Basic	A	40	26.02.12

Name of surface product	Surface code	Address code	Expiry date
Epufloor Comfort	A	40	26.02.12
Grand Slam 10 (sand-filled)	C	46	03.12.11
Grand Slam Resilience Sport Flooring GS200i (2009)	A	14	18.01.13
Greenset Grand Prix	A	30	14.11.11
Greenset Grand Prix Cushion	A	30	17.03.13
Greenset Trophy	E	30	20.03.11
Ground Sky III	A	36	19.08.12
Hamonice	A	36	04.06.13
Jrace Green Grass Silicon PU Sports Surfaces	A	32	26.10.13
Latex-ite Medium	A	47	30.09.13
Magic Cushion Roll Sheet Acrylic Surface	A	21	07.08.12
Mantoflex Cushion Comfort	A	51	08.04.13
Mondoturf NSF 66 15 (sand-filled)	C	52	26.10.13
NewGrass Red Clay (sand-dressed)	B	49	07.07.12
NewGrass T6 20 (sand-filled)	C	49	17.05.13
Novacrylic Ultracushion® M	A	56	26.01.14
OmniCourt ProCourt (sand-filled)	C	79	15.06.13
Omnicourt XP (sand-filled)	C	80	21.09.12
Poraflex	A	77	29.04.12
Rebound Ace Pro International “MF”	A	64	06.11.11
Rebound Ace Synpave	A	64	06.11.11
Sit-In Sport Smash 10 (sand-filled)	C	63	13.11.11
Sport Ing. Flex	A	71	18.01.13
Sport Paint	A	67	08.03.13
Supersoft Doppio	A	12	08.04.13
Supersoft Pro Turf	A	12	07.07.12
Taraflex Tennis ATP	E	28	27.11.11
TigerTurf ClayTurf (sand-dressed)	B	86	04.06.12
TigerTurf Grand Prix (sand-filled)	C	86	19.03.12
TigerTurf Tournament (sand-filled)	C	86	19.03.12
Top Ace (sand-filled)	C	91	30.09.12
Truflex MultiSport	A	23	04.11.11

CATEGORY 4

Name of surface product	Surface code	Address code	Expiry date
AC Play Cushion System	A	74	18.01.13
Acryflex T Cushion	A	9	25.09.11
Advantage IV	A	3	23.09.12

Name of surface product	Surface code	Address code	Expiry date
Apron Acrylic System	A	50	17.12.11
Apron Cushion SD	A	50	17.12.11
Astor-Court	A	81	01.12.13
Bross Slide (Indoor Court)	E	10	21.02.14
DecoColor	A	11	28.04.13
Desso Crown Tennis (sand-filled)	C	22	29.01.13
Desso Forte Tennis (sand-filled)	C	22	11.08.12
Desso Grand Slam + (sand-filled)	C	22	29.01.13
Edel Elite LSR 20 (sand-filled)	C	24	25.03.13
Elastosport plus Elastoturf	A	61	01.04.12
Fast Track 15 (sand-filled)	C	42	07.07.12
Gerflor® Masters 1000	A	28	21.12.12
Greenset Confort	A	30	14.11.11
GridCourt™ Tennis Floor	J	34	14.01.14
Herculan TC Court Pro	J	38	08.07.12
Porous Kushion Kourt	A	78	08.01.12
Laticpave	A	31	15.04.12
Laykold Colorcoat Concentrate	A	2	07.07.12
Mondoturf NSF 66 11 R (sand-filled)	C	52	26.02.12
Novacrylic Combination Surface®	A	56	09.12.12
Novacrylic Novacushion® System	A	56	09.12.12
Novacrylic Ultracushion® System	A	56	09.12.12
Play-Ace Cushion I	A	29	21.12.12
Play-Ace Cushion II	A	29	21.12.12
Play-Ace Pro	A	29	21.12.12
Plexicushion Prestige	A	11	29.01.13
Plexicushion Prestige AO	A	11	01.10.12
Plexipave	A	11	29.01.13
Proflex Situ Cushion	A	77	22.07.13
Rebound Ace Grand Slam	A	64	09.12.12
Rebound Ace HSA Club “MF”	A	64	06.11.11
Résisoft® C	A	25	26.07.13
RuKortHardTournament MF	A	19	14.10.11
RuKortTour	A	19	14.10.11
Schöpp-Allround	E	68	12.09.11
Schöpp-Challenge	E	68	12.09.11
Schöpp-Classic	E	68	12.09.11
Schöpp-Slide	E	68	12.09.11
Shell Flintkote BUR 4	A	84	13.04.12
Sit-In Sport Tennis 12 (sand-filled)	C	63	09.02.12
Sportisca T-Floor T7 Pro	E	85	12.08.12
Supersoft W.S.	A	12	08.04.13

