

The quality and safety requirements described in this leaflet have no retroactive effect on tables approved by ITTF before the date of issue of this leaflet.

Chapter 1: Introduction

High performance in modern sport cannot be achieved without good equipment. Although the expert and the beginner require different degrees of excellence, both need equipment of a consistent and safe standard. Perhaps the most important item of table tennis equipment is the table, for with a bad model that produces abnormal, irregular or unpredictable bounces not even enjoyment can be obtained.

The International Table Tennis Federation tests and approves tables, thus setting a high standard for sporting quality and safety during international competitions. Information and instructions for applying for or renewing ITTF approval of tables and information about the approval procedures are established by the Equipment Committee as an appendix to the present Technical Leaflet and are, available to Associations and manufacturers from the ITTF Web-Site.

New tables are approved only provisionally for the first year after their first use at a tournament listed in the ITTF calendar; during this period the approval can be cancelled by the Equipment Committee if ITTF receives adverse comments and a re-test at the supplier's expense shows that the table does not meet ITTF specifications.

Some wish to make tables of concrete. Although these are not approved for international play, the ITTF has written some recommended specifications for tables for leisure play, which may be found in Technical Leaflet 1A.

Chapter 2: Laws and Regulations for International Competitions

The Laws of Table Tennis relating to the table are:

2.1 The Table

- 2.1.1 The upper surface of the table, known as the playing surface, shall be rectangular, 2.74 m long and 1.525 m wide, and shall lie in a horizontal plane 76 cm above the floor.
- 2.1.2 The playing surface shall not include the vertical sides of the tabletop.
- 2.1.3 The playing surface may be of any material and shall yield a uniform bounce of about 23 cm when a standard ball is dropped on to it from a height of 30 cm.
- 2.1.4 The playing surface shall be uniformly dark coloured and matt, but with a white side line, 2 cm wide, along each 2.74 m edge and a white end line, 2 cm wide, along each 1.525 m edge.
- 2.1.5 The playing surface shall be divided into 2 equal courts by a vertical net running parallel with the end lines, and shall be continuous over the whole area of each court.
- 2.1.6 For doubles, each court shall be divided into 2 equal half-courts by a white centre line, 3 mm wide, running parallel with the side lines; the centre line shall be regarded as part of the each right half-court.

The Regulations for international competitions (3.2.1.2) state as follows:

- 3.2.1.1 The approval and authorisation of playing equipment shall be conducted on behalf of the Board of Directors by the Equipment Committee; an approval or authorisation may be suspended by the Executive Committee at any time and subsequently the approval or authorisation may be withdrawn by the Board of Directors.
- 3.2.1.2 ... the equipment ... shall be selected from brands and types currently approved by the ITTF.
- 3.2.5.3 ...fluorescent, luminescent or glossy colours shall not be used anywhere in the playing area...
- 3.2.5.6 Advertisements on the table shall comply with the following requirements:
 - 3.2.5.6.1 There may be 1 permanent advertisement of the manufacturer's or supplier's name or logo on each half of each side of the table top and on each end.
 - 3.2.5.6.2 There may be 1 temporary advertisement, which also can be of the manufacturer's or supplier's name or logo, on each half of each side of the table top and on each end.
 - 3.2.5.6.3 Each permanent and each temporary advertisement shall be contained within a total length of 60cm.
 - 3.2.5.6.4 Temporary advertisements shall be clearly separated from any permanent advertisements.
 - 3.2.5.6.5 Advertisements shall not be for other table tennis equipment suppliers.
 - 3.2.5.6.6 There shall be no advertisement, name of table, name or logo of the manufacturer or supplier of the table on the undercarriage, except if the table manufacturer or supplier is the title sponsor of the tournament.

Chapter 3: Definitions and types of construction

Definitions

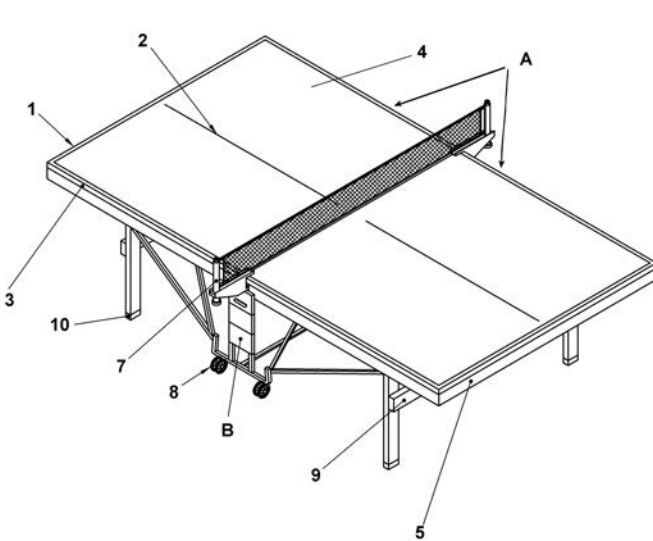


figure 1a: Playing position

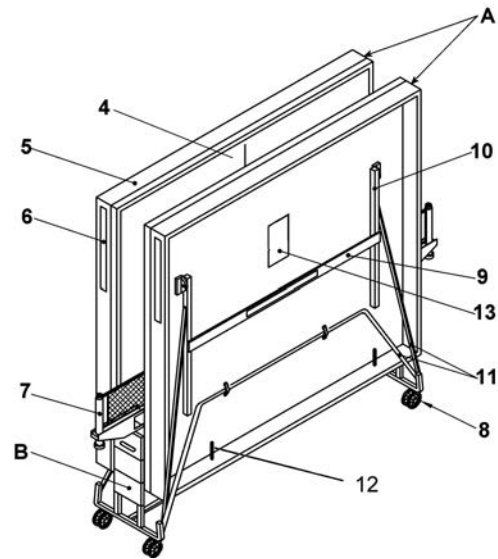


figure 1b: Storage position

Key:

- A Tabletop
- 1 End line
- 2 Centre line
- 3 Side line
- 4 Playing board + surface
- 5 Frame
- 6 Trademark, Table name, ITTF logo
- 7 Net assembly, Net attachment area

- B Undercarriage
- 8 Wheel
- 9 Cross bar or cross-bracing
- 10 End leg
- 11 Strut
- 12 Safety device or lock
- 13 Operation and safety instructions
- 14 Players' safety area (see figure 13)

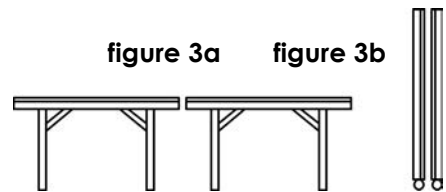
Tabletop	Half of a table, divided at the net, including the playing board, the finish and lines of the playing surface, the frames and other reinforcements under the board especially around its edge and side, the markings on the frames and any device holding or attaching together both halves and, in general, any other part attached to and moving with the tabletop, but without any part of the undercarriage.
Full tabletop	Two tabletops assembled in the playing position
Undercarriage	All the parts whose principal function is to support the tabletop including the wheels attached to the undercarriage and the legs
Playing position	Both tabletops in the horizontal position with the net assembly attached (figure 1a)
Playback position	One tabletop in the horizontal position with the net assembly attached and the other one in the vertical position
Storage position	Both tabletops in the vertical position (figure 1b)
Net assembly	Net, its suspension and the supporting posts, including the system attaching it to the table
Players' safety area	Area in which all parts of the undercarriage have to comply with the specific requirements preventing the moving player from getting hurt.

Types of construction

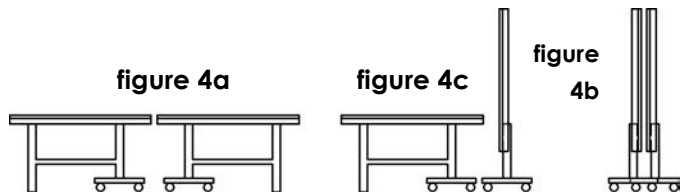
Currently four types of table may be considered:

Type (I): Non rolling tables, i.e. stationary tables without wheels at the bottom of the undercarriage.

