

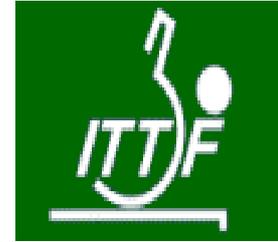
Racket Control

Technical Leaflet T9

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Chapter 1: Introduction

The purpose of this Technical Leaflet is to describe how the tournament officials may check and measure that a racket is legal and does not release volatile solvent vapours, except water.

During a tournament the umpires, the referees and racket controllers contribute to an efficient inspection of the rackets. Before the event starts, the tournament organisers provide and equip the needed facilities, and deliver them the latest one day before the competition starts.

Chapter 2: The Laws of Table Tennis

The Laws of Table Tennis relating to the racket are:

2.4 THE RACKET

- 2.4.1. The racket may be of any size, shape or weight but the blade shall be flat and rigid.
- 2.4.2. At least 85% of the blade by thickness shall be of natural wood; an adhesive layer within the blade may be reinforced with fibrous material such as carbon fibre, glass fibre or compressed paper, but shall not be thicker than 7.5% of the total thickness or 0.35mm, whichever is the smaller.
- 2.4.3. A side of the blade used for striking the ball shall be covered with either ordinary pimples rubber, with pimples outwards having a total thickness including adhesive of not more than 2mm, or sandwich rubber, with pimples inwards or outwards, having a total thickness including adhesive of not more than 4mm.
 - 2.4.3.1. Ordinary pimples rubber is a single layer of non-cellular rubber, natural or synthetic, with pimples evenly distributed over its surface at a density of not less than 10 per sq. cm and not more than 30 per sq. cm.
 - 2.4.3.2. Sandwich rubber is a single layer of cellular rubber covered with a single outer layer of ordinary pimples rubber, the thickness of the pimples rubber not being more than 2mm.
- 2.4.4. The covering material shall extend up to but not beyond the limits of the blade, except that the part nearest the handle and gripped by the fingers may be left uncovered or covered with any material.
- 2.4.5. The blade, any layer within the blade and any layer of covering material or adhesive on a side used for striking the ball shall be continuous and of even thickness.

- 2.4.6. The surface of the covering material on a side of the blade, or of a side of the blade if it is left uncovered, shall be matt, bright red on one side and black on the other.
- 2.4.7. The covering material should be used as it has been authorised by the ITTF without any physical, chemical or other treatment, changing or modifying playing properties, friction, outlook, colour, structure, surface, etc.
 - 2.4.7.1. Slight deviations from continuity of surface or uniformity of colour due to accidental damage or wear may be allowed provided that they do not significantly change the characteristics of the surface.
- 2.4.8. At the start of a match and whenever he changes his racket during a match a player shall show his opponent and the umpire the racket he is about to use and shall allow them to examine it.

Chapter 3: Regulations for International Competitions

The Regulations for International Competitions of Table Tennis relating to the racket are:

3.2 EQUIPMENT AND PLAYING CONDITIONS

3.2.1 Approved and authorised equipment

- 3.2.1.3. The covering material on a side of the blade used for striking the ball shall be of a brand and type currently authorised by the ITTF and shall be attached to the blade so that the supplier and brand names and the ITTF logo plus the ITTF number (when applied) are clearly visible near the edge of the striking surface.
List of all approved and authorised equipment and materials are maintained by the ITTF Office and details are available at the ITTF web site.

3.2.4 Gluing

- 3.2.4.1 It is the responsibility of each player to ensure that racket coverings are attached to their racket blade with adhesives that do not contain harmful volatile solvents.
- 3.2.4.2 Tests for harmful volatile solvents shall be carried out at World and Olympic title competitions, Pro-Tour tournaments and World Junior Circuit events, and a player whose racket is found to contain such a solvent is liable to be disqualified from the competition and reported to his Association.
- 3.2.4.3 At all ITTF events a properly ventilated area shall be provided for the attachment of racket coverings to rackets, and liquid adhesives shall not be used anywhere else at the playing venue.
“Playing venue” means the whole establishment in the playing building and the ground where the playing building stands, which contains the doorway, the parking lot and related facilities.

Chapter 4: Harmful volatile solvents. Testing with enez®

The solvents may harm our health in three ways, depending how they get into the body:

- ◆ By inhalation: the most important way, the vapours of the solvents in the air are breathed and go easily through the lungs to the blood.
- ◆ By contact: the solvents go directly through the skin to the blood.
- ◆ By ingestion: the solvents may be ingested through the mouth by contact with the hands, etc...

Other important factors influencing the health of those who use solvents are their age, the concentration of the solvent vapours and the time of exposure.

Most of the volatile solvents are also highly flammable, and their mixture with air may explode on the contact with a flame or static spark. They also may cause long-term adverse effects in the environment.

