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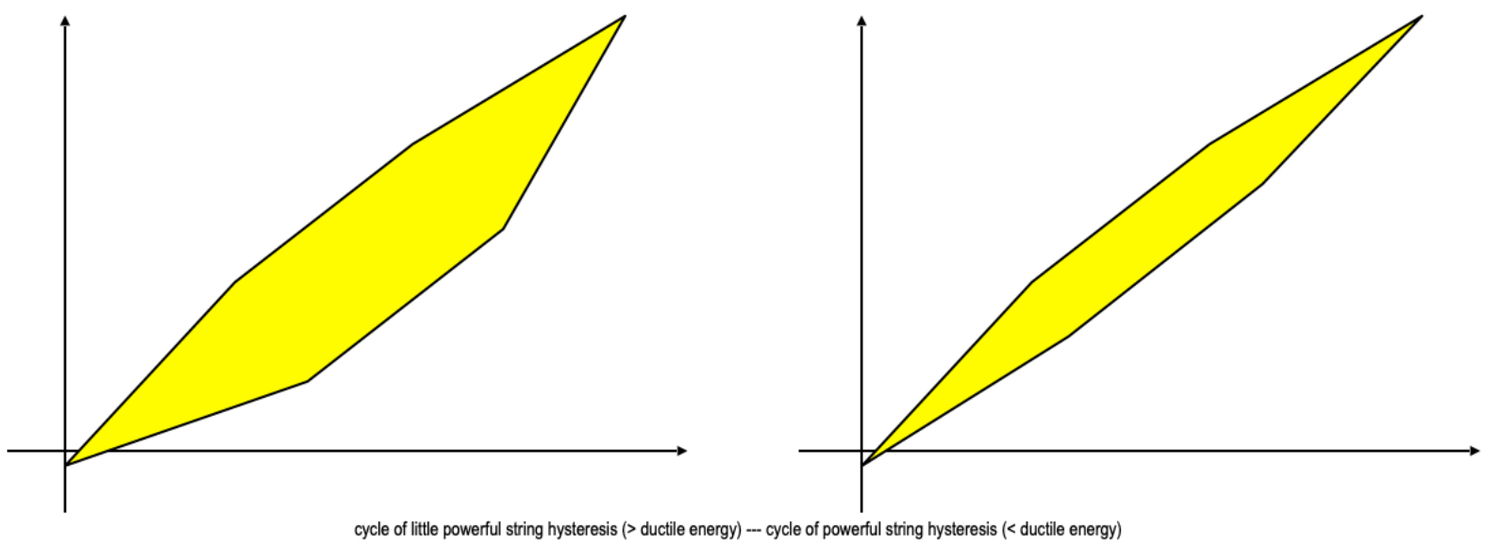
Power

POWER is the response of the string in terms more or less elastic and reactive to external stresses. A powerful string gives more ball depth and a less powerful string gives less ball depth.

The power of the string can be defined according to how much the string pushes and returns energy to the ball giving a feeling of dynamism and reactivity under the action of the player's swing.

The power of the filament is determined, with the same frame, tension and other conditions, by physical and perceptual parameters that mix in a single "sensation".

As far as the physical component is concerned, it contributes to the definition of power, the energy dissipated during loading and unloading, or technically speaking, by the energy connected to the hysteresis cycle. In a nutshell, if a string disperses little energy during the impact phase (loading and unloading) it is very powerful, while if a string disperses a lot of energy due to the effect of ductility, we can define the string as not very powerful.

