

Racket Control 101
Prepared by Dr. Chandra Madhosingh

The I.T.T.F. has found it necessary to set up Racket Control stations at specific competitions. Successful steps have been taken to ensure that there is a transparent channel in dealing with carcinogenic glues and irregularities including the degrees of gloss, colour, thickness, flatness, pimples and boosting.

Examinations, Inspections, Measurements and tests are carried out and cover:

1. **The blade** is made of natural wood and must be flat and rigid. The handle is firmly attached, and flexibility is not permitted. Rigidity applies to the blade and the handle taken as a whole. The blade must be continuous and of even thickness.
2. **LARC** – The list of Authorised Racket Coverings has a validity period specified in the header. It is not permitted to use a racket covering which is not included within the valid period in the LARC. Check the List and the Legend.
3. The **thickness** of the rubber covering on the side of the blade for striking the ball must be not more than 2.0mm for pimples rubber, and not more than 4.0mm for sandwich rubber (sponge). This maximum thickness includes any adhesives being used.
4. **Pimpled** rubber is a single layer of continuous non-cellular rubber with the pimples evenly distributed with a density between 10 and 30 per cm². The pimples are on one side only of a sheet.
Sandwich rubber is a single layer of continuous cellular rubber (sponge) covered with a single outer layer of pimpled rubber. The thickness of the pimpled rubber can be up to 2.0mm, but no more.
The covering material, which is continuous and of even thickness, must extend up to and not beyond the edge of the blade. The part nearest the handle is an exception. The racket must be bright red on one side and black on the other. Only 2 colours are allowed. Several instruments can be used to measure thickness. These include the net gauge, a magnifier with a built-in mm scale, an electronic device or a 4mm metallic pin.
5. **Gloss** – Both sides of the racket must be matt to reduce reflection.
A rubber will be unacceptable if it is shiny enough so as to permit the shape of a light source to be distinguished in its reflection. If the white large letters on a dark coloured net gauge, held perpendicular to the rubber, can easily be read at an angle of about 45°, it is too glossy. In addition, a glossometer can be used with the ASTM procedure D523, a 60° gloss-checker. A value of less than 24% is acceptable. An EEL glossometer at 45° headsetting should read no more than 6%.
6. **Flatness** – A glue pocket or a bent blade may cause the racket centre to be convex. A straight edge or net gauge can be lightly placed on the rubber, and observed against a light, and should not show a gap between its ends. However, some slight deviations are allowed – no more than 0.2mm when the shape is convex and no more than 0.5mm when the shape is concave. Also, a flatness device has a flat support with a pin attached to a dial. The diameter of the pin shall be between 0.80 and 1.0mm, and the pressure of the spring inside the dial shall be between 40 and 50 grams. For convex rubbers the dial shows readings over 0.00mm, and for concave rubbers readings are less than 0.00mm. Spark plug gauges are also used for this measurement. Again, the maximum deviation is allowed as above.
7. **Powdering** a glue pocket or zones of different sponges under the same pimpled rubber are not acceptable. Powder particles can be transferred to the ball and change the frictional qualities of the opponent's rubber. Powdering can be detected with the naked eye, and can be confirmed with a magnifier.

8. **Pimples** – Pimple height \div pimple diameter = Aspect Ratio:
 The Aspect Ratio may be equal to or less than 1.10
 All pimples should be equal. Each pimple should have a circular symmetry, with its axis perpendicular to the plane of the base layer. At any height above the base it shall be no wider than any point closer to the base.
 Pimples must be evenly spaced along three sets of parallel lines, at 60° to one another.
 The surface of the pimple top must be parallel to the base and can be roughened or smooth.
 Hollowness is not permitted. However, the coefficient of friction between ball and pimple should not be less than 25 μ N.
 Some pimples – in coverings may show some irregularities on the side of the pimple. However, for the pimples-out coverings, deviation from an ideal shape is not acceptable.

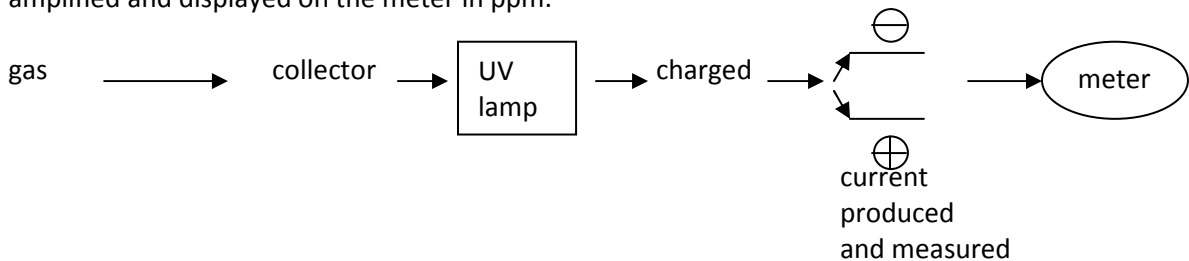


- The LARC categorises racket coverings in four types: In, Anti, Out and Long
9. **Glues** – Some volatile substances may harm our health and they are found in certain glues. The I.T.T.F. has banned the use of these volatile organic compounds (VOC). The instrumentation industry offers various devices for detecting VOC's e.g.

- Flame ionization detectors
- Photo ionization detectors
- Gas chromatographs
- IR spectrometers
- UV – VIS photometers.....

For the past 30 years the I.T.T.F. has been identifying the VOC's using Dräger tubes with direct reading colourimetric indication. About 350 different substances can be detected and measured using the Dräger chromatographic tubes.

Then the Enez electronic box was introduced. This method was cheaper and easier to apply. Lately, the I.T.T.F. has started to use the Mini RAE Lite instrument, developed by the RAE Systems, with expertise in chemical and radiation detection. It is a photoionization detector (PID) which uses an ultra-violet (UV) light source of 10.6 eV, to produce ions. Then the gas becomes electronically charged. In the PID these charged particles produce a current which is amplified and displayed on the meter in ppm.



All racket failures are reported to the **referee who is the final arbitre.**
 When B.C.T.T.A. inspects and measures rackets, the results are sent to the I.T.T.F., and is kept confidential.