International safety laws regulate very strictly the conditions of composition, packaging, labelling, transport, sale and use of volatile solvents.

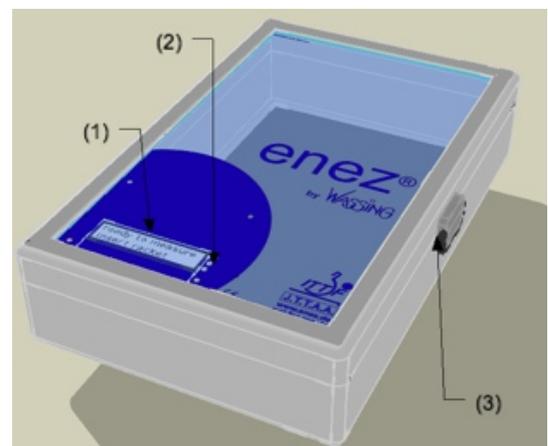
The ITTF bans volatile solvents, except water, from the racket as well as its use by the players. According with the regulation 3.2.4.2 tests to detect the presence of volatile solvents shall be carried out at World and Olympic title events, Pro-Tour tournaments and World Junior Circuit events.

The instrument used to detect such volatile solvents is enez ®, developed exclusively for such purpose.

The device contains the following parts:

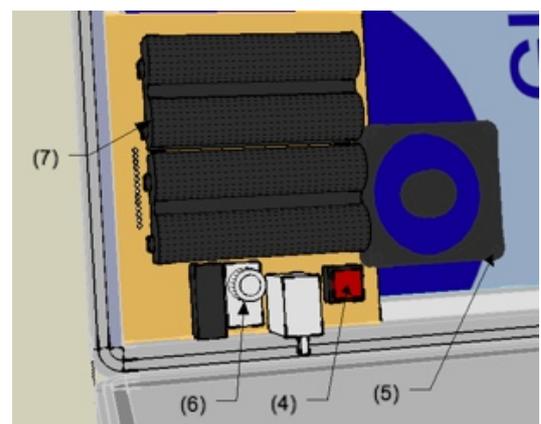
▪ Outside parts:

- 1) Display screen
- 2) Status LEDs (Light-Emitting Diode)
- 3) Lock



▪ Inside parts:

- 4) Power button
- 5) Fan
- 6) Sensor
- 7) Batteries



To start a measurement, be sure that batteries are charged and insert them correctly taking into account the polarities, and continue with the following steps:

- a) Open the container and press the power button (4) for at least one second to turn the device on.
- b) The device will then prepare automatically for the first measurement. This may take a few minutes for the first taking into operation of the device (or after a long period without using it).
The display screen (1) shows the progress of the preparation of the device with the message: **“Adjustment level 0 to 100%”**
- c) Once the adjustment level reaches 100% the device is ready to measure, and the screen shows the message: **“Ready to measure, insert racket”**
- d) The box should be horizontally placed on a table.
- e) Insert the racket and close quickly the lid and fasten the lock (3).
- f) The device starts automatically a measurement. The display screen shows the countdown with the message: **“Measuring ... remaining 60s to 0s”**
The container should not be moved during the measurement. During the countdown the inside air is mixed several times by the fan (5), and the sensor searches for volatile solvents releasing off the racket.
- g) At the end of the measurement the unit analyses the measured data and decides whether an abnormal level of air contamination occurred during the measurement. The result of the analysis is shown in the display screen: **“Racket passed, OK clean”** for clean racket, **“VOCs* present, racket failed”** for contaminated racket, as in the status LEDs (2) with green or red light respectively. (* Volatile Organic Compounds)
- h) Note the result and take the racket out of the device.
- i) For next measurement, let the lid open until the display screen shows again the message: **“Ready to measure, insert racket”**



The device should be always used as far as possible from volatile solvents sources. Liquid harmful volatile solvents should not be directly measured ever.

At main events such as World Championships, Olympic and Paralympics Games shall be used a photoionization detector (RAE ® device) as a back-up of the results of enez ® in case of an appeal for a positive result, and the result of this test shall be final.

Chapter 5: Other important playing properties of a racket. Identification and measurement of irregularities

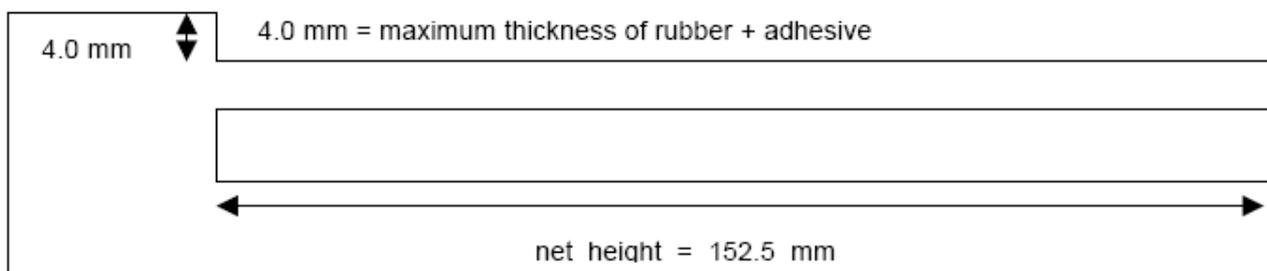
Both sides of the racket should be matt in order not to distract the opponent or to dazzle the spectators or the TV cameras.