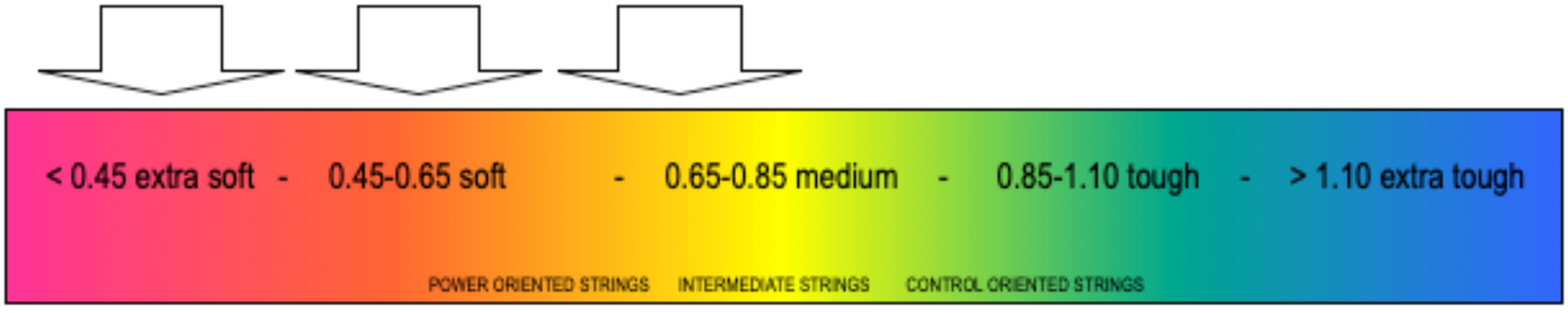


cycle of little powerful string hysteresis (> ductile energy) --- cycle of powerful string hysteresis (< ductile energy)

A second fundamental element in defining the power of a tennis string at a perceptual level is the static stiffness of the string tested.

The more rigid the string is, the more it is oriented towards control and less towards pushing as well as on the contrary, the softer the string is, the more it is oriented towards pushing and less towards control..

The stiffness of the string has a great impact on the perceived power and consequently we will have to choose the value of static stiffness depending on our characteristics of play, physical condition, ability to accelerate the ball and power generated.



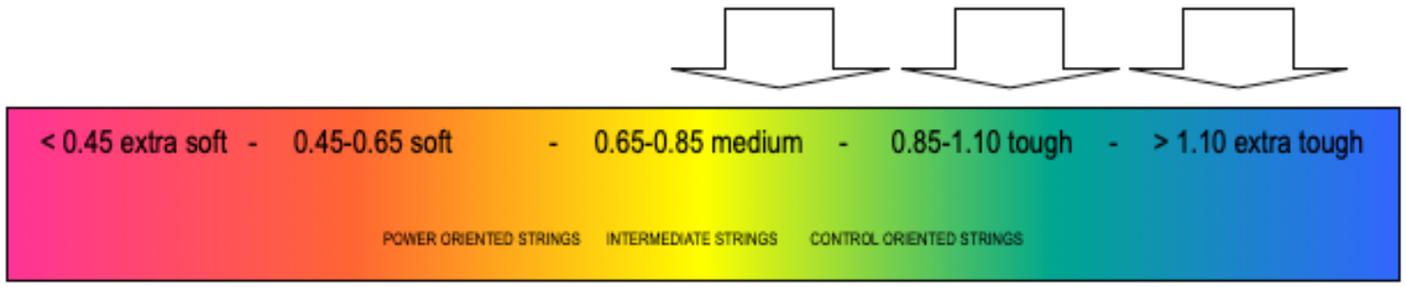
Another element not to be underestimated is the sound of the string, the noise it develops, knowing that the louder the noise, the higher will be the perception of power returned by the string at the impact with the ball.

