FROM STRINGER TO RACQUET-TUNER

1. What is the difference between a stringer and a racquet-tuner :

> A **stringer** *masters* the stringing-technical skills.

> A **racquet-tuner** *can adjust the string-job* to the type of play and possible arm injuries of the player.

2. It is quite difficult for many stringers to **choose the right tensions for main and cross strings** for a certain stiffness and a **particular racquet**.

WE WILL TRY TO SIMPLIFY THIS MATTER :

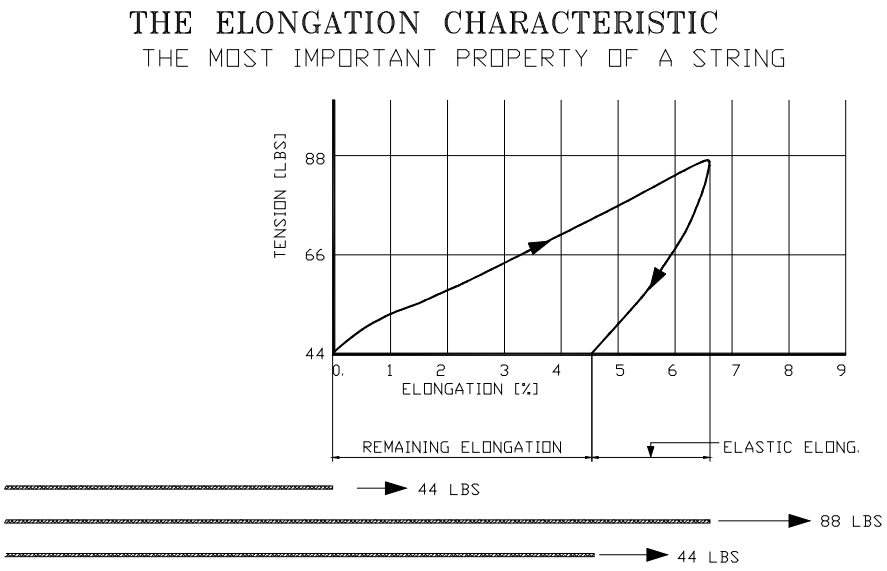
The basis of this SYSTEM is **the type of play** and possible (past or present) arm **injuries of the player**.

WE CAN MAKE A SIMPLE CLASSIFICATION :

- ***lady*** *or* ***man ?***
- ***comfort play*** *or* ***powerful play ?***
- ***with spin*** *or* ***without spin ?***
- ***suffer(s)ed*** *from an* ***arm*** *or* ***shoulder injuries ?***

The **racquet tuner** can ***TUNE*** the racquet with the right choice of the ***string*** and the most appropriate ***stringing tensions*** for each player.

THE MAJOR QUALITY OF STRINGS :



MORE ELASTIC ELONGATION:

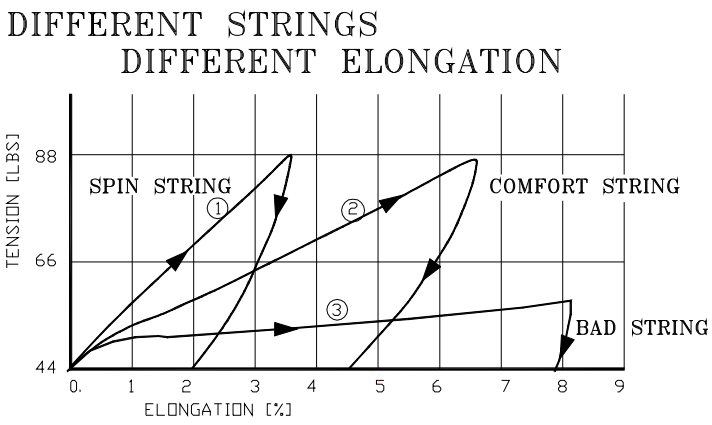
* BETTER BALL ACCELLERATION.
* BETTER RECOVERY AFTER SPIN STROKE.