The umpire or the referee may check the gloss of a racket covering or its base and decide as follows: A rubber will be unacceptable if it is so shiny as to permit the shape of a light-source to be distinguished in its reflection. A rubber may also be considered too glossy, if the white big letters on a dark coloured net gauge hold perpendicularly to the covering can easily be read at an angle of about 45°.

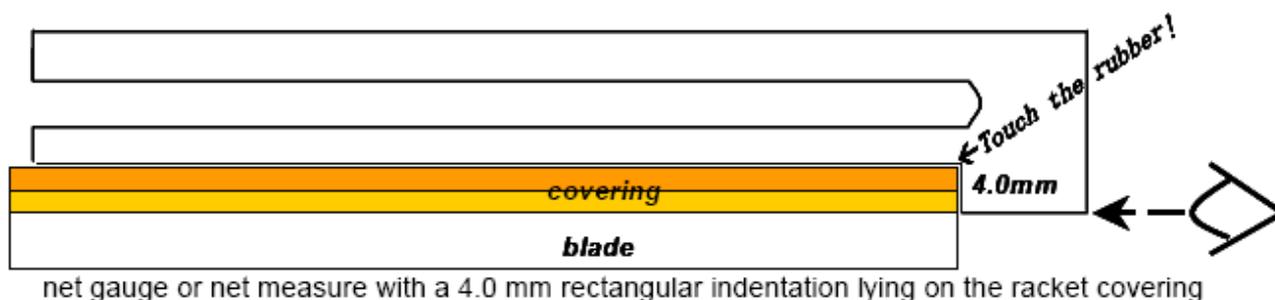
The referee or the racket control panel may measure the gloss of pimples-in rubbers by using ASTM procedure D523: a 60° gloss-checker must give values less than 24%. The gloss checker cannot measure the gloss of pimples-out rubbers.

The thickness of a sandwich rubber including the adhesive layer may not be more than 4.0 mm. Thicker sponges may increase the speed and spinning properties of the racket especially when re-glued.

The net-gauge controls the height of the net (= 152.5 mm) and the thickness of the rubber (≤ 4.0 mm)

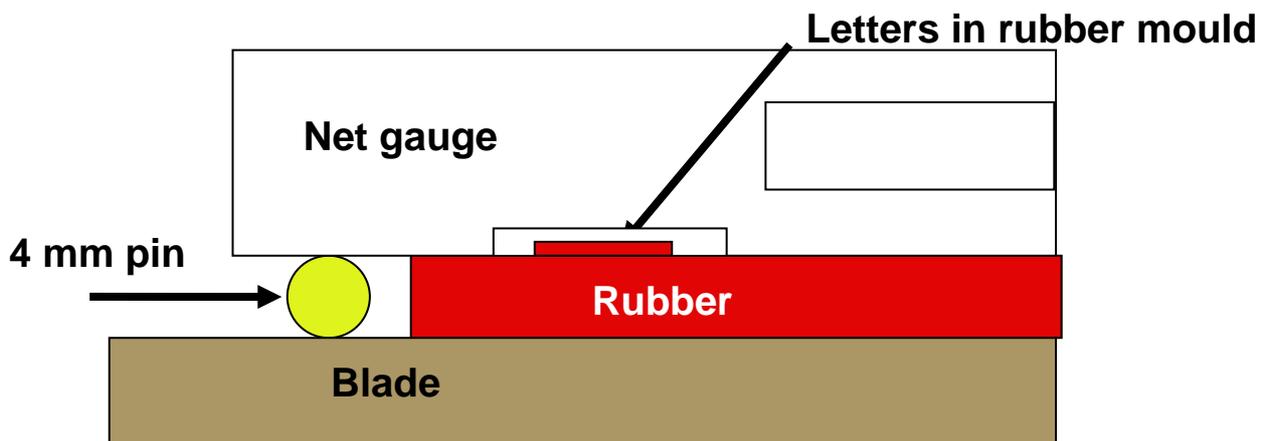


The umpire and the referee may check the thickness of the racket covering by laying the net gauge on the rubber without pushing i.e. without indenting the covering; the edge of the gauge must touch the rubber at the measuring point. If the wider part reaches the bottom of the racket covering so that the observer looking along the edge of this part in the direction of the side of the blade does not see any sponge, the thickness of the rubber is not more than 4.0 mm. If the umpire suspects the rubber being too thick, the referee may decide by using the rectangular indentation of the net measure or a magnifying glass with an integrated 0.1 mm scale or refer to the racket control panel.