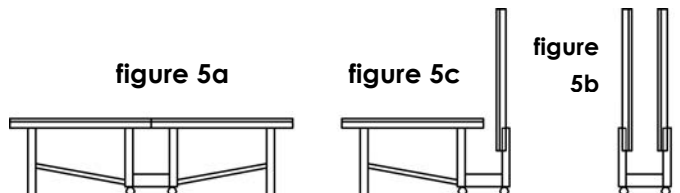
They may have an undercarriage that, in the storage position, is not attached to the tabletop or they may be made up by two separate tabletops both with a folding undercarriage.



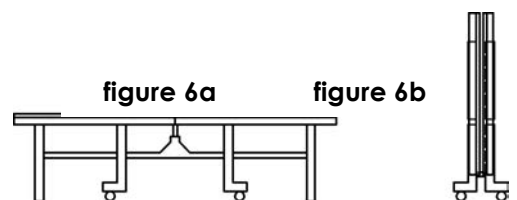
Type (II): Rollaway tables with two tabletops, each with an own separate folding undercarriage.



Type (III): Rollaway tables with one undercarriage and two tabletops that can be folded independently from each other.



Type (IV): Rollaway tables with one undercarriage whose tabletops always fold in and out together.



Chapter 4: Criteria for approval and guidelines

The following notes describe both mandatory and desirable qualities of the table and suggest how these may best be attained.

4.1. Name of the table

Each table must have a specific name that distinguishes it from any other table.

Tables, whose tabletops are different or made in different factories, must have different names. Tables with the same tabletop and with a similar or nearly identical undercarriage may have the same name, if agreed by ITTF-Equipment Committee.

A second version of a table that is re-designed to be suitable for wheelchair play can have the same name as the original version but with the letter W added.

The ITTF will make its best effort to ensure that the trademark or brand name does not infringe on the already existing table brands. The ITTF is not responsible for any illegal use of registered trademarks. Verifying the correct and legal use of trademarks is not part of the ITTF approval procedure.

4.2. General appearance of the table

The appearance of the table, although important, is difficult to specify and only some items will be pointed out. It should be noted, however, that the purpose of ITTF approval is to determine which items of equipment are suitable for top-level play, particularly international. Such play is normally held in front of spectators, and often before TV cameras that transmit their images to millions of people in dozens of countries. This medium is the sport's best source of advertising; all aspects of the presentation must be on a professional level, including the appearance of the table.

Paint, colour or gloss irregularities that are visible to the naked eye are not acceptable. The paint must be firmly bonded to the substrate, it should neither colour the ball nor look scuffed or scratched.

A table that for some reason looks home-made, flimsy or cheap, regardless of the playing qualities of the tabletop, will not be given approval.

The table should look safe and not have dangerous or harmful protruding parts. There shall be no sharp edges or corners, except on the table surface, and no raspy surfaces or shear points.

4.3. Material of the playing board

For general use the tabletop board may be of any continuous material; tables are available with tops of plywood, particle-board, plastics, metals, concrete or fibre-glass. Since the finish governs the frictional properties more than the substrate does, a broad spectrum of materials can be used so long as the bounce is suitable; this point is discussed in a later section.

For major tournaments, however, only wood or wooden derivatives may be used for the playing board, and the ITTF therefore approves only wood or its derivatives.

Wood is a natural product susceptible to the effects of moisture, and the dimensions and shape of the table can therefore change according to humidity. Most manufacturers have found methods of construction that minimise these changes, but some variation is unavoidable.

4.4. Overall table dimensions

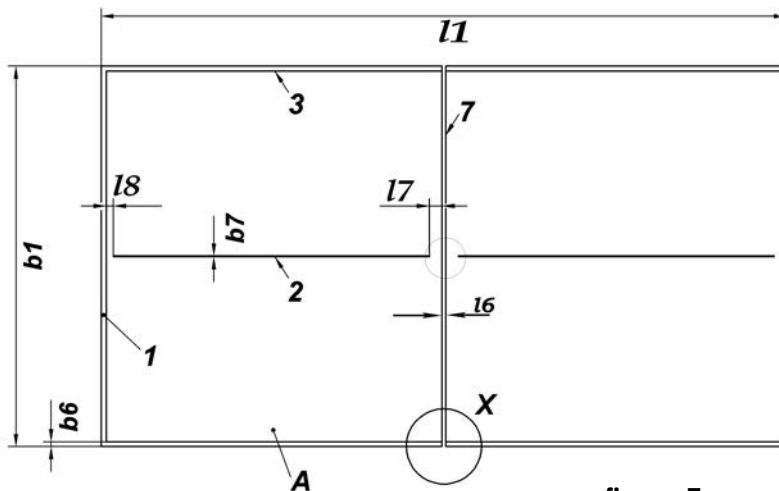


figure 7

The length ($l1$) must be within 5 mm of 2.740 m, and the width ($b1$) and height ($h1$) must be within 3 mm of 1.525 m and 0,760 m, respectively. When designing for the length of the table, manufacturers should bear in mind that, regardless of their precision, the gap ($l6$) between the tabletops of the tables type III or IV may reach a maximum of 20 mm;

if each half had a length of exactly 1.370 m, the overall length of the table would be greater than 2.740 m. When the table is in its playing position the tabletops or the two halves of the centre-line must not be more than 2 mm out of alignment ($b8$).

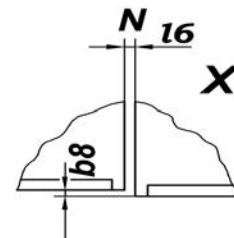


figure 7x

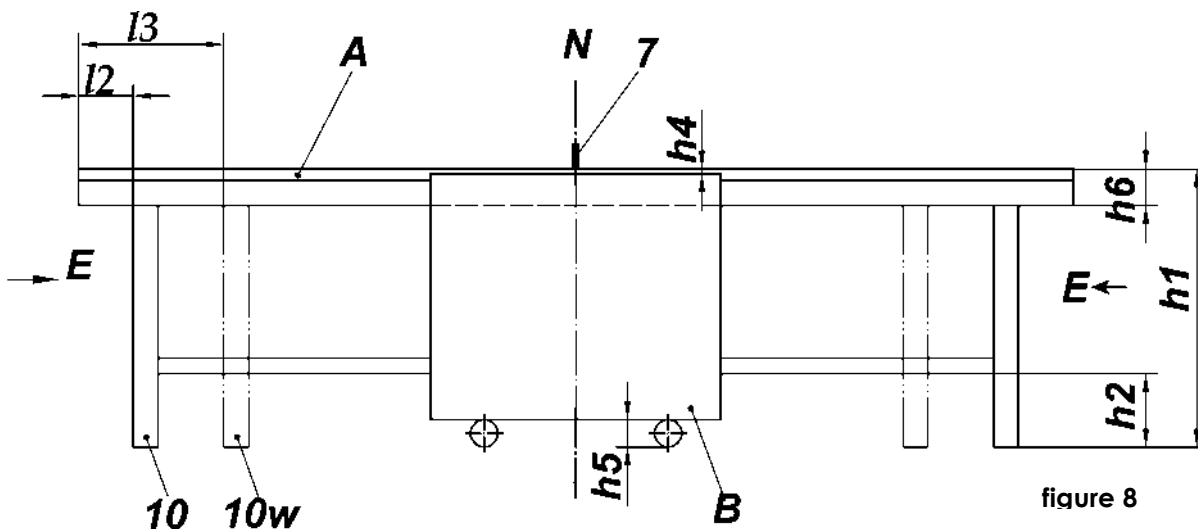


figure 8

E = tabletop end

N = tabletop net-end

4.5. Net attachment area

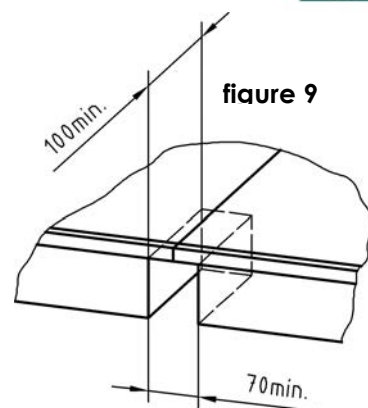
If the edges of the table are reinforced, the battening must be cut away where the net posts are to be attached. At this point, as shown in figure 9, the free space between the battening on the two halves of the table should be at least 70 mm wide, and it should extend under the table at least 100 mm.