Name of surface product	Surface code	Address code	Expiry date
T.E.A.M. Sports Tiebreak (sand-filled)	C	82	08.04.13
TechTennis Medium Cushion	A	48	14.11.11
Tennis Incorporated ProTour 3	A	83	31.01.12
TigerTurf Advantage (sand-filled)	C	86	21.05.13
TigerTurf Elite (sand-filled)	C	86	19.03.12
TigerTurf TG15 (sand-filled)	C	86	29.03.13
TigerTurf Tournament 1000 (sand-filled)	C	86	19.03.12
Winner 15 (sand-filled)	C	60	10.11.13

CATEGORY 5

Name of surface product	Surface code	Address code	Expiry date
Acryflex T Standart	A	9	25.09.11
Action Pave Acrylic Color Coating System	A	20	19.05.12
Advantage V	A	3	23.09.12
Apron Cushion EX	A	50	17.12.11
APU Hi-Court	J	15	19.08.11
Bergo Tennis	J	8	07.06.13
BounceBack® Athletic Surfacing	J	70	16.12.11
Changhe SPU-Cushion Polyurethane System 5	A	41	28.05.13
Co-Tech System	A	17	04.08.12
Composport Tennis	A	18	04.11.11
Courtsol Pro Plus	A	4	26.02.12
CushionMaster Pro-5	A	76	04.12.12
Decoflex™ Softcourt 3mm	A	66	26.02.12
Decoflex™ Softcourt 5mm	A	66	26.02.12
Decoflex™ Softcourt 7mm	A	66	26.02.12
DuraCourt® Athletic Surfacing	J	70	16.12.11
Durflex® 200 sp	A	90	08.09.11
Durflex® 200 sp Cushion	A	90	08.09.11
Epufloor Comfort IS Plus	A	40	26.02.12
FloorSport	A	87	27.01.14
Gripper Outdoor 12”	J	27	29.10.13
Latex-ite Fast	A	47	03.08.13
Mondocourt 4mm	E	52	11.05.12
OwenCourt	J	35	17.05.13
Play Turf	E	59	25.06.13
Polywin Acrylic Cushion System	A	33	29.01.13
Potene Colorplus Acrylic System	A	62	09.12.12
Potene Cushion Acrylic System	A	62	12.04.13

Name of surface product	Surface code	Address code	Expiry date
PowerGame™	J	73	09.07.11
Pro DecoTurf	A	11	28.04.13
ReActive™	J	70	21.09.13
RuKortHardTournament F	A	19	14.10.11
SportDeck™	J	73	09.07.11
SportGame™	J	73	09.07.11
SportGame	J	49	07.07.12
SportMaster Pro-5	A	76	04.12.12
Supersport SL Tennis 6mm	J	49	29.01.13
Swiss-Flex Elite	J	89	18.01.13
Taraflex Tennis Tournoi	E	28	29.08.11
T.E.A.M. Sports Grandprix (sand-filled)	C	82	08.04.13
TechTennis Fast Cushion	A	48	14.11.11
Tennislife Fast Non-Cushion	A	48	14.11.11
Tennislife Medium Non-Cushion	A	48	14.11.11
TigerTurf Evolution (sand-filled)	C	86	19.03.12
TigerTurf Volley (non-filled)	C	86	03.06.13
Top Sport	E	91	30.09.12
Triomphe	E	7	11.11.12
Trucourt Competition	J	43	12.08.12
Truflex Acrylic	A	23	04.11.11
Truflex Cushion	A	23	04.11.11
Truflex Ultra Cushion	A	23	04.11.11
VersaCourt Elite	J	89	18.01.13
VHAF® NottsSward® TS (sand-filled)	C	55	29.08.11
Yoguli	A	39	26.10.12