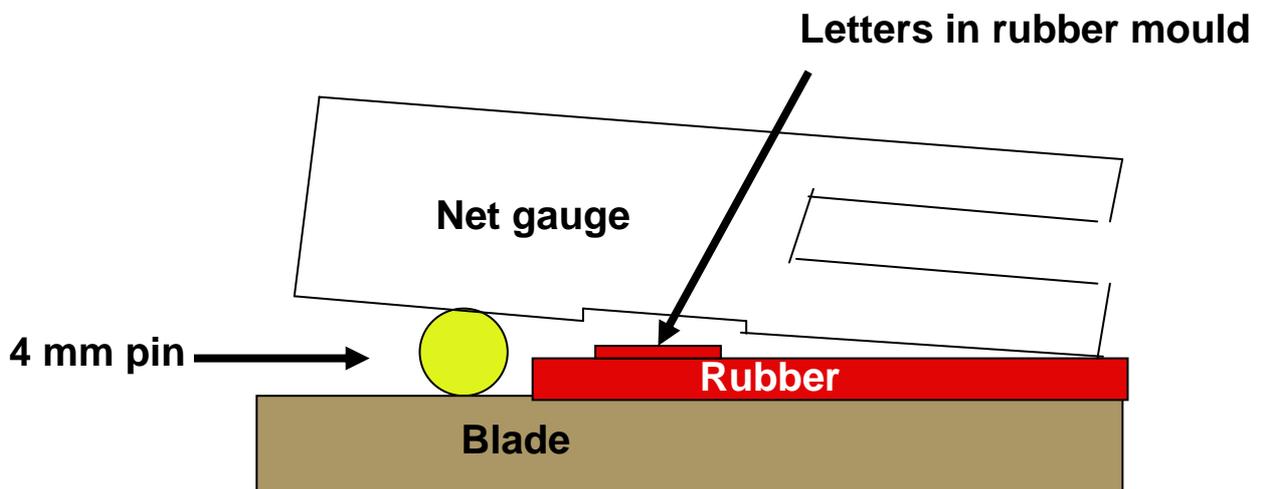


The racket controller shall proceed as follows to measure the thickness of the rubbers:

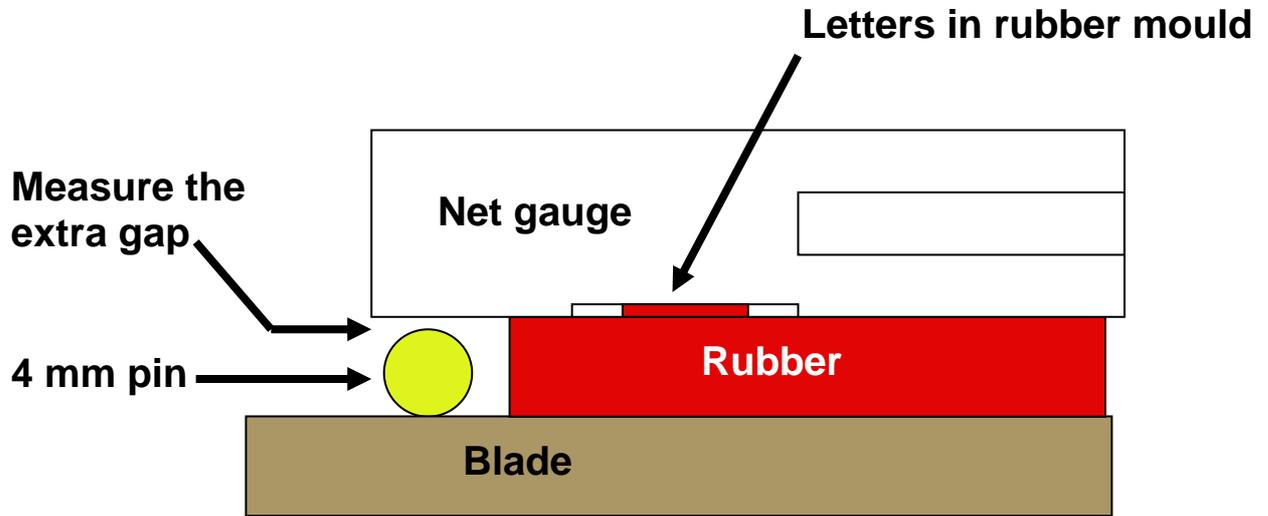
- Place a metallic piece of a pin with a diameter of 4,0 mm. in the zone of the blade between the handle and the end of the rubber.
- Then place across the rubber a ruler (might be a net gauge) with a slot saving the height of the letters in the rubber mould.
- If the ruler touches the rubber and the pin at the same time the rubber is 4,0 mm thickness and no action shall be taken.