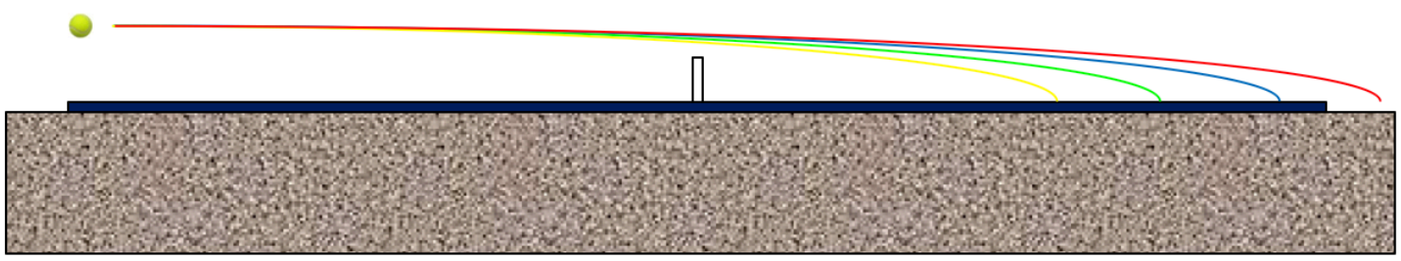
Control

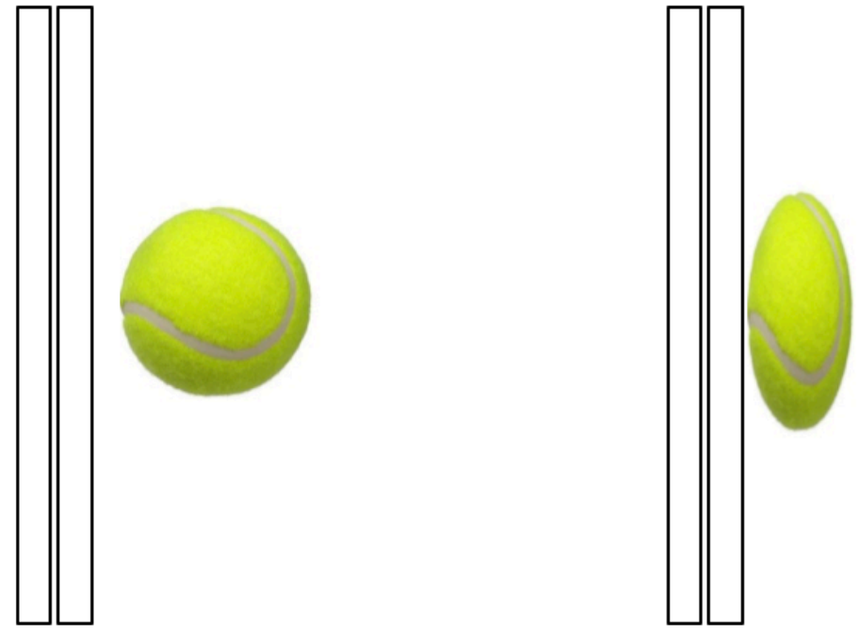
The level of control of a tennis string depends on how much this, pushing in confidence and full arm allows you not to lose the ball control, ensuring directionality and trajectory.

The control of a string is defined proportionally by the level of stiffness of the filament itself, that is, on the basis of how much, by deforming or wrapping the ball, the string allows to obtain the right depth of shots.

It must be considered that a second element that contributes to the feeling of control during the game is the "progressive plasticization" of the string, that is, how much the string, impact after impact, tends to deform in a plastic way giving that feeling of ball "attached" to the stringbed that gives the player the maximum confidence during the execution of the shots.







note: it should be noted that the stringing tension directly affects the performance in terms of control of a filament. The greater the applied tension, the greater the deformation on the ball and the energy lost in the impact phase.

Spin

The spin attitude of a string depends on a number of factors that can be distinguished into two large "families".

Strings that work predominantly for snap-back, where the primary element of influence on the spin depends on:

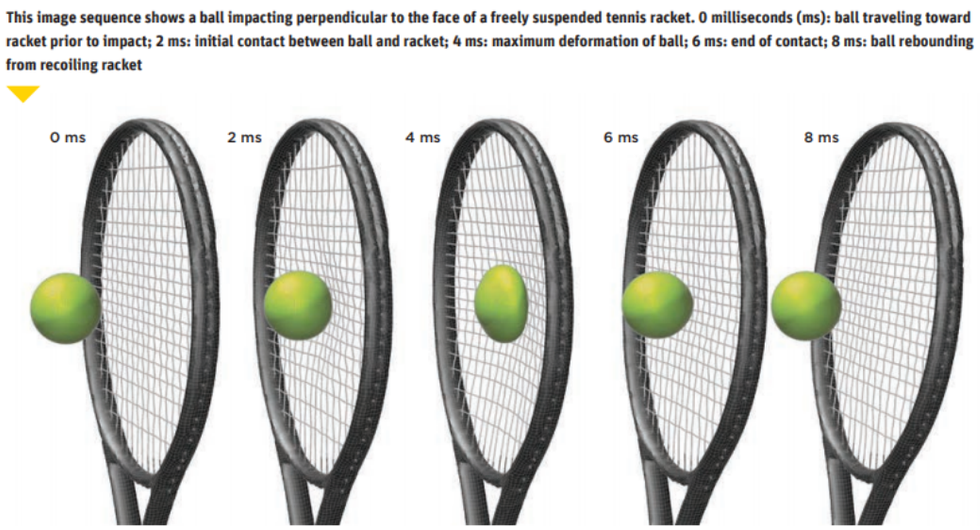
GROUP 1 (made of rigid and medium rigid strings working for snap-back):