If these requirements are met, then the table will accept almost all ITTF-approved net assemblies.

It is desirable that the areas contacted by the clamp surfaces of the net posts, both on the playing surface and on the underside below it, be reinforced to prevent wearing by continual attachment and removal of the posts.

Metal or fibre-glass inserts at these points represent one means of accomplishing this objective, although protectors on the net posts serve the same purpose. The reinforcements should not considerably increase the thickness of the tabletop. No part of the undercarriage or the battens should hinder easy and safe attachment.

Permanently attached nets may not need any specially designed space.



4.6. Flatness of the tabletop

To qualify for approval, the playing surface must not be warped.

A rigid straight-edged surveyor's staff about 2 m long is placed on 2 shims of identical height that rest on 2 diagonally opposed corners of the playing surface of a tabletop: the difference between the smallest and the largest gap between the playing surface and the staff shall not exceed 3.0 mm. Regardless of this criterion, however, no warping will be acceptable that is visible to the naked eye.

One means of reducing warping is to increase the thickness of the playing board, but the complete elimination of warping in this way probably requires an uneconomical thickness. A common compromise is to use at least the minimum thickness that gives the desired bounce (for tournament tables it currently varies from 18 to 30 mm) and to reinforce the underside of the top by battens around the edge, or recessed under the table, or both.

The vertical dimension of the end or side of the table, i.e. the thickness (h_6) of the batten plus the playing board, may be no more than 100 mm.

4.7. Surface colour, finish and lines of the playing surface

The playing surface of an ITTF approved table must have a dark colour, whose lightness L in the CIELAB system must not be more than 40% . "The Equipment Committee may tolerate lightness up to 44%, if the appearance and colour of the surface remains dark." It must be matt, with a degree of gloss not more than 15 (60° specular gloss, ASTM procedure D 523) and a low haze-gloss. A change of the paint may affect the friction, the gloss and the bounce; it requires testing.

It may be reminder that about 8% of the male population, with North European ancestors, have problems in distinguishing green and red.

The finish must be uniform over the entire surface; it must therefore be applied in some uniform manner such as spraying, roller or curtain coating or similar; brush marks are unacceptable. The finish will also be unacceptable if, regardless of the measured degree of gloss, it permits the shape of a light-source to be distinguished in its reflection.

The surface must be even and regular, with no inlaid dust and no projecting particles of pigment.

The finishes may not transfer surface pigment to the ball. This causes concern to players, spectators and TV crews. A suitable choice of finish may eliminate this problem completely. Other finishes undergo a hardening process that takes days or weeks; manufacturers who use this type usually store their tables for long enough to permit this process to take place so that their tables do not colour the ball.

In addition to the principal finish, the playing surface must be marked with white lines.

These comprise a 20 mm wide (b6) line round the perimeter of the playing surface to ensure that its limits are clearly visible, and a 3 mm wide (b7) line, parallel to the sidelines, dividing each end of the table into two half-courts. The tolerance on width of all lines is plus or minus 1 mm; there may be a gap (l8) of up to 10 mm between the centre line and the end line and a gap (l7) of up to 50 mm between the centreline and the net. The difference in level of all lines should not be detectable by the fingers, and in no case shall it be measurable.

4.8. Friction of the playing surface

The changes of both spin and trajectory when a table tennis ball bounces are governed by the coefficient of friction (CoF) between the ball and the table; the part contributed by the table to the CoF is almost exclusively a property of the surface finish. We formerly specified the CoF of the playing surface, but have subsequently learned that there are unidentified variables that reduce the reproducibility of the method. The following is therefore advisory, not mandatory:

The dynamic CoF between the playing surface and that of any ITTF-approved ball should not be greater than 0.66 and not be less than ... (this limit will be set during 2016, and submitted to BoD in 2017). The CoF should be essentially the same regardless of the direction in which it is measured.

A simple practical method of determining coefficient of friction uses a triangular raft or sled supported on three balls, about 2 cm apart, glued to a piece of wood or other substance that gives a total weight of about 100g. The maximum angle between the playing surface and the horizontal when the sled will not continue to slip is measured. The tangent of this angle is the CoF.

Alternatively the 100g sled described above may be pulled over the horizontal table at a speed of 300 mm/min, and the pulling force is measured. The dynamic CoF is pulling force divided by the weight of the sled, both in Newtons. The average of five measurements should be taken. Care should be taken that any device used for determining the pulling force should be as free from friction as possible.

It should be noted that not all balls have the same frictional properties; The CoF should be measured according to a standardized procedure including balls used and prior cleaning of balls and tables.

4.9. Bounce on the playing surface

Both speed and spin of a ball are affected by the resilience and the friction properties of the playing surface and other factors that all together govern the bounce.

The vertical bounce of a spin-less ball is measured by dropping an approved ball of average bounce on to the table; from a height of 300 mm, measured between the playing surface and the bottom of the ball, the ball must rebound to a height of 230-260 mm. A table will not be approved unless the bounce is legal and uniform (see below) over the entire playing surface.

Almost any tabletop constructed as described above (i.e. with at least 25 mm plywood or 18 mm particle-board) will give a suitable bounce. It is this bounce, rather than the material of construction, that is of paramount importance.

There are several possible methods for the measurement of the height of the bounce:

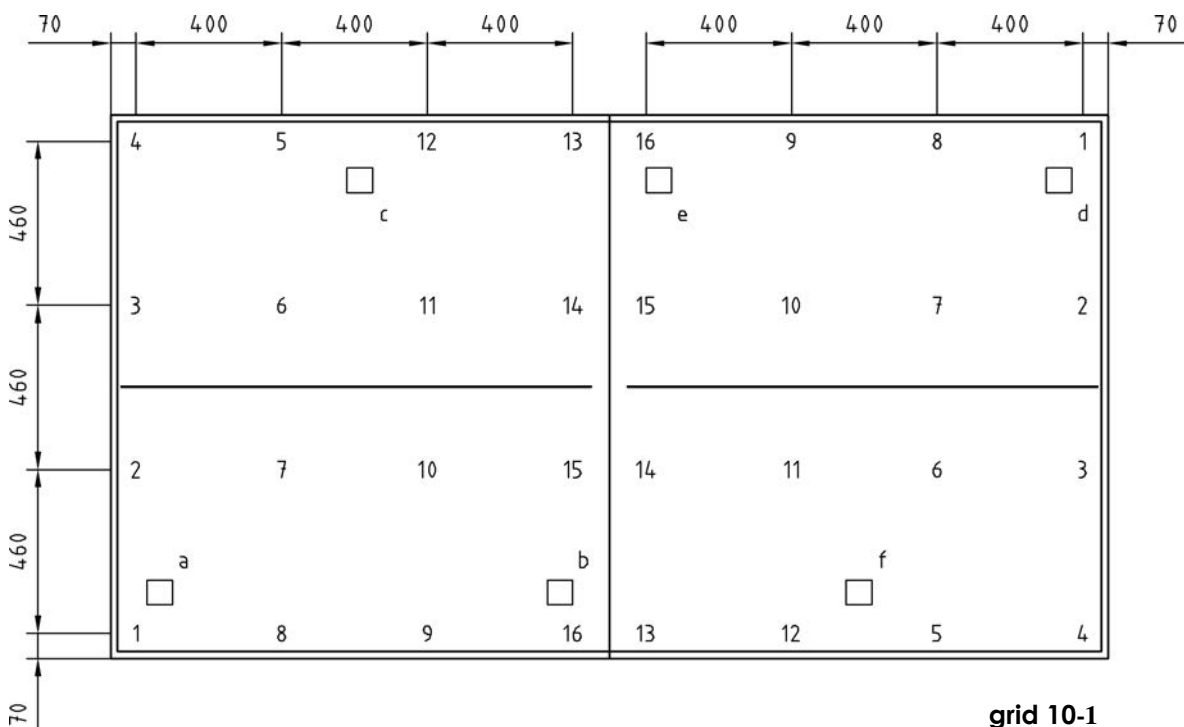
- By eye, but the operation is quite tiring, and it is subject to both random and systematic errors.
- A simple and precise method involves the formula $h=gt^2/8$, where h is the bounce height in m, g is the acceleration due to gravity in m/sec^2 , and t is the time in seconds for the complete bounce, up and down. The time t is measured electronically; a timer is started by a microphone detecting the first bounce, and is stopped similarly by the second bounce.
- By video-taping or photographing the vertex of the bounce: the camera is adjusted at the bounce summit and a scale in the background located next to the ball indicates the height. The bounce height then is determined either by the operator using a slow motion (picture by picture) procedure or by a computer calculating the exact vertex of the bounce.
- By electronic measurement before the bounce summit of the time that a ball needs to interrupt successively two light beams. The geometric mean of the measures permits calculation of the maximum bounce height.