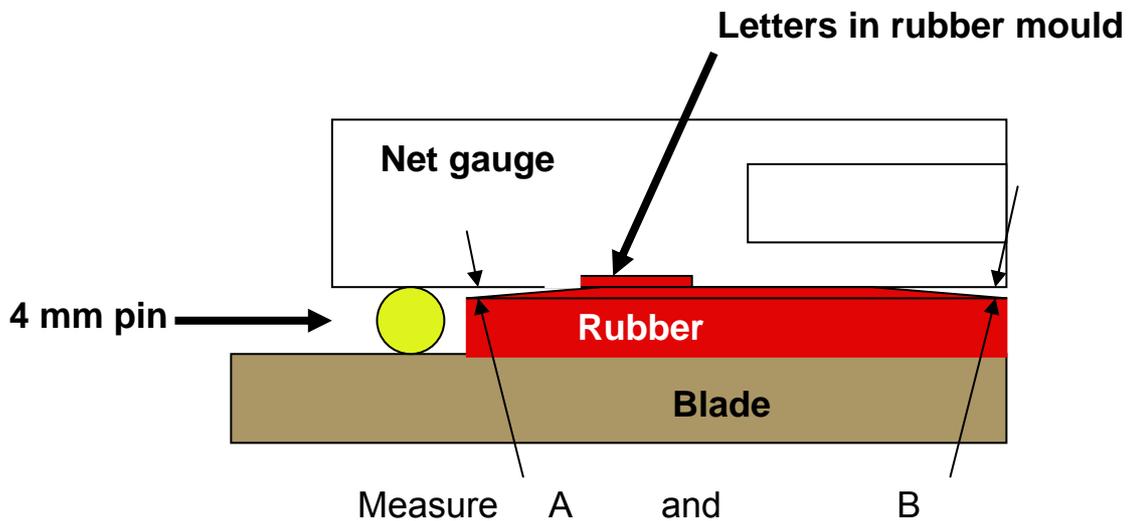
- If the ruler touches the pin and laid-down in the other extreme of the rubber, this is less than 4,0 mm thickness and no action shall be taken.



- If the ruler touches the rubber, but not the pin, the rubber is too thick, so the extra gap between the ruler and the pin shall be measured with a thickness gauge. The maximum thickness which may be introduced between the pin and the ruler (without pushing up the ruler) shall determine the value of the extra thickness of the rubber.



- If the ruler touches the rubber and the pin, but the rubber has a bubble in the middle, the tester has to measure the remaining gap near the pin and at the end of the rubber (see picture below). If the gap near the pin is even or bigger than the gap at the end of the rubber, provided that this gap is less than 0,2 mm, no action shall be taken. If the gap at the end of the rubber is bigger than the gap near the rubber and bigger than 0,2 mm, the rubber shall be considered as too thick.



A = B, max 0,2 mm OK A > B, OK A < B > 0,2 mm NOT OK

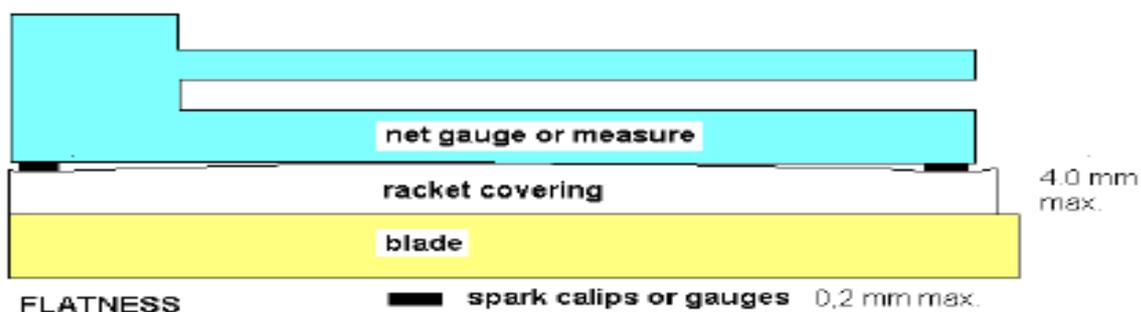
Other devices are available on the market to measure the thickness of the rubbers, as magnifier glasses, which may be applied on the edge of the rubbers. Also are available new devices consisting in a support which it is place on the rubber with a clock-gauge with a pin for touching the bare zone of the blade between the handle and the end of the rubbers as shown in the figure below.