4. CONTACT DETAILS FOR COURT SURFACE SUPPLIERS

Code	Supplier	Address	Tel/Fax/Email
1	Actionsports International Ltd. (ASI)	18th Floor, 301 Lockhart Road, Wan Chai, Hong Kong, China	T: +852 25275450 F: +852 25276930 simon@eagleturf.us www.eagleturf.us
2	Advanced Polymer Technology, Laykold Surfaces Division	109 Conica Lane, PO Box 160, Harmony, PA 16037, USA	T: +1 724 452 1330 F: +1 724 452 1703 E: info@advpolytech.com www.advpolytech.com www.laykold.com
3	Advantage Sport Coatings	5201 Brighton, Kansas City, MO 64130, USA	T: +1 816 923 4325 F: +1 816 923 6472 E: info@chooseadvantage.com www.chooseadvantage.com
4	Allios – Division Courtsol	2648, RN7, 06270 Villeneuve Loubet, France	T: +33 4 92 02 66 60 F: +33 4 92 02 66 59 E: service.export@allios.fr www.courtsol.com
5	Baoding Chaoda Sports Facilities Co., Ltd	Dongerhuan Road 660, Baoding City, Hebei Province, China	T: +86 312 599 1091 F: +86 312 599 8484 E: chaodatiyu@hotmail.com www.chaodasport.com
6	BASF Construction Chemicals Europe AG	Division CONICA Technik, Industriestrasse 26, 8207 Schaffhausen, Switzerland	T: +41 58 958 25 25 F: +41 58 958 36 23 E: infoconica@basf.com www.conica.basf.com
7	Beijing Taiao Sports Development Co. Ltd	Room 491, Wang-lian Tower, China Nat. General Sport Bureau, No. 50, Tiatan East Road, Chongwen, Beijing, 100061 China	T: +86 10 8368 7578 F: +86 10 8718 3942 E: xxy721521@sina.com
8	Bergo Flooring AB	PO Box 10, Ågatan 7, Anderstorp, SE-33421, Sweden	T: +46 371 587700 F: +46 371 587711 E: info@flooring.se www.bergoflooring.se
9	Boytem Boya ve Kimya San. Tic. Ltd. Sti	Istanbul Boya ve Vernikciler Toplu İsyeri Sanayi Sitesi No:41 Orhanlý/Tuzla Istanbul, Turkey	T: +90 216 304 03 05 F: +90 216 304 12 15 E: info@unicaboya.com www.unicaboya.com

Code	Supplier	Address	Tel/Fax/Email
10	Bross AG	Industriestrasse, CH-9475, Sevelen, Switzerland	T: +4181 750 1358 F: +4155 442 4148 E: info@bross-tennis.com www.bross-tennis.com
11	California Products Corporation	150 Dascomb Road, Andover, MA 01810, USA	T: +1 978 623 9980 F: +1 978 623 9960/9970 E: info@decoturf.com; info@plexipave.com www.decoturf.com; www.plexipave.com
12	Casali S.p.A Divisione Sintetici	Zona Industriale C.I.A.F., 60015 Castelferretti (AN) Italy	T: +39 071 916 2095 F: +39 071 916 2098 E: staff@casalisport.it www.casalisport.it
13	Champward Chemical Industrial Co., Ltd.	No. 1 Kung Yeh 12 Road, Taichung 40755, Taiwan	T: +886 4 2359 1540 F: +886 4 2359 2501 E: mail@champward.com www.champward.com
14	Chiao-Chin Enterprise Inc.	15F, No. 316 Jhonghe Road, Jhonghe City, Taipei County 23574, Taiwan	T: +886 2 2922 1836 F: +886 2 2926 8548 E: yen589@ms63.hinet.net
15	Chingtai Resins Chemical Co., Ltd.	50, Kung II Road, Tachia, Taichung, Taiwan	T: +886 4 2681 6835 F: +886 4 2681 1329 E: stevetsai@chingtai-resins.com.tw www.chingtai-resins.com.tw
16	Classic Turf Co. LLC	437 Sherman Hill Road, Woodbury, CT 06798, USA	T: +1 203 266 4862 F: +1 203 263 0275 E: sales@classicturf.org www.classicturf.org
17	Co-Tech Corporation	671-47 St., 3A Brooklyn, New York, USA	T: +1 510 862 8088 F: +1 510 862 8088 E: cotechproduct@gmail.com
18	Composan Construcción, S.A.	C/Narciso Monturiol s/n. 28340 Valdemoro, Spain	T: +34 91 8950968 F: +34 91 8954825 E: composan@composan.com www.composan.com
19	Concept 90 d.o.o.	5 Ravnice bb, 10000 Zagreb, Croatia	T: +385 1 291 0066 F: +385 1 291 0394 E: concept90@concept90.hr www.concept90.hr