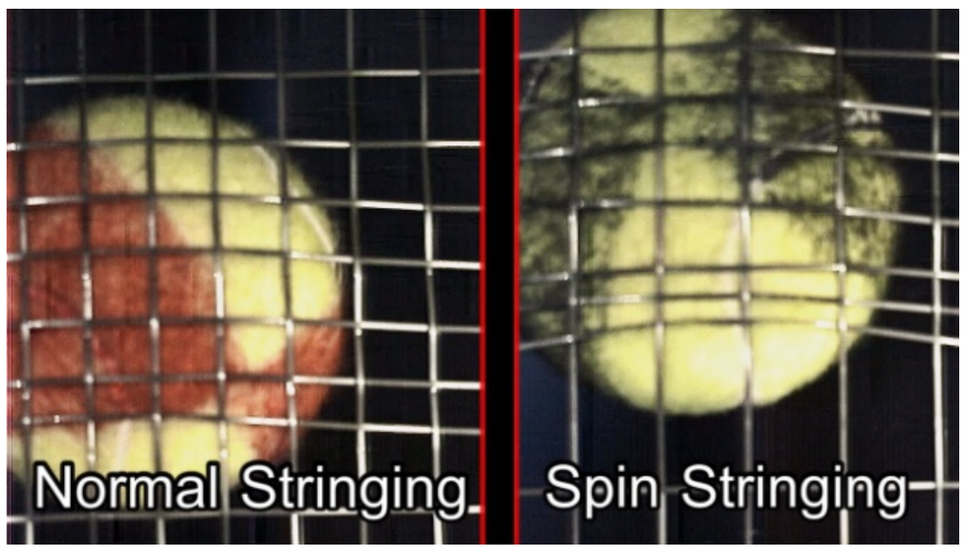
- static and dynamic surface friction coefficient (i.e. from the outer layer of the string)
- deflectional stiffness of the string which determines the return of the string into place
- reactivity / resilience peak - fast elastic return of the string

GROUP 2 (made up of intermediate stiffness strings working for ball-pocketing)

- medium and medium low static stiffness
- progressive plasticisation of the string. The string wraps around the ball and deforms plastically shot after shot in the same way that a race tyre uses its grip to stick to the ground.

note: It is absolutely necessary to point out that the shape, the section of the string (e.g. pentagonal, hexagonal, octagonal) has a low incidence and is almost insignificant for the spin potential