The layers in a racket must be continuous and of even thickness. Powdering, a glue pocket or zones made of different sponges under the same pimped rubber are not acceptable. Powder particles may be transferred to the ball and change the friction of opponent's rubber; differently structured sponge-layers under the top sheet give unpredictable effects. More glue may increase the speed and the spinning ability of (part of) the racket.

Powdering can be detected with the naked eye; confirmation can be given with a magnifying glass. The contours of the zones of different sponges under a top sheet sometimes are seen under a strong light. A glue pocket or a bent blade may render the racket centre convex*; a net gauge laid down as a ruler with its straight edge on the rubber and observed against the light, should not show a gap between its ends and the rubber of more than 0.2 mm when the shape is convex, and no more than 0,5 mm when the shape is concave.

An excessive height of the bump can be determined by using standardized steel blades (callipers or gauges for sparks), 0.2 mm thick for convex shapes, and 0,5 mm for concave shapes, that are laid under the ends of the net measure, but at a distance of about 2 mm from the side of the covering.



As in thickness measuring, new devices are also available on the market, consisting in a support with a clock-gauge in the middle with a pin. The support is placed across the racket in different positions and the pin is placed in the rubber as well. If the rubber is not flat, the clock-gauge shall show the difference as it is shown in the figure below.

For convex rubbers the clock-gauge shows readings over 0,00 mm ($> 0,00$), and for concave rubbers the clock-gauge shows readings below 0,00 mm ($< 0,00$). The maximum deviation for convex rubbers is + 0,2 mm, while for concave rubbers the maximum deviation is – 0,5 mm.



*To determine the reason of the bad flatness of a racket, 2 quick checks are available:

- a) if the other side of the racket is convex, the blade is bent (with pimple-out rubbers this is not visible)
- b) if the flatness at the bumped side also in the direction of the handle without including the area with the raised rubber name: if there is no gap, the blade is warped.

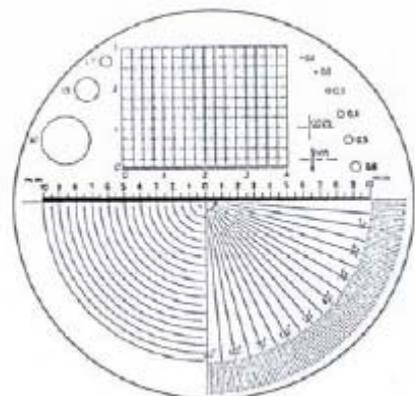
The racket covering may not be post-treated, for instance coated, otherwise it is no longer authorized.

It is very difficult to determine if the rubber has been post-treated. The lack of friction, fine fissures in the top sheet, a special sound or bounce may be indicators, or a comparison with a standard authorized rubber sheet may be helpful.

The aspect ratio of the pimples, height/diameter, shall not be higher than 1.10. A pimple-out should not be shorter than 1.0 mm. Long and flexible pimples give unpredictable spins to the ball.

With an 8x or 10x magnifying glass including a 0.1 mm scale it is possible, but difficult, to measure the height and the diameter of the pimples. Such measurement requires a lot of skill; more safe and precise portable equipment is for the moment not available during a tournament.

Infringing any of these restrictions may result in an illegal advantage.



Chapter 6: Voluntary and compulsory controls and racket inspections. Consequences if defaults reported.

Voluntary racket controls

The day before the tournament as well as during the event, voluntary testing should be available. Each player can present maximum 2 rackets for a voluntary test.

The rackets submitted shall be examined very carefully.

All measurements or observations during a voluntary test shall be recorded in the normal form "Racket Control Report". All defaults identified shall be recorded in a special form, which will be signed by the player as a record that the player was informed about the irregularity found. The member of the racket control team shall then inform the player about the consequences of a failed glue-test during the competition and, for any other default identified, shall invite him/her to seek the referee's decision if the racket is acceptable.

There is no risk of disciplinary action against a player whose racket does fail in a voluntary test. If requested, the pre-named records are handed to the referee or to the jury; otherwise they are confidential.

Compulsory racket control

Racket controls may be mandatory during any event; they may include before-match and/or after-match examination of any kind.

Chapter 7: The practical organisation of the racket control

The practical process of the racket control should interfere as little as possible with the preparation time of the players just before the match and it should not delay the start of a match. Nevertheless the referee may have the time to make his/her decision according to the rules.

Every day, the chief of the racket control panel shall make the draw and schedule of racket controls for the next day, and shall report to the referee and the competition manager of the competition. The referee shall endorse the schedule and may, in any moment, change this schedule by adding or removing matches to be controlled.

Team events

In case of team events, the captains shall be informed directly by a member of the racket control panel during the draw for the selection of letters and sequence of play. All the players of each team who are going to play in the match shall be controlled.

The players who have to play the first individual match must submit their rackets to the racket control room 20 minutes before the scheduled match time. If the racket is found illegal, the player has to play the match with another racket, which shall be tested after the match.