The ball should always be dropped without spin on the same spot of its surface in order to eliminate the variation due to ball structure; each measure should be tripled.

In order to investigate whether a table half has a uniform bounce, triplicate assessments of the bounce are made for each tabletop at 16 prefixed points and 3 special points such as above the legs. If one or more of the prefixed 16 points are located over fixations, they may be slightly displaced.

Using a computer program the observed bounce values can be converted into a three-dimensional plot from which the calculated uniformity can be instantly visualised.

For the calculation of the bounce uniformity, several conditions and mathematical steps have to be considered. The location of the regular and special points is given in the co-ordinate system [0-137]*[0-152] cm describing the whole surface of a table half with an X-Y axis system, where X refers to the tableside and Y to the table end. The grid 10-1 indicates the 16 regular points.



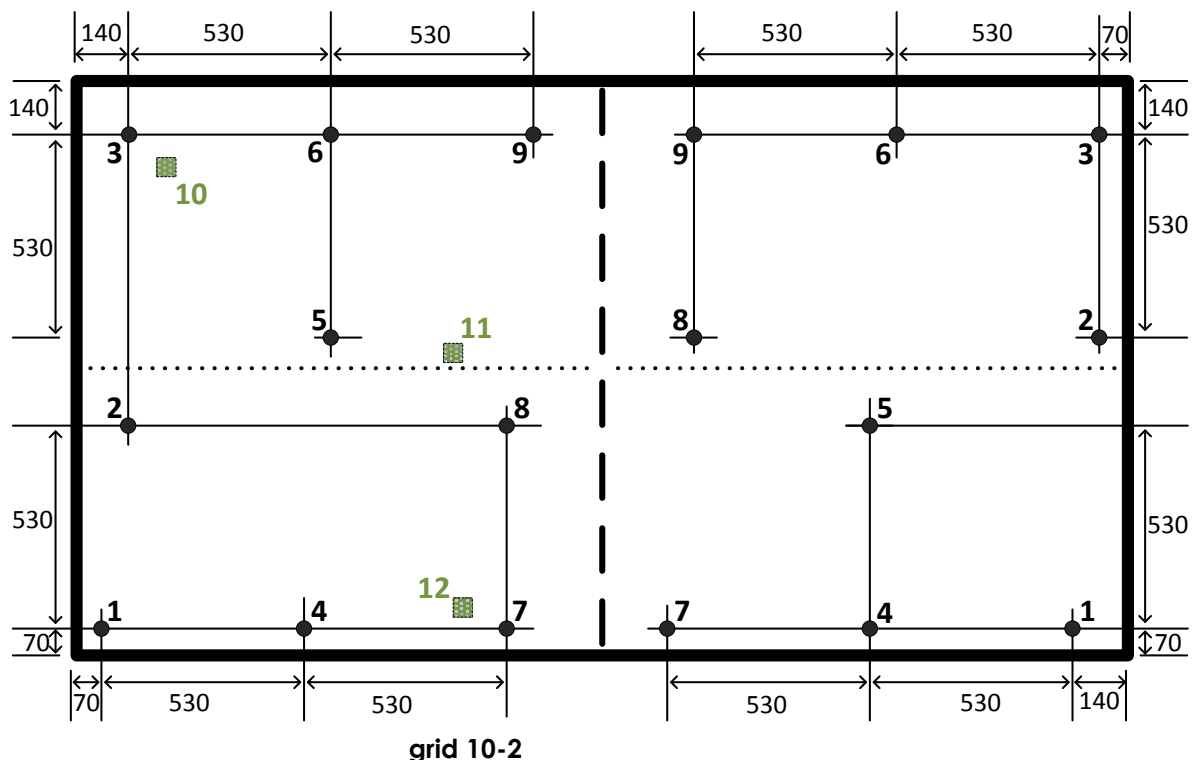
The median value of the bounce values (= average bounce) per point is used for further analysis. The median is defined as the middle observation. To assess uniformity for the whole surface, the bounce is modelled as a function of the x- and y-ordinates. This function is estimated with the available information at the 16 positions; then for the whole surface a predicted bounce value is obtained which can be 3-D-plotted and/or summarised per half.

Having 4 values per ordinate, a cubic equation can be fitted. Thus, for the bounce function the following general expression is taken: $\text{bounce}(x,y) = \sum_i \sum_j \alpha_{ij} \cdot x^i \cdot y^j$, where i and j range from 0 to 3 and \sum denotes the summation symbol over the index. The 16 coefficients alpha sub ij are estimated by solving the system with 16 linear equations from the 16 known assessments of the table half (it is advised to use statistical software for multiple regression). With this approach, the bounce function value on a grid position equals the reported value. From the known bounce function, the predicted bounce value is computed for arbitrary interpolative positions (x,y). From the span of the used grid, a high-density interpolation grid has been defined with step size 1 mm alongside the X- and Y-axis, and for all these points, the predicted bounce is computed. From these bounces, the minimum, maximum, mean and range for the interpolated surface are computed and a 3-D plot may visualise the behaviour of the surface in regard of bounce uniformity.

The following specifications should be met for the bounce uniformity:

The range of the predicted bounce values should be less than 10.0 mm. At the special points, the maximum value should be less than 3.0 mm higher than the maximum value given by the interpolated points. The difference between the mean predicted bounces for the two table halves should be less than 2.0 mm.

A less scientific evaluation for the quality of the bounce regularity is acceptable. At each point the average bounce is calculated out of the three measurements and rounded up to the next full or half millimetre-unit; if one of the three measurements is really outlying, it may not be considered or the bounce may be repeated. The medium bounce of a tabletop is calculated through the average bounces at the 9 points prefixed according to the grid 10-2 and 3 special points located over legs, fixations or parts of the inner frame. If one or more of the 9 points are located over fixations etc., they may be slightly displaced.



The minimum standards must be met as given in table 1.

Tolerances on a table (= 2 tabletops)	
Bounces outside the limits of the mean bounce (230 – 260 mm)	0
Difference of the mean bounce of the 2 tabletops	≤ 1.0 mm

Tolerances on each tabletop	
Number of average bounces more than 2.0 mm higher or lower than the mean bounce	≤ 2 average bounces
Difference of any average bounce at a special point to the mean bounce	≤ 4.0 mm
Difference between maximum and minimum average bounce	≤ 5.0 mm

- table 1 -

4.10. Advertisements and markings on the table

Restrictions on advertising markings on tables are described above under “International Regulations”. The side of half a table is considered to be a “face”, so that on the sides of the complete table the manufacturer’s mark may appear twice.

Each side of the table shall carry once the ITTF logo indicating that the table is ITTF-approved. The logo shall be visible in an area of at least 25 sqcm and not more than 50 sqcm that may be located on the frame of the tabletop or on the undercarriage. On show tables the ITTF logo may be bigger on the undercarriage.

**Recommended:
LOGO 4**

(Line Art Version: Black On White Background)



For more information, please refer to the ITTF Branding Guidelines v3.0: <http://bit.ly/2ybHNbw>

All versions needed, of the ITTF logo, can be found here: <http://tiny.cc/ittflogos>

Permanent advertisements on tables are allowed only on the sides and ends of the tabletop and each shall be no longer than 60 cm on any face. On each face, a continuous length of 70 cm shall be free, i.e. without any permanent marking including ITTF-logo, so that temporary advertisements can be affixed. The organising authority of a competition may grant permission for additional, but not other table tennis equipment supplier’s, temporary advertisements, one on each half of a side and one on each end, clearly separated from the permanent advertisements.

The undercarriage can carry the ITTF-logo but shall not carry any permanent advertisement.