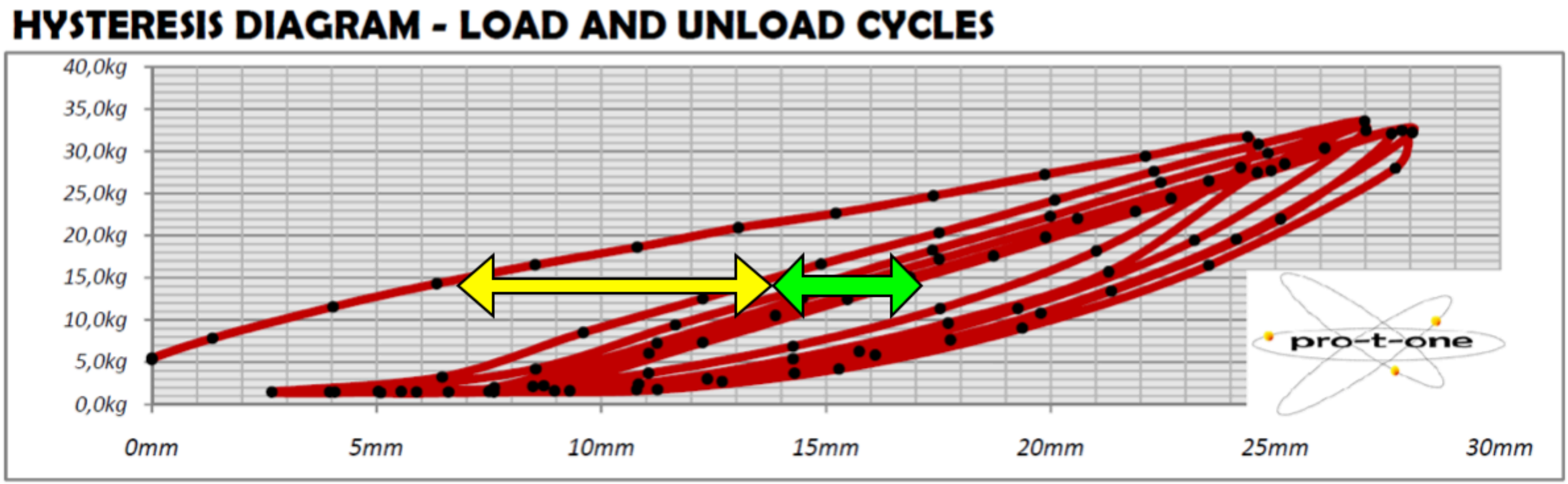
Dynamic stability

The dynamic stability of a string is a direct measure of how the string tends to maintain its original characteristics over time.

In the case of a string with poor attitudes to dynamic stability, shot after shot we will see a progressive drop in tension, a progressive plasticization of the string and a pronounced and progressive drop in tension.

On the other hand, in the presence of a string with excellent aptitude for dynamic stability, we can assist and perceive a substantial constancy of performance with the passing of the hours of play, a good tension holding and a variance from the initial response rather contained..

The concept of dynamic stability is closely linked to tensional stability and to progressive plasticisation of the string.



? Value related to dynamic stability - dynamic tension loss

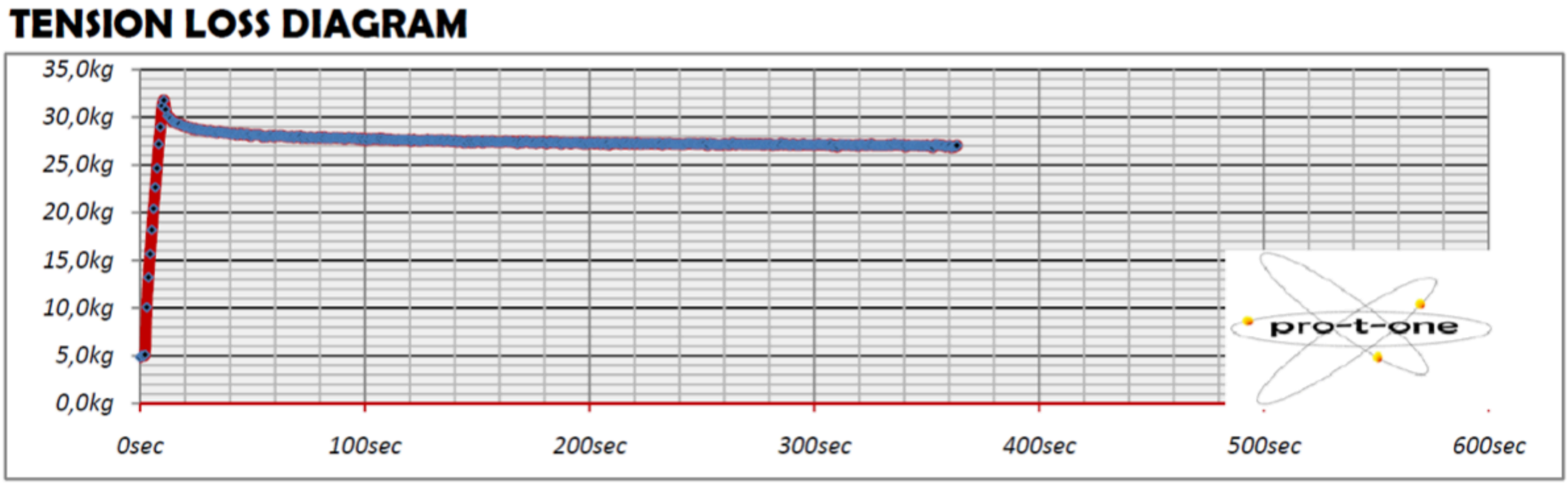
? Value related to progressive plasticisation

Static tension holding

The static stability of a string is a direct measure of how the string tends to maintain or not, in the first 300 seconds (5 minutes) after tensioning, the initial tension.