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21	DaeJong Sports Construction Co. Ltd.	338, Mangdeok-ri, Juchon-myeon, Gimhae City, Geong-sangnam-do, Korea	T: +82 55 338 9922 F: +82 55 338 9923 E: yhdo@dae-jong.co.kr www.daejong.co.kr
22	Desso Sports Systems NV	Robert Ramlotstraat 89, 9200 Dendermonde, Belgium	T: +32 52 262 411 F: +32 52 214 865 E: avdwende@desso.com www.dessosports.com
23	Dulux Australia	1956 Dandenong Road, Clayton, Victoria 3168, Australia	T: +61 88 440 6218 F: +61 88 347 1963 E: acratex.info@acratex.com.au www.acratex.com.au
24	Edel Grass B.V.	Pr. Beatrixstraat 3, PO Box 164 8280 CA Genemuiden, The Netherlands	T: +31 384 250 050 F: +31 384 250 051 E: info@edelgrass.com www.edelgrass.com www.advantageredcourt.nl
25	EURO 2000	ZA Les Hautes Places, Suevres, 41500, France	T: +33 2 54 87 86 87 F: +33 2 54 87 81 10 E: info@euro2000.fr www.euro2000.fr
26	FieldTurf Tarkett	2 Rue de l'Egalité, 92748 Nanterre Cedex, France	T: +33 1 41 20 40 40 F: +33 1 47 21 49 09 E: fieldturf@tarkett.com www.fieldturftarkett.com
27	Geoplast S.p.A.	Via Martiri della Libertá 6/8, Grantorto (PD), 35010, Italy	T: +39 049 9490289 F: +39 049 9494028 E: geoplast@geoplast.it www.geoplast.it
28	Gerflor	43 Bld Garibaldi, 69170 Tarare France	T: +33 4 74 05 4000 F: +33 4 74 05 0460 E: tennis@gerflor.com www.gerflor.com
29	Giant Construction Chemical Co., Ltd.	No.1-1002, 168 Beiyuan Road, Chao-yang District, Beijing 100101, China	T: +86 10 5824 6803 F: +86 10 5824 6808 E: giantchemical@163.com

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35	Hangzhou OwenSports Management Co., Ltd.	Room 203, Building 3, 402 Wensan Road Xihu, Hangzhou, Zhejiang, China	T: +86 571 8971 4482 F: +86 571 8971 4480 E: owensports.alex@gmail.com www.owencourt.com
36	Hanseo Polymer Co., Ltd.	965 Goyang-ri Wolgot-myeon, Gimpo-shi, Gyeonggi-do, 415-874, Korea	T: +82 31 984 8558 F: +82 31 984 8559 E: hspoly@hspoly.co.kr www.hspoly.co.kr
37	Har-Tru Sports	2200 Old Ivy Road, Charlottesville, VA 22903 USA	T: +1 434 295 6167 F: +1 434 971 6995 E: info@hartru.com www.hartru.com
38	Herculan Sports Surfaces B.V.	Energieweg 6, 4231 DJ Meerkerk, The Netherlands	T: +31 183 354 700 F: +31 183 354 740 E: info@herculan.com www.herculan.com
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46	Lano Sports N.V.	Zuidstraat 44, 8530 Harelbeke, Belgium	T: +32 56 654 290 F: +32 56 654 299 E: marketing@lanosports.com www.lanosports.com
47	Latex-ite International, Inc.	4051 North Point Road, Baltimore, Maryland, 21222, USA	T: +1 410 477 5432 F: +1 410 477 4339 E: info@latex-ite.com www.latex-ite.com
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76	SportMaster Sports Surfaces, a division of ThorWorks Industries, Inc.	2520 S.Campbell Street, Sandusky, Ohio 44870, USA	T: +1 419 626 4375 F: +1 419 626 5477 E: info@sportmaster.net www.sportmaster.net
77	Sports Coatings Ltd.	Hawthorn House, Helions Bumpstead Road, Haverhill, Suffolk, CB9 7AA, UK	T: +44 1440 766366 F: +44 1440 768897 E: enquire@sportscoatings.com www.sportscoatings.com
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84	The Shell Company of Thailand Ltd.	10 Soonthornkosa Road, Klongtoey, Bangkok 10110, Thailand	T: +66 4751 0102 F: +66 2262 6591 E: p.sangsuwan@shell.com www.shell.co.th/misterflintkote
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89	VersaCourt International, LLC	1705 Gulf, Lamar, MO, 64759, USA	T: +1 417 682 9944 F: +1 417 681 0366 E: danny@versacourt.com www.versacourt.com
90	Vesmaco – Synthetic resins for sport and civil surfaces	15, Via Cassolo, 60030 Monsano (AN) Italy	T: +39 0731 60070 F: +39 0731 60140 E: export@vesmaco.com www.vesmaco.com
91	Viganò Pavitex S.p.A.	Via Carlinga 35, Curno (BG) 24035, Italy	T: +39 035 201 711 F: +39 035 201 740 E: info@pavitex.com www.pavitex.com