4.11. Country of origin markings

A printing or sticker (letters at least 1 cm high) on the table-top underside shall inform as follows:

If the undercarriage and the table top are made and assembled in the same country, simply print: «Made in <Country>»

If the essential parts are made or assembled in different countries, print (all together not one of the three):

«table top made in <country 1>»

«table undercarriage made in <country 2>»

«table assembled in <country 3>»

If table top and undercarriage are made and assembled in the same <country 1>, the table top frame may wear on both (out)sides once «made in <country 1>».

4.12. Height adjustments on the undercarriage

Tables of type (I) do not need height-adjustment devices because of their rigid structure. Tables of type (II) to (IV) shall have height-adjustment devices at least at the bottom of their end feet, but preferably also under their net ends. All of these should be easy and safe to handle, to adjust and to fix. A desirable feature permits lifting the table from the wheels on to non-rolling feet, which should be large enough to avoid indenting a sports floor.

4.13. Colour of the undercarriage. Undertable light.

The undercarriage should not be white i.e. its lightness L in CIELAB system should not be more than 90 % ; its finish must not reflect light upwards, so that the players and the spectators are not dazzled.

Not dazzling under-table light or fluorescent paint may be used to enhance the attractive presentation of a table undercarriage; they shall not affect the sight of players, spectators, officials and cameras neither directly nor by reflection. A switch must be provided in order to power off the light; the switch may also dim.

Chapter 5: Safety requirements

In the storage and in its rolling or playing position, the table must meet the highest possible safety standards in order to avoid dangerous and inadvertent displacement, unfolding or collapse and to prevent players from being hurt.

It is important that the players feel safe and confident with the design of the table.

The following requirements describe the standards as required by ITTF; if a country's legislation enforces additional or other measures, its regulations prevail on that territory.

5.1. Playing position

If a player, or anything he wears or carries, moves the playing surface, his opponent scores a point (Law 2.10.1.8). In case of a violent shock or a heavy load, the table should not collapse nor tilt. Although the ITTF does not stipulate minimum distances between the points of the undercarriage touching the ground, the table or table half of tables type (II) must be rigid, stable and sturdy enough to endure without being damaged or tipping a brusque or longer sitting-down of a person on its top and a slight sway of the seated person, but its legs and cross bracing must not obstruct the players' feet.

In the playing position each table half needs 4 legs, except if its tabletop or the tabletop supporting block is made of one solid piece or if its halves are strongly sealed together.

The *rigidity* of a table expresses its resistance to the shift of its top when pulled by a force of 300 N in the longitudinal and 200 N in the transverse direction.

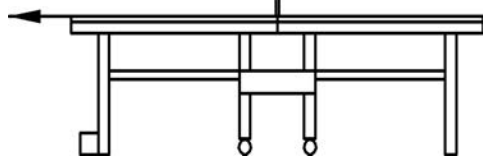


figure 11a

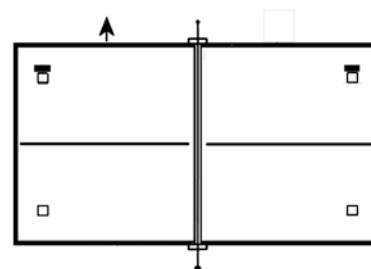


figure 11b

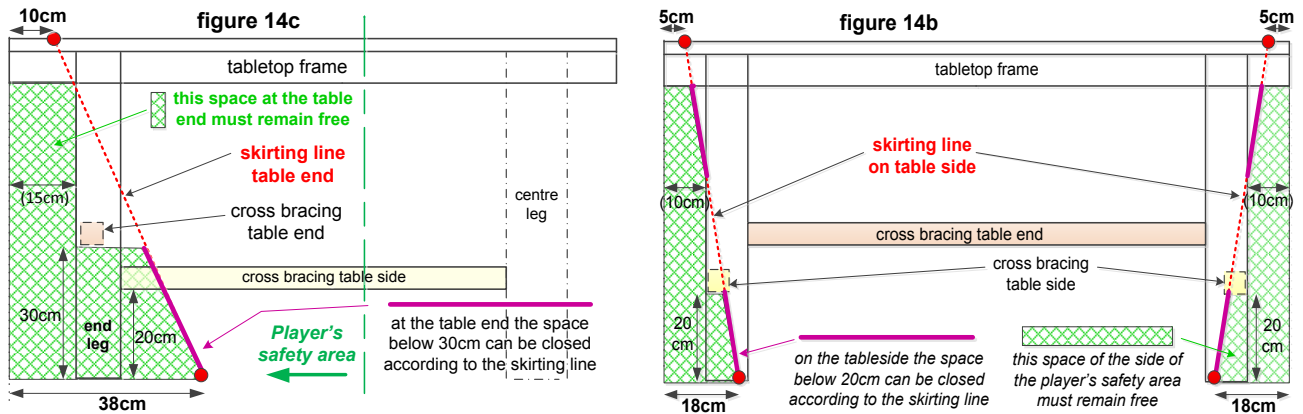
This traction is applied to the middle of the end and to the middle of the half side of a table ready to use with a mounted net and with both end-feet blocked by a 50 mm high obstacle on the floor. The shift of the tabletop in the longitudinal or in the transverse direction should be less than 10 mm.

If a permanent net without clamps is attached to the table, the same rigidity shall be reached.

The *loading capacity* of a table or tabletop expresses its resistance to tilting, folding or deforming when its most unfavourable spots, i.e. end and centre corners, are loaded with a weight of 80 kg, which shall be a disc of 30 to 35 cm diameter and whose gravity centre is applied at the interior corner of a square of 15 cm side length. The table should not show any unstable tendency during this test and not sustain any damage. The corners of the table should not considerably bend down under the load of 80 kg. During this test no net is mounted.

If a permanent net without clamps is attached to the table, the same rigidity and loading capacity shall be achieved.

An asymmetric design of the undercarriage resulting in structural differences at the safety area(s) shall observe all relevant requirements of dimensions and safety, and permit the server placing his feet the same way, whatever side or end he chooses for serving.



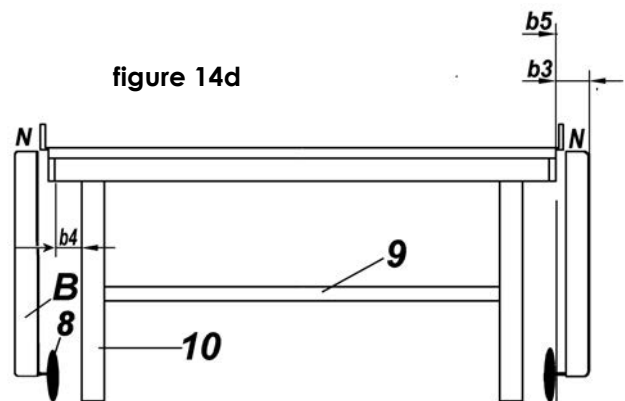
For tables type (I) and (II), the resting or fixation points of the tabletop at the supporting framework of the undercarriage or directly at the legs may be inset not more than 25cm from the table end and 15cm from the table side. Resting or fixation points must be exactly the same for both table halves. The design, strength and rigidity of the table undercarriage must ensure that the tabletop is showing no undesirable unbalancing, no see-sawing, no swinging and no vibrating risks or effects that may affect the players' or officials' confidence.

Elastic layers between table top and undercarriage are not allowed.

Dampers used for an easier set up of these tables may not cause bobbing up and down or vibrating risks at the tabletop ends.

At the net area of the tabletops an *extension of the undercarriage of rollaway tables* beyond the sidelines is allowed provided that:

- All edges and corners must be rounded and its construction may not hurt the players' feet.
- No wheel, in its most unfavourable position, may project beyond the tabletop side (*b5*).
- This central part remains at least 12mm under the playing surface (*h4*), and it does not approach to within 5 cm of the floor (*h5*).
- The width (*l5*) of this central part shall be less than 20 cm and it may carry no advertisement.
- The extension beyond the sideline of any part of the undercarriage must remain less than 6 cm (*b3*).
- Parts, which could generate shearing, must be 15 mm away from each other (*b4*).



Under the net, any hinge or other joint attaching both tabletops together must not extend more than 5 mm above the playing surface.

5.2. Storage, roll-away and setting up

A table in a *storage position* or being moved from one place to another shall be *safe with regard to*

- inadvertent unfolding of its halves or undercarriage
- tilting and collapsing
- inadvertent rolling away

A table while *being set up* may

- not tip over or collapse
- not demand too a high skill or strength of one single person.