MORE REMAINING ELONGATION:

* MORE LOSS OF TENSION.

MORE TOTAL ELONGATION:

* LONGER BALL CONTACT:
  - BETTER COMFORT.
* WORSE DURABILITY.



MAIN DIFFERENCES:

* NYLON STRINGS: THE REMAINING ELONGATION.
* NYLON AND GUT: GUT HAS MORE ELASTIC ELONGATION.

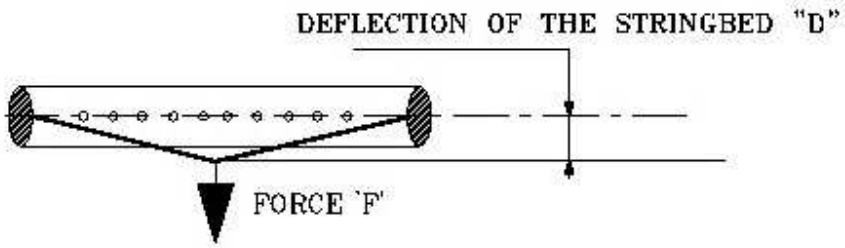
To measure the elongation quality (see demo)

Classification of strings based on the elongation :

			REMAINING EL.			
C1 COMFORT		**ELASTICITY**		**TOTAL ELONGATION**	**"QUALITY**	**INDEX"**
Magic Fiber	1,7	2,5	2,1	4,6	0,5	
Supreme Titanium 1,30	1,5	2,4	2,2	4,6	0,5	
T 931038	1,3	2,2	2,2	4,4	0,5	
Supreme Comfort	1,1	2,3	1,8	4,1	0,6	
Kevlastic	1,1	2,2	1,9	4,1	0,5	
C2 ALLROUND						
PT16028 1,28	0,7	1,5	2,4	3,9	0,4	
SuperSynt.	1,1	2,2	1,4	3,6	0,6	
UT43532 1,30	1,1	2,2	1,4	3,6	0,6	
C3 SPIN PLAYABILITY						
Syntetic Super	1,2	2,1	1,3	3,4	0,6	
UT40030 1,30	0,9	2,0	1,3	3,3	0,6	
UT45032 1,30	1,0	2,1	1,1	3,2	0,7	
C4 SPIN DURABILITY						
PolyesterGrijs	0,7	1,4	1,9	3,3	0,4	
PT10023 1,23	0,8	1,7	4,3	6,0	0,3	
Useless to much elong						
Supreme power 1,25	0,6	1,1	8,1	9,2	0,1	
Supreme touch 1,25	0,6	1,0	8,8	9,8	0,1	
Supreme Lemon (bsm o	0,5	0,9	9,0	9,9	0,1	
PT10018 1,18	0,9	1,1	6,0	7,1	0,2	