PART D – ITF RECOGNITION OF TENNIS COURTS

1. INTRODUCTION

ITF Recognition is an acknowledgement that a court meets the recommendations provided in the *ITF Guide to Test Methods for Tennis Court Surfaces* (Part B of this document).

ITF Recognition is targeted at venues hosting elite-level competitions where the standard of play demands the specification of precise playing characteristics, e.g. at international tournaments, national/regional tennis centres.

There are two levels of ITF Recognition:

One-Star ITF Recognition – the court is tested for quality of installation.

Two-Star ITF Recognition – in addition to the One-Star tests, the court is tested for pace.

To obtain One-Star ITF Recognition, courts can be tested by an ITF Accredited laboratory or a surveying company that has demonstrated to the ITF's satisfaction that it has the skills, equipment and experience to conduct the tests.

All testing to obtain Two-Star ITF Recognition can only be undertaken by an ITF Accredited laboratory or the ITF Technical Centre.

ITF Recognition is retained until the court is resurfaced. However, the results are only valid for the day of testing. Properties of the court may change over time, due to factors such as ambient conditions, use and maintenance.

IMPORTANT NOTE: ITF Recognition is not mandatory, nor does it imply any form of ITF approval or endorsement.

2. ITF RECOGNITION

2.1 One-Star ITF Recognition

To obtain One-Star ITF Recognition, the court is tested for quality of installation:

- Visual inspection. The court is inspected for visual flaws.
- Evenness (ITF CS 02/02). Undulations in the surface of the court are measured.
- Slope and planarity (ITF CS 03/03). The height of the surface is surveyed at a range of locations around the court.
- Dimensions (ITF CS 04/02). The positions of the lines and net are measured.

All test results must meet the recommendations contained in the *ITF Guide to Test Methods for Tennis Court Surfaces* to be eligible for One-Star Recognition.

Testing for One-Star Recognition shall be conducted by an ITF Accredited laboratory or other company approved in advance by the ITF.

Recipients of One-Star Recognition shall receive a certificate from the ITF, confirming that the court/s tested meet the recommendations of the *ITF Guide to Test Methods for Tennis Court Surfaces.*

2.2 Two-Star ITF Recognition

For a court to obtain Two-Star ITF Recognition the average Court Pace Rating (CPR) must be within 5 points of the ITF Classified value for the surface product (ITF CS 01/02).

If the surface product is not already classified, the product supplier may apply for ITF Classification of the surface product based on the results of the on-site test. The full ITF Classification fee will apply and classification will be valid for 3 years. For this purpose, the court must have been surfaced within the preceding 12 months.

Note: It is not possible for Two-Star ITF Recognition to be granted to courts where the surface product has not been classified under the ITF Court Pace Classification Programme.

Recipients of Two-Star Recognition shall receive a certificate from the ITF, confirming that the court/s tested meet the recommendations of the *ITF Guide to Test Methods for Tennis Court Surfaces*, and stating the category of Court Pace Rating.

3. APPROVAL OF COMPANIES

A court owner or product supplier may engage a company other than an ITF Accredited laboratory to conduct testing to obtain One-Star ITF Recognition.

Prior to commencing work, any such company must seek approval from the ITF by providing the following information in English:

- Confirmation that the company possesses equipment with the required accuracy to conduct the tests for evenness, slope and planarity, and dimensions.

- Information on company accreditation to a national or internationally recognised quality management system, or other relevant qualifications (e.g. membership of professional bodies).

- Evidence that the company has the knowledge and capability to conduct the on-site tests. A reference list of tennis courts tested in the preceding two years may be supplied in this regard. If the company has no prior experience of testing tennis courts, the company will be requested to conduct all One-Star tests on a minimum of two (local) courts, and complete an ITF report, which it will send to the ITF to review.

- Details of any work undertaken for National or International Governing Bodies of Sport, Sports Associations, Councils or Federations.