A rolling table type (III), whose raised tabletops up to 76 cm are more than 11 cm away from each other, must be equipped with a device preventing the intrusion of a child into this gap in order to avoid that the head or trunk could be squashed by an unfolding tabletop. This protecting system should be designed in a way to bar the access to the gap from the bottom and from the top, in the storage as well as in the playback position.

The undercarriage of a *non-rolling table* may not fold out when the table half is moved. Each pair of braced legs or each leg must therefore be kept folded by a manual or automatic locking device, which may be unlocked only manually. Two small but substantial caster wheels, fixed on or inset into the batten under the net end of the table half, may permit rolling the table half instead of carrying it. Recommended minimum specifications for these wheels on type (I) tables are as follows: wheel diameter 5 cm, wheel width at contact with floor 2 cm, clearance between table and floor 2 cm.

The table halves of a *rolling table* must be held up by means of safety devices so that unintended folding out will be prevented in both storage position and moving, also on an uneven or sloping floor.

The safety bolts or catches of each table half must be built and placed in such a way that

- their locking is automatic, easy and safe
- their manual unlocking demands two deliberate, not-continuous actions requiring either skill or force
- their unlocking & the safe unfolding of a tabletop or table is possible for one or two persons.

The locking devices must always be delivered completely assembled. They should preferably be affixed to the table; if this is not the case, the customer must be instructed to easily and safely attach it without any doubt or error.

Normally two different locking devices must be used; at least one of them must not be a gravity-catch.

If the gap between the raised tabletops is less than 11 cm and if the traction requested for unfolding a not locked tabletop requires a force higher than 25 N, the tabletop of the rollaway table may be secured by one locking device only, which needs two not-continuous actions to unlock it.

See next page: Table 2 — Locking devices and unlocking actions

Table type	Locking devices and systems & unlocking actions		
	Unit locked	Minimum number and type required	Deliberate action(s) for unlocking the locks
(I)	No folding legs	no locking device is required	
	Legs folding individually	1 locking device for each leg	1 action for the device
	Legs folding as pairs	1 locking device for each pair	1 action for the device
(II)	Tabletop	2 locking devices, located more than 90 cm apart, one not based on the gravity principle	1 action for each device 1 action for the two devices together taking place less than 35 cm from the tabletop end
		<i>if tabletop-unfolding force > 25 N</i> 1 locking device, not based on the gravity principle	2 not continuous actions for the device
(III)	Tabletop <i>With a gap between the 2 tabletops in the storage position ≥ 110 mm</i>	2 locking devices, located more than 90 cm apart, one not based on the gravity principle	1 action for each device
		1 locking device, not based on the gravity principle	2 not continuous actions for the device, not possible from between the tabletops in storage or playback position
	Tabletop <i>With a gap between the 2 tabletops in the storage position < 110 mm</i>	2 locking devices, located more than 90 cm apart, one not based on the gravity principle	1 action for each device 1 action for the two devices together taking place less than 35 cm from the tabletop end
		<i>if tabletop-unfolding force > 25 N</i> 1 locking device, not based on the gravity principle	2 not continuous actions for the device
(IV)	Table	2 locking devices one not based on the gravity principle	1 action for each device, both actions shall take place less than 35 cm from the tabletop end, or one of them may be achieved by foot 1 action for the two devices together taking place less than 35 cm from the tabletop end or by foot
		<i>if table-unfolding force $25 > F \leq 60 N$</i> 1 locking device not based on the gravity principle	2 not continuous actions for the device
		<i>if table-unfolding force > 60 N</i> 1 locking device	1 action for the device taking place less than 35 cm from the tabletop end or by foot

Unfolding is not an unlocking action.
Unfolding force is the pulling force needed to unfold the unlocked tabletop (types II & III) or table (type IV) by applying a horizontal force at the top of a raised tabletop.

- table 2 -

The locking systems must resist and not deform, when a horizontal pulling force of 200 N is applied at the top (the end) tending to unfold the raised tabletop without unlocking it. For this test the undercarriage shall be strongly fixed to the floor. After the test, the state of the locking devices is checked. The ITTF recommends that the locking devices should sustain without damage the endurance test as described in section 5.4. below.

A rollaway table-unit, in its most unfavourable position, must not tip over nor roll on a *surface sloping* at 10 degrees. The track between the wheels must be wide enough to give the desired stability; at least 2 brake-wheels per table unit are recommended.

All fixings, hinges and joints must be *strong and secure* in order to withstand without damage the rolling of the table over an uneven pavement, for instance a tiled floor. The undercarriage shall not get out of shape under the same conditions. All parts shall sustain without damage the endurance test as described at the end of the leaflet.

The *legs* of a rollaway table half shall *extend automatically*, i.e. without needing to be pulled, when the top is folded down. The table in its storage position should be as narrow as possible.

5.3. Wheels and brakes

As many *swivel-wheels* as possible should be used. For an undercarriage with four wheels, at least two shall swivel. For an undercarriage with three wheels not inline, at least one shall swivel. If the castor wheels of a table half are all in line, no one must swivel; an only wheel must not swivel.

The wheels should permit *safe* rolling over uneven floors. The wheels should not damage the sports floor; in order to preserve the 760 mm table height, they should not indent the synthetic and rolled types of flooring.

The *diameter* of the wheels must at least be 75 mm; it is advised to use a diameter of more than 90 mm so that the rolling of the table is easier and safer. In order to reduce the indentation of the floor, the total *width* of all the wheels together of one transverse row are recommended to be more than 4.0 cm, or the width of one single wheel in contact with the floor shall be more than 2.0 cm; for a twin wheel this width shall be more than 3 cm together.

The manufacturer should take in account also the reduction of the wheel diameter because of the compression of the tyre material. The wheels may *not* have *sharp* or *abrasive* lines or edges.

Half of the wheels should carry an easily adjustable *brake*, thus preventing rolling away on a slope. The following recommendations should be considered for the location of the brake wheels:

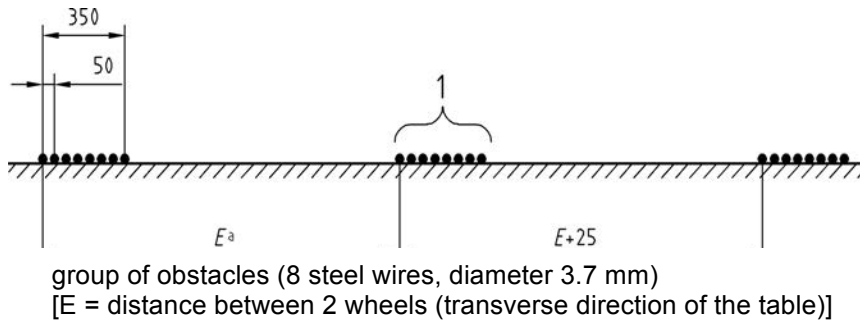
- Rolling tables type (II): brake wheels on the furthest end from the player
- Rolling tables type (III): brake wheels diagonally opposed
- Rolling tables type (IV): brake-wheels under one tabletop only.

The rolling devices should be solid and durable; they should sustain without damage the endurance test as described at the end of this chapter.

5.4. Quality of the locking, rolling and other moving devices of rollaway tables evaluated through an endurance test

The table, in its storage position, is submitted to a test of 250 to-and-fro movements over 5 m, i.e. 2500 m with a speed of 2 km/h created by unguided pulling.

The rolling circuit is made up and adapted to each table. Three groups of identical obstacles, constructed in wire mesh form with eight steel wires (diameter 3.7 mm) 50 mm apart, are placed over an area 7 m long to 1,5 m wide. The distance between the first group of obstacles and the second group is equal to the width of the table (transverse distance between the axes of the wheels); the distance between the second group of obstacles and the third group is equal to the table width plus 25 mm.



This layout permits the application of stress simultaneously then alternately on the chassis as a whole and on the wheels in particular.

No locking device (except the one acting on gravity) shall unlock itself, even temporarily, or be deformed in a way that it does not function correctly after the test. The rolling devices should work properly after the test. Fixings, hinges and joints should not be damaged. A visual inspection will check all the items and detect malfunctions or possible risks.