In the case of a string with poor attitudes to static tensional stability, there will be a pronounced decline in the tension value, which is always concentrated in the first 30-60 seconds after stretching and then stabilize and reach, with an asymptotic course, an almost constant value after 180-240 seconds.

In the case of a string with excellent static tensional stability, the tensional drop will be contained in values of about 15% (±2%), a string with intermediate holding values will return values close to 20% (±2%) while for tensional drop values greater than 20% we can define the filament as sagging. It must be pointed out that the static tensional stability value, however connected, is not always indissolubly linked with the dynamic tensional stability value and in some cases, there may be strings with a significant tensional drop when the racquet is stationary, which do not show a decay and a change in behaviour under the dynamic action of play.



Static tension holding value 5 minutes (300 seconds)

Max resilience range

The maximum resilience range of the string is the range in which the string has the highest elastic response.

If you want to maximize the performance of the string in terms of power, dynamic response and elasticity, you should approach this value.

If, on the other hand, it is intended to increase control skills by reducing the exuberance of the string, it is necessary to raise the tension in proportion to the desired level of control.

Max resilience peak

Fast elastic response to impact, in other words if the string gives a feeling of EXPLOSIVITY. A sort of value that indicates how much the string is explosive

The resilience peak value is the intensity of the resilient response compared to the maximum value obtainable from a natural gut filament. Higher values indicate high dynamic responsiveness typical of filaments that give exuberance, vivacity and string power.

- resilient string- powerful - reactive - vivid - string with fast ball exit

- poorly resilient string weakly powerful - poorly reactive - woody - string with progressive ball exit

Average resilience

Value related to the average resilience of the string in the loading and unloading cycle compared to natural gut strings, absolute reference in terms of average resilience and peak.

High values indicate a string with "elastic" behaviour, generally softer on the joints and more powerful, while low values indicate strings with plastic behaviour, generally stiffer and with plastic behaviour more oriented to control and spin potential.

Recommended tension

The recommended tension range for the strings varies according to the string's stiffness and the maximum resilience interval. In the presence of strings with low power and reactivity, rigid and very consistent, the recommended range is close to the range of maximum resilience. On the contrary, in the presence of very powerful, soft strings, which are not particularly stable from a dynamic point of view, the recommended range in terms of tension is moved higher as the characteristics listed above are more evident

→ Powerful, elastic, dynamically unstable strings with low to medium modulus of elasticity high tension range compared to the maximum resilience range.

→ Low-power, stiff, medium-high modulus of elasticity strings, dynamically stable low tension range compared to maximum resilience range.

note: obviously the tension must be chosen according to the needs of the player and the range indicated represents an optimal range able to optimize the power of the string in relation to the qualities of control, dynamic stability of the string.

Pre-stretch

The pre-stretch action on the string, indicated with the relative percentage, is shown as possible and/or advisable in case the string is characterized by a pronounced dynamic decay (progressive plasticization - poor dynamic duration - loss of tension).

The pre-stretch is always a personal choice of the technician, player or stringer and must generally be associated with a drop in tension applied to the string equal to the percentage of pre-stretch applied.

es. 20kg pre-stretch 10% → 20kg - 10% 20kg = 20kg - 2kg = 18kg

es. 25kg pre-stretch 10% → 25kg - 10% 25kg = 25kg - 2.5kg = 22.5kg

es. 25kg pre-stretch 20% → 25kg - 20% 25kg = 25kg - 5kg = 20kg

note: it should always be pointed out that the action of mechanical stabilization operated with the pre-stretch limits the losses of tension by plasticization of the filament but at the same time, aligning the molecular chains, gives greater stiffness to the filament itself - stiffness variable from string to string depending on the initial stiffness, the characteristics of the material and the section of the string itself.