The information must be submitted on an ITF form which is available on request by email to technical@itftennis.com or by download from the ITF website www.itftennis.com/technical. Upon obtaining ITF approval, the surveying company will be listed on this website.

Note: The ITF reserves the right to deny or remove approval at any time.

4. ACCREDITATION OF LABORATORIES

Only ITF Accredited laboratories or the ITF Technical Centre are permitted to conduct court surface pace testing for Two-Star ITF Recognition. In addition, the laboratory must be capable of conducting all testing for One-Star ITF Recognition.

4.1 Criteria for Accreditation

The laboratory should be an organisation that includes a test laboratory devoted to the research and development of sports surface science, and shall have achieved a position of influence and responsibility in the field of sports surface provision. Its work shall include the testing and evaluation of sports surfaces and related materials, both in the laboratory and in the field, with well documented records.

The laboratory shall be independent of any company manufacturing, supplying or installing sports surfaces, or manufacturing or supplying sports equipment.

The work of the laboratory must be recognised as being of high quality, maintained by operating a comprehensive policy of calibration of all its relevant test equipment. Evidence of compliance to ISO 9001:2008, ISO/EN 17025 or another internationally recognised quality system is required.

The laboratory must confirm its willingness to participate regularly in 'round-robin' testing, presentations of papers and publications, attendance at meetings, and other scientific and technical matters, which may be undertaken by the ITF.

The laboratory must have access to facilities capable of undertaking all tests detailed in the *ITF Guide to Test Methods for Tennis Court Surfaces* (Part B of this document).

4.2 Application for ITF Accreditation

Laboratories applying for ITF Accreditation must provide the following information to the ITF in English:

- A list of test equipment relevant to the testing of tennis surfaces.
- A diagram of its organisational structure, together with the Curriculum Vitae of its nominated representative(s) and brief details of the qualifications and experience of other relevant staff on the organisational structure.
- A reference list of tennis facilities and surfaces tested in the preceding two years.
- A list of relevant publications, technical papers and articles produced by, or contributed to by, the applicant laboratory in the preceding two years.
- Details of any work with National or International Governing Bodies of sport, sports associations, councils or federations.
- Membership of National or International Standard Organisations, e.g. ISO, CEN, BSI, DIN, ASTM or their Working Groups.
- Evidence that the company is accredited to an internationally-recognised quality management system.

All laboratories applying for ITF Accreditation shall be inspected by a representative of the ITF. The laboratory shall be required to undertake round-robin testing as directed by the ITF Technical Centre. The applicant laboratory shall meet all costs and expenses involved in this procedure.

Note: The ITF reserves the right to deny or remove ITF Accreditation at any time.

5. PROCEDURES AND FEES FOR OBTAINING ITF RECOGNITION

Any manufacturer, installer or facility owner may apply for ITF Recognition. A request for ITF Recognition shall be made on an application form submitted to the ITF. The form is available on request by email to technical@itftennis.com or by download from the ITF website www.itftennis.com/technical. The ITF shall issue an invoice for the recognition fee of US$ 500 (the "Recognition Fee") per facility for any number of tennis courts to be tested on the same day.

The Recognition Fee is non-refundable and will apply to the applicant. If there is more than one applicant (e.g. facility owner and installer), then every applicant will be required to pay a recognition fee of US$ 500.

Applicants should nominate an ITF Accredited Laboratory and/or ITF approved surveyor to conduct the necessary testing, with whom testing fees should be agreed directly.

Upon receipt of payment, the ITF shall provide the appointed laboratory or approved company with an Authorisation Code to insert onto the ITF court test report. On completion of the tests, the laboratory or approved company shall return the completed test report to the ITF, who will determine if the court has achieved Recognition status. Where more than one court is tested, only those courts that have passed all tests will be granted ITF Recognised status. The ITF will inform the customer of the result, issue a certificate and list the facility on the ITF website www.itftennis.com/technical.

6. VALIDITY OF ITF RECOGNITION

ITF Recognition is valid on the day of the test only, which shall be stated on the test report and certificate. Recognition will cease to be valid once a court is resurfaced, at which time a new application for ITF Recognition must be submitted. Listings of Recognised facilities and/or companies/individuals will remain on the ITF website for 10 years or until such time as the ITF is informed that the court/s have been resurfaced, whichever is the sooner.

Note: The ITF reserves the right to deny or remove ITF Recognition at any time.

ITF Foundation

The ITF Foundation is comprised of international manufacturers and companies involved in the tennis industry. The ITF and the ITF Foundation work together for the development and promotion of the game.

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