The players who have to play the second individual match must submit their rackets to the racket control room before the previous individual match starts. The same procedure for subsequent individual matches.

The tested rackets shall be given directly by the racket tester to the umpires, who only shall give them back to players when they come into the playing area.

The spare racket shall be also submitted to the racket control room at the end of the match to be tested if a player had to change it before play due to failing the first racket test or during play due to damaging the racket accidentally.

From 1st July 2009 there will be only after-match controls at designated ITTF events. At other events the usual pre-match racket check will be conducted by the umpires / Referees as usual.

Singles or doubles events

In case of single or doubles events, the racket controls shall be before the matches till 30 June 2009. The spare racket shall be also submitted to the racket control room at the end of the match to be tested if a player had to change it before play due to failing the first racket test or during play due to damaging the racket accidentally.

If the schedule allows from quarterfinals on all the matches will be controlled.

For a before-match test players shall be informed in advance, and they have to submit the rackets at least 20 minutes before the scheduled match time to the racket control room. If the racket is found illegal, the player has to play the match with another racket, which shall be tested after the match.

When all the rackets of a match have been tested, they shall be given to the umpires, who only shall give them back to players when they come into the playing area to start the match.

From 1st July 2009 there will be only after-match controls at designated ITTF events. At other events the usual pre-match racket check will be conducted by the umpires / Referees as usual.

For an after-match test, the umpires of the match shall be informed in advance, and they have to collect the rackets of both players or pairs just after the match finishes. If any of the players has had to change the racket during play, the umpires shall collect both the damaged racket and the spare one. Rackets will be submitted to the racket control panel for testing and players may collect their rackets at the racket control room ten minutes later. For Team events, members of the racket control panel shall come to the playing area to take all the rackets for testing and players may collect their rackets at the racket control room ten minutes later.

Previous information. Handling rackets. Data recorded.

Before the tournament all delegations and officials including umpires will be given details of the racket control procedure. This information includes voluntary and compulsory controls, procedure of the controls, necessity of correctly airing new

rubbers, location of the racket preparation area and the racket control room, sanctions encountered in case of a racket failure, and procedure for appeal at World Championships and Olympic Games.

During voluntary and compulsory controls only the player and one designated accompanying person (coach, official or teammate) can stay in the Racket Control room beside the controllers.

Racket controllers or umpires must cautiously take the rackets by the handle, add a notice with the name of the player and bring them to the racket control room.

If the player covered the side of the blade and the sponge with a trimming, the tester cautiously must take off half of the trimming while keeping in mind to attach it correctly later on. Then he/she shall place the racket in the Enez box and shall start the glue-test. The other measurements shall be done as required.

All data about the rubbers are recorded as requested by the racket control report form.

Any disciplinary action and decision related to the racket control during the tournament is the authority of the Referee.

Chapter 8: Testing facilities and equipment. Hospitality

The organizer must provide a testing facility called **Racket Control Room** that meets the following specifications. For big events as World Championships or Olympic Games the room size will be larger and more equipment will be needed.

Room size and equipment: about 30 m², overall well lit + 60 W table lamp, opening window or ventilated but no air-streams, room-temperature between 20°C and 25°C (never more), 230V plug, locker of about 0.25 m³ with key, locking door with key, 6-12 seats, 3-6 tables (depending on the event) 120x80, 1 small bin, 1 bigger bin. Photocopier available as close as possible. Internet connection. At World Championships and Olympic Games a computer shall be available in the racket control room.

Information to the participants: location indicated on the venue map given to the participants, by numerous signs with arrows inside the venue, and on the door of the room.

Room location: as close as possible to the main hall of the competition.

Continuous information to the racket control panel: The racket control panel should have a pigeonhole provided with two sets of all communications to associations, players or officials, plus updated playing program and changes, final list of participants with their numbers and associations, results, TV-transmitted or recorded matches.

Testing equipment: The ITTF Chief racket controller will provide the test equipment. The organizer may be asked to refund the ITTF 50% of the shipment costs for RAE equipment at the World Championships and 100% in the case of Olympic Games.

Hospitality: The ITTF shall take over the travel costs of the ITTF racket controllers to the site of the event. The organizer shall provide free hospitality for the duration of the event + 2 extra days (for voluntary tests) for one ITTF racket controller, one (local) control assistant and at least 2 helpers, except at World Championships and Olympic Games, where three ITTF racket controllers and two (local) control assistants are given free hospitality.

Chapter 9: The racket control panel

At main events as World Championships, Olympic or Paralympics Games, the ITTF Equipment Committee shall appoint a racket control panel of 3 racket controllers, and one of them shall be appointed as Chief Racket Controller.

For being appointed as racket controller during these main events, the candidates have to attend a racket control course according with the Chapter 11 of this Technical Leaflet T9.

For all other minor events, the organisers shall appoint at least one official to act as racket controller.