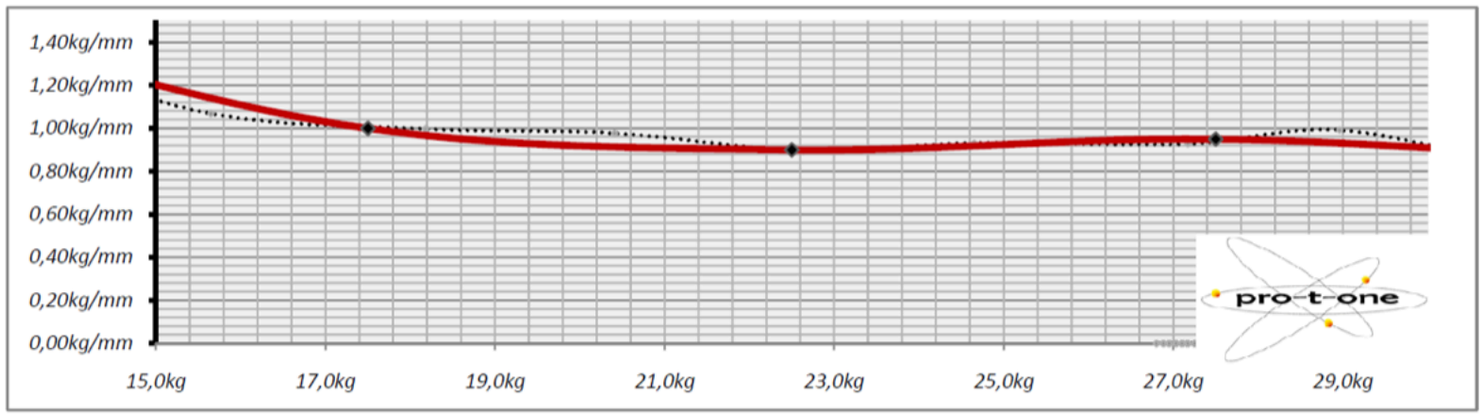
Static stiffness

Static stiffness is a direct measure of the force that the string opposes during traction at incremental load.

Consider that the behaviour of the strings, in almost all cases, does NOT have linear behaviour and changes with the variation of the load.

The variation in stiffness over the tensions is due to various aspects such as the alignment of the molecular chains, the tenacity characteristics of the material, the geometric characteristics of the string that can significantly affect the tensile stiffness and resistance.

STRING STATIC STIFFNESS MODULUS



The static stiffness of the string directly measures the consistency of the stringbed and indirectly contributes to the definition of playing comfort and level of protection of the arm which concurs, the tension at which the string is pulled.

		kg/mm				kg/mm	
STATIC STIFFNESS 10-15kg	super tough	1,45	new	103%	⇨	1,50	used
STATIC STIFFNESS 15-20kg	tough	1,00	new	155%	⇨	1,55	used
STATIC STIFFNESS 20-25kg	medium-tough	0,90	new	172%	⇨	1,55	used
STATIC STIFFNESS 25-30kg	medium-tough	0,95	new	158%	⇨	1,50	used
STATIC STIFFNESS 30-35kg	medium-tough	0,85	new	171%	⇨	1,45	used
AVG. STATIC STIFFNESS 15-30	med-tough	0,95	kg/mm				

< 0.45 extra soft - 0.45-0.65 soft - 0.65-0.85 medium - 0.85-1.10 tough - > 1.10 extra tough