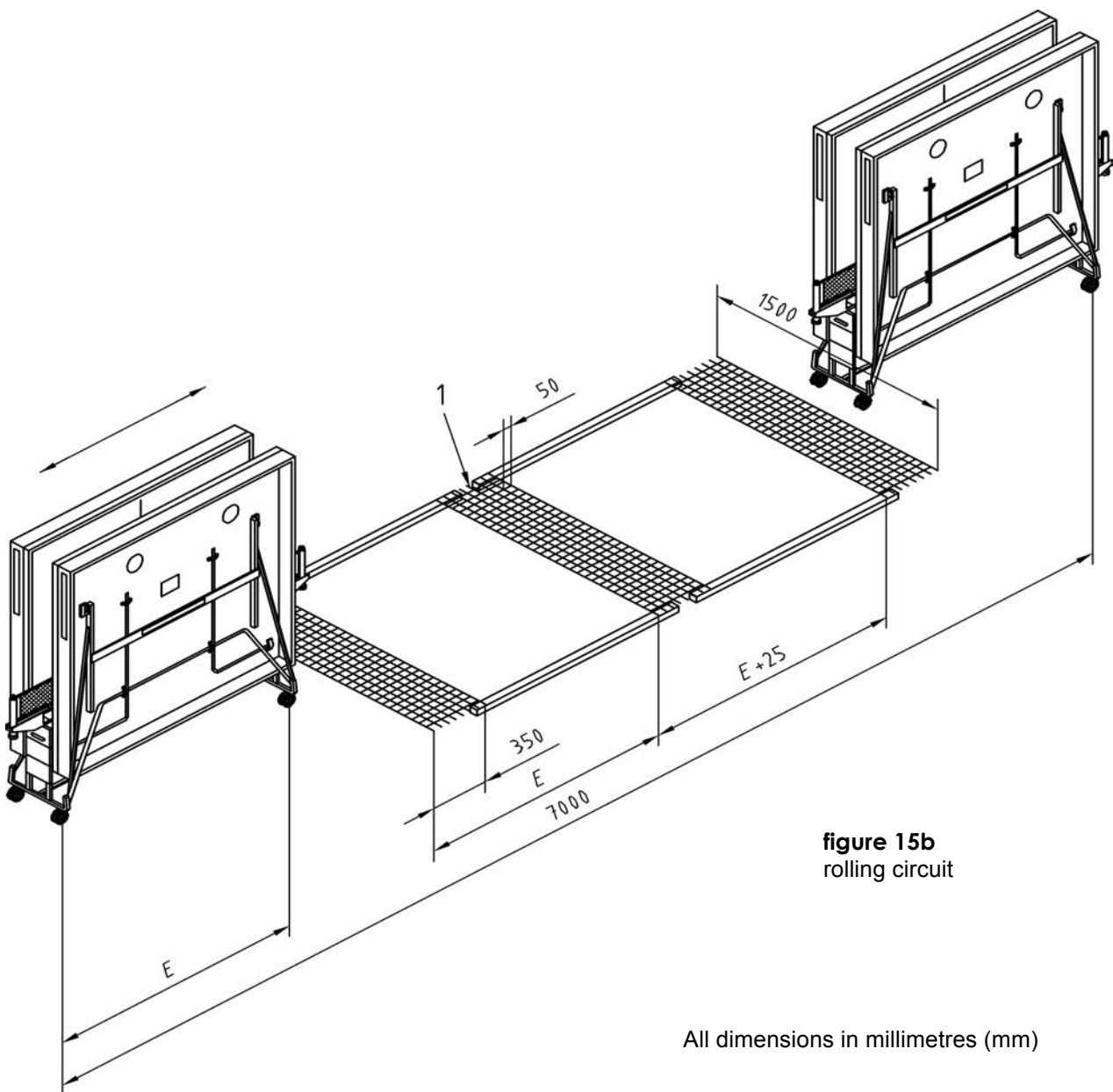


figure 15b
rolling circuit

All dimensions in millimetres (mm)

Chapter 6: Permanent net posts

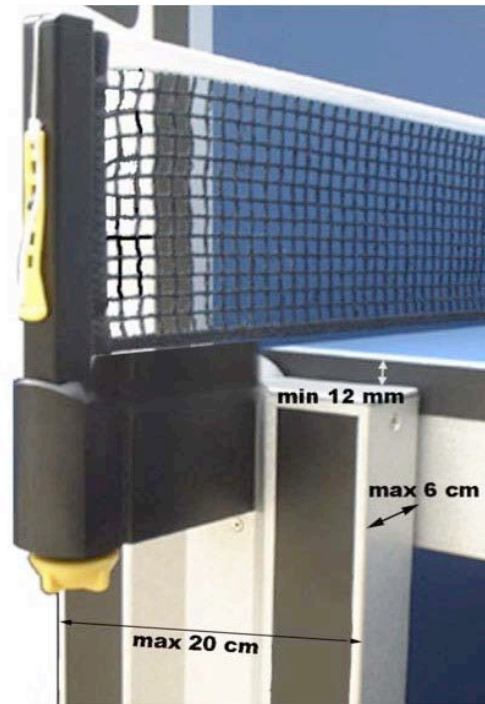
Net supporting posts are permanent if they do not need to or cannot be removed when the table is closed for the storage position.

A permanently attached net supporting post can be affixed either to the frame of the tabletop or to the undercarriage or to both. It should accept most of the approved nets and should be designed such that the net can be easily changed should that be necessary.

The horizontal and the vertical parts of the *net posts* and the net attachment must be designed according to the specifications of T2.

The horizontal part of the **net supporting post** up to the width of 45 mm must be designed in a way that

- its sides allow a clear visual distinction between post and attaching or undercarriage parts
- no part of its upper edge shall be below the level of the table surface
- parts that may generate dangerous shearing are and stay at least 15 mm away from the table side.



The **attachment system** of the net posts *shall* meet the following criteria:

- Horizontal parts of the attachment system along and affixed to the tabletop side must be at least 12 mm below the playing surface, be less than 200 mm long (i.e. 100 mm from net end) and extend less than 30 mm beyond the table side. They are considered as a part of the frame.
- Any part of the attaching device that may generate dangerous shearing shall be at least 15 mm away from the table side
- Vertical parts of the fixture attached to the undercarriage shall extend less than 60 mm beyond the table side; they are considered as a part of the undercarriage.

The net posts and attachment systems shall be sufficiently rigid to endure strokes and shocks from any direction without showing lasting bending or twisting. The application of a force of 10 N at the post end, parallel to the table side and vertically, should not cause any deformation.

Chapter 7: Warnings and user information and instructions

Warnings and notice for use should be *applied* permanently to the undersides of both tabletops, at eye height. The information shall be provided in form of drawings or pictures. Additional headings or advice must be written in easily *legible* letters in the language of the user's home country.

Tabletops (I, II) or tables (III, IV) must carry on its underside a rectangular not-detachable label or permanent-ink stamp of minimum 18 sqcm informing about the month/year of production (pitch min. 16 pts), of the top designed as follows:

TABLE TOP SURFACE	
Month / Year PRODUCTION	10 / 13
<i>(Manufacturer's internal notices or codes)</i>	

A folder coming with the packaging should provide written instructions in English and at least in the language where the table is to be delivered. The *assembly instructions* must include a list that allows easily identifying the loose parts and the tools required;

drawings or pictures of the steps and explanations for the assembly of the parts; warnings about the precautions that need to be taken during assembly of the table including the stages where more than one adult is needed; advice about not over-tightening screws at moving parts and how to carefully test the functionality immediately after completing the setting up. Written *operating instructions* must describe the regular handling and the precautions that should be taken during the setting up of the table in the playing or in the storage position and when it is rolled away; the maintenance instructions must include the warning to replace any broken or damaged part immediately and should give instructions about cleaning of the table top. The folder(s) must give a contact address where the customer can get in touch with the manufacturer or the supplier.

All information should comply with international and local legislation: this is the responsibility of both the manufacturer and the local distributor.

Minimum information on all tabletop undersides shall be pictograms about: Children shall not play on or near the table in storage position; Moving the table on a sloping surface may be dangerous; During the unfolding and folding of the table, the user has to observe a sequence of steps and precautions.