The ITTF Executive Committee may decide to do racket controls by ITTF Racket Controllers in any of the tournaments under its jurisdiction. For that it shall ask for the ITTF Equipment Committee to appoint a Chief Racket Controller.

The Chief Racket Controller has the following duties and responsibilities:

- He/she reports to the referee.
- He/she shall agree with the referee the appropriate tolerances to be acceptable or not before the competition starts.
- He/she prepares and checks in advance the documents about racket preparation and control to be distributed to the officials, players and umpires.
- He/she prepares the forms needed for racket controls.
- He/she gets in touch with the organizer before the start of the tournament.
- As soon as possible after his arrival, he/she shall inspect the racket preparation area and the racket control room, and shall meet with the referee and the tournament director to discuss all problems and needs with them.
- If possible, he/she should attend the umpires and the coaches briefing and answer all relevant questions.
- He/she is an active testing and controlling member of the panel.
- He/she works out the duty-roster of the members of the racket control panel.
- He/she is considered as a technical judge or match-official, and the results of his measurements are matter of fact. He watches that the tests are conducted

with care and accuracy and that the results are correctly recorded and kept confidential.

- He/she ensures the contact with the referee: confidential schedule and random choice of match-controls, written reports about racket failures and other business or information.
- After the tournament, he/she shall submit a racket control report to the ITTF Equipment Committee (number of the tests, failures and their reasons, reports to the referee, actions of the referee, other problems). Statistics about the test results may be published.

The detailed inspection of the racket remains the duty of the umpires, who may ask the referee for a racket check, before the match starts, if they consider a racket as illegal. The measurements done by the racket control panel are then a service for the referee. The racket control panel reports to the referee all items that they consider as being not acceptable or legal.

Before it reports an illegal situation to the referee, the racket control panel has already taken into account the appropriate tolerance: No measurement is 100% accurate, new rubbers and glues may release a small amount of banned solvents, players may not be able to keep a re-glued covering totally flat ...

The racket control panel may detect manufacturing imperfections or illegalities (such as pimple geometry, ...) that are not included in the Laws or International Regulations but are against specifications of the Technical Leaflet; these items are not referred to the referee but to the ITTF Equipment Committee; referees, umpires, coaches and players may not know or may not be able to check them.

Chapter 10: The racket preparation area

The organizer must provide a facility called **Racket Preparation Area** that shall meet the following specifications. The size has to be adapted to the number of tables i.e. to the number of players who are preparing their rackets at the same time.

Location: Outside (under a roof) or Inside (largely open to fresh air), preferably next to practice area. Not in narrow dressing rooms or corridors. It shall not be exposed to rain or wind, but well ventilated or aired, and the access to public must be prohibited.

Size and equipment: the size depends on the event (for 20 players at the same time: at least 40 m², 20 seats with tables), several bins.

Information: location indicated on the venue map given to the participants, by arrows in the venue.

Chapter 11: The ITTF racket controllers

The ITTF qualified racket controllers will conduct the equipment controls at ITTF main events such as World Championships, Olympic and Paralympics Games and at any other tournaments under the ITTF's jurisdiction.

The programme of the initial and continuous formation will be elaborated by the ITTF Equipment Committee, and the courses delivered by equipment control instructors, who have advanced scientific and table tennis knowledge and are appointed by the ITTF Equipment Committee.

The programme should cover the following issues:

- Technical Leaflet T9 for Racket Controls
- Technical Leaflet T4 for Racket Coverings
- Measurement of solvents released from a racket with enez® device.
- Measurement of solvents released from a racket with RAE® device.
- Measurement of other properties of the racket.
- Practical organisation of racket controls.

To be qualified as **ITTF Racket Controller** the interested persons should

- attend an initial course including a theoretical and a practical test. The ITTF equipment control instructor will deliver a certificate for attendance.
- prove to be able to do the tests and measurements correctly and independently, complete the forms and follow the procedures. The ITTF Equipment Committee will deliver a certificate of qualification as **ITTF Racket Controller**.

To maintain the qualification, the ITTF Racket Controllers have to officiate as racket controller during a tournament at least once in three years.

The ITTF Equipment Committee shall decide among the ITTF Racket Controllers those who may be appointed as Chief Racket Controller during the main events.

The racket controllers are regularly informed by e-mail or during seminars about the new issues related to equipment testing; in order to keep their status they practice, and regularly answer questions about the papers they get. They shall report about their controls to the ITTF Equipment Committee in between an imparted delay. The experienced racket controllers should initiate the education of racket control assistants and assist the instructors in organizing and giving the racket control courses. The racket control assistants should advise the tournament organizers in their country how and where to set up a racket preparation area and a racket control room, and how to equip them.

The racket controllers on charge with a racket control should instruct local racket control helpers how to do and supervise their work.