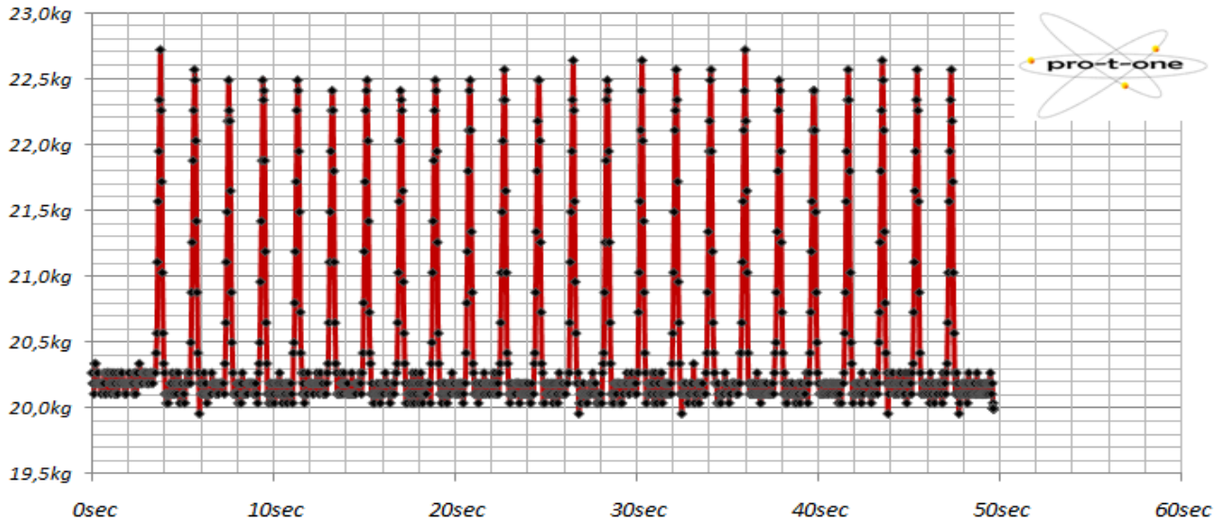
POWER ORIENTED STRINGS INTERMEDIATE STRINGS CONTROL ORIENTED STRINGS

Dynamic stiffness

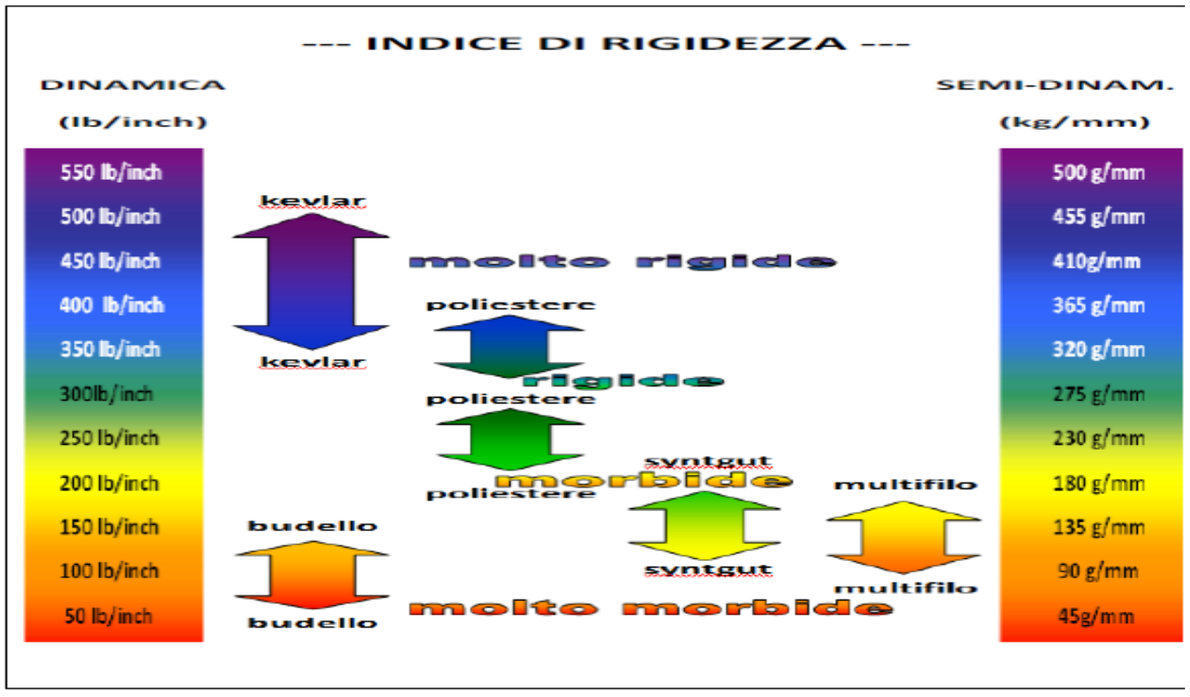
The dynamic stiffness of a string is a direct measure of the overtension that the string tolerates in the phase of impact with the ball. The calculation of STRINGINGPEDIA is determined by using a semi-dynamic deflection test, imposing a drooping of 10mm on a total length of the string of 325mm pulled at 20kg after a first pull at 35kg and a subsequent tensioning adjustment.

High overtension measurements indicate strings characterized by a higher shock in the phase of impact with the ball while low measures give indications on the limited overtension of the strings at impact.

The measurement of comfort and the level of protection of the joints is inversely proportional to the measurement of the dynamic stiffness of the string.



note: to protect player's joints it is necessary to choose strings with low dynamic stiffness, but always remembering that it is very important to combine the use of a gentle string to a tension of use not too high.



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ADDITIONAL NOTES

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