A table whose *weight* excessively loads the arms of one single person requires an additional warning: Folding and unfolding requires two persons!

An *arrow* may indicate the location of a safety catch that must be unlocked manually.

Chapter 8: Tables for Young Players

Some tables are made so that the playing surface can be lowered by a small distance to accommodate younger players. It is strongly recommended that, for use in Asia, a 10 cm reduction be possible, and that for use elsewhere a 5 cm reduction is a reasonable compromise among the various heights currently available.

Height reduction may be by a continuous mechanism, with one or both of these heights clearly marked, or in discrete increments of 5 or 10 cm, or both. Provision for height adjustment in either manner will not be justification for relaxation of the requirement for rigidity during play.

Chapter 9: Tables for Wheelchair play

Tables that are suitable for wheelchair play must be of the same safety and playing quality standard as all other ITTF-approved tables. Therefore stationary tables type (I) made of two separate tabletops or rollaway tables of construction type (II) cannot get ITTF-approval.

The area under the table end must observe the following requirements:

- Instead of a minimum of 15 cm the inset of the end legs with their cross-bracings must be 40 cm (I3).
- Below the height of the end cross-bar (h_3), space of not less than 48 cm deep (from table end) shall be kept free of any obstacle in order to accommodate the athlete's feet.
- The distance between the table end legs must at least be 95 cm unless their inset from table end is 48 cm or more.
- There should be no projecting part that could hurt the player moving with his/her wheelchair under the table.
- The edges and the corners of the frame and all other parts that could be gripped or touched by the player should be blunt and smooth.
- The height of the batten + playing board in the player's safety area is recommended to be less than 8 cm.

The supplier of the table should mark through the table name that he has given the design not only a legal but also otherwise careful consideration for the needs of wheelchair players. The ITTF recommends adding the logo “full accessibility for wheelchairs” either on the frame or on the undercarriage, once per side, within an area of at least 25 sqcm and not more than 50 sqcm.



Chapter 10: Show tables

Tables may be specially manufactured for a show-court use. They are usually not commercialised and can be considered as prototypes whose design is more attractive for the media and more appealing to spectators.

Such show tables must be of the same safety and playing quality standard as all other ITTF-approved tables. The supplier must submit to the ITTF Equipment Committee all documents proving that the tabletop of the table is exactly the same as for another ITTF approved table, that its fixation to the undercarriage does not change the bounce, and that the design and the structure of the undercarriage comply with all the safety requirements for the playing position.

It shall be possible to simply and quickly replace the table top:

- An accidental damage may not delay the competition (instructions, tools and a spare tabletop per tournament shall be available)
- Tabletops used shall be approximately of the same age than the other table tops used at the tournament.

When knocked by the finger knuckles at different spots, the table surface of a show table should respond in nearly the same way than an ordinary table does. The sound should not vary considerably over the table surface and no substantial vibrations should spread from the table end or sides. When loaded the table surface should not bend down more as for normal tables.

The design of the undercarriage of such tables shall embellish the playing scene and may carry no permanent advertising on the undercarriage, and temporary advertising shall be according to the relevant ITTF regulations.

The ITTF Equipment Committee must inspect the table before its use and may ask for improvements, or require a test before approval can be given.

Chapter 11: Table skirting

Skirts are removable parts of the undercarriage that are not functional or structural elements of the table, but whose declared ambition is embellishment of the playing table and area.

They shall not adversely affect the requirements of safety, functioning, presentation and sporting properties; once the skirt attached to the table, all dimensions laid down in the present technical leaflet must be strictly observed.

The material used may be soft or hard, but must not break or tear when a player collides heftily with it. A vigorous shock shall not damage or disconnect parts of the skirt from the undercarriage or create pointed or sharp edges or corners.

The skirt may be completely or partly translucent or opaque, and its colour, reflexion and shine shall not reduce the visibility of the ball for players, spectators or cameras. If there is an under-table light, the material of the skirt may efficiently contribute to dim or diffuse the light and reduce the halo on the floor around. Parts that may reflect the hall-light upwards shall be matted; white colour or bright shine at the table end is prohibited.

The skirt shall not carry advertisements or logos other than those authorized according to 3.2.5.7.

The skirt shall not let cross balls to the space inside.

Skirts must get the agreement of the Equipment Committee before they can be used; an authorization scheme will be published on the ITTF web site. A picture or drawing of the authorized skirt will be visible with the approved table on the related list at the ITTF web site.

Chapter 12: Environmental and health aspects

The selection of materials for the production of a table shall not only value aspects of mechanical properties, processing ease, reduced costs and design, but also consider the health of the workers and consumers and take into account the environmental impacts during manufacturing and discarding.

No part of the final table shall contain or release harmful substances:

- The content of formaldehyde of wood and wooden materials shall not exceed the mean value as determined in European standard E1 or similar other norms.
- Plasticizers like DEHP, DBP and BBP may not be used during manufacturing. No residues of the mentioned plasticizers or of other softeners like DIND, DIDP, DNOP or similar chemicals suspected for having allergic, asthmatic or hormone-disrupting properties shall remain in the final product.
- The final table shall not release VOC and its paint or finish shall not contain toxic pigments or binders that may be unhealthy for the user. Before being delivered to the market the table shall be stored and aired long enough in order to no more release VOC.

The approval scheme may require the supplier to submit certificates related to the above- mentioned health requirements; ITTF may check their truthfulness.

Environmental considerations shall include:

- Reduce nuisances (noise, vapours, etc.) for the workers during production.
- Do not release harmful products to the air or water during production
- Reuse and recycle as much as possible
- Use risk-free packaging material and reduce its quantity as much as possible
- Use materials for the table that can be safely disposed and even recycled at the end of the table's life; instruct the consumers accordingly

Chapter 13: Recommendation

ITTF recommends manufacturers and suppliers to strictly apply the technical and other legal regulations of the user's home countries. The ITTF cannot be held responsible in case of non-observance of any additional or different national request; the ITTF approval sets up ITTF standards guaranteeing a safe and reliable table tennis at top-level events. Currently the following national standards have been brought to the attention of the ITTF: CEN/TC – prEN 14468-1 and prEN 14468-2 (Europe), JIS-S-7008 (Japan), GB7902-1987 (China).

List of the dimensions and the symbols used in this technical leaflet T1

fig § *l* distances in the longitudinal direction

7	4.4	<i>l1</i>	length of the table
8	5.1	<i>l2</i>	inset of the end legs from the table end
8	9	<i>l3</i>	distance of the end legs from the table end for use of wheelchair players
13	5.1	<i>l4</i>	length of the player's safety area (starting at the table end toward the net end)
13	5.1	<i>l5</i>	width of a central part of the undercarriage that extends beyond a tabletop side [see also figure 16]
7	4.4	<i>l6</i>	gap between the two tabletops in the playing position (tables type III and IV)
7	4.7	<i>l7</i>	gap between the centre-line and the middle edge of the table
7	4.7	<i>l8</i>	gap between the centre-line and the end line

fig § *b* distances in the transverse direction

7	4.4	<i>b1</i>	width of the tabletop
14a	5.1	<i>b2</i>	inset of the end legs from the side of the tabletop
14b	5.1	<i>b3</i>	extension of the middle section of the undercarriage beyond the side of the tabletop [see also figure 16]
14b	5.1	<i>b4</i>	gap between a folding leg and the frame
14b	5.1	<i>b5</i>	extension of a wheel beyond the side of the tabletop
7	4.7	<i>b6</i>	width of the side and also end lines
7	4.7	<i>b7</i>	width of the centre-line
7x	4.7	<i>b8</i>	alignment of both tabletops and their centre-lines

fig § *h* distances in the vertical direction, on an even floor (if relevant)

7	4.4	<i>h1</i>	height of the table
8	5.1	<i>h2</i>	distance between a side cross-bar and the floor within the player's safety area (see <i>l4</i>)
14a	5.1	<i>h3</i>	distance between an end cross-bar and the floor
8	5.1	<i>h4</i>	distance between the playing surface and any extension of the middle section of the undercarriage or permanent net supporting post [see also figure 16]
8	5.1	<i>h5</i>	distance between the middle section of the undercarriage and the floor
8	4.6	<i>h6</i>	thickness of the batten plus the top