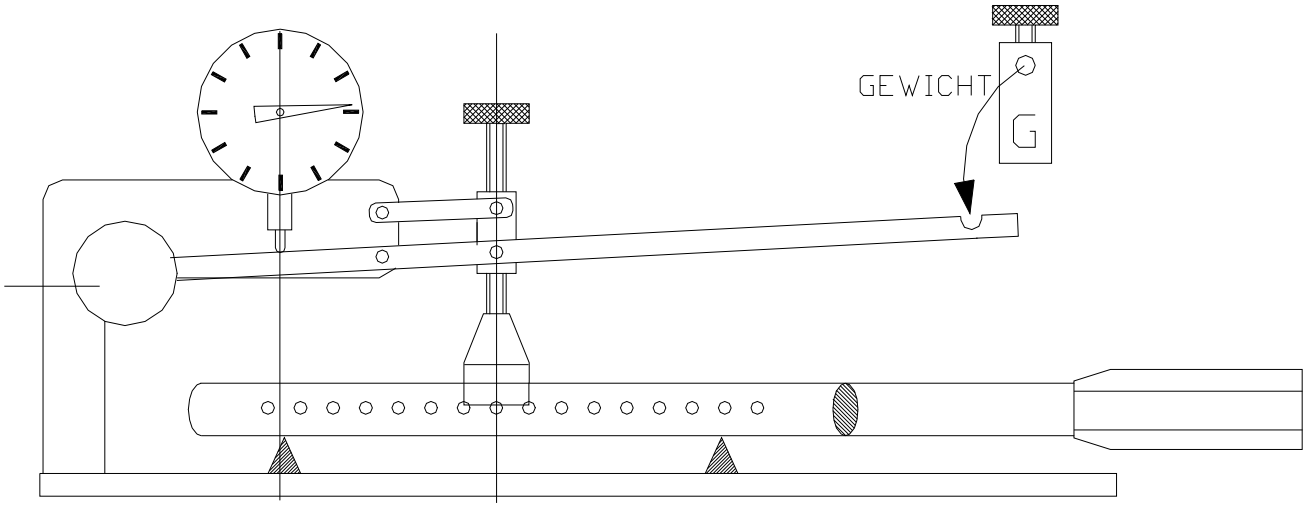
STRING-BED STIFFNESS :

THE PLAYER FEELS:
* THE STIFFNESS OF THE STRINGBED
* NOT THE STRINGING TENSION.



$$\text{STIFFNESS} = \frac{F}{D} \text{(KG/CM OR DT VALUE)}$$

STATIC MEASUREMENT.



DYNAMIC STIFFNESS TESTS :

ERT 300

StringLab

The difference between Dynamic and Static MEASUREMENTS :

With the Static Stiffness Test :

- *The **elongation characteristics** of the string has influence on the test results.*

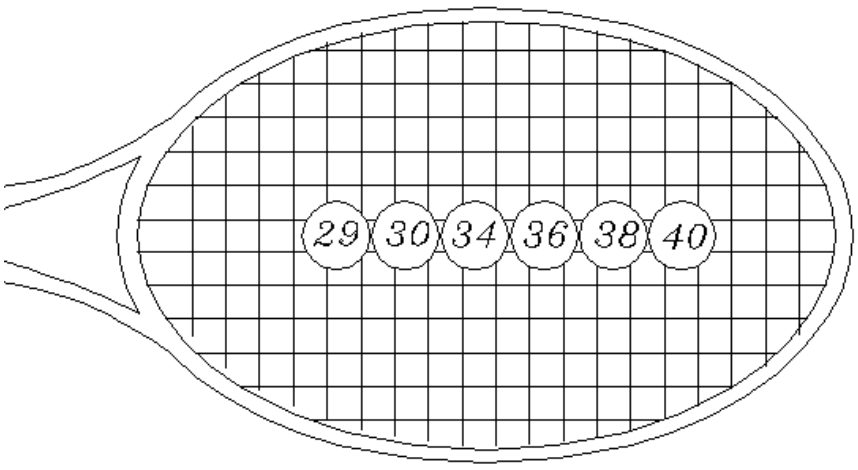
- *The **stringbed is deflected** so much that the string actually stretches.*

Dynamic Test only measures the String-Bed Stiffness :

*This means that **there is a clear relation** between the **stringing tension** and the **dynamic test result**.*

The String-Bed Stiffness is different in every position of the string-bed :

The **difference** is caused by the difference in tension of



the **cross strings**. The **friction** between mains and crosses varies because of the length of the mains gets shorter towards the end of the string job.

THE CHECK OF THE STRING BED STIFFNESS IS IMPORTANT FOR MANY REASONS :

Just after stringing :

> to check if the **stiffness is right** for that player.
> to verify the correct fonctions of the stringing **machine**.
> ***To check the qualities of the stringer himself !!***

Just after play :

> to check the **quality of the strings :**
Bad strings, with too much remaining elongation, **lose tension** very quickly.
> **the Dynamic Stiffness Test :**
The dynamic stiffness tester measures the natural vibration of the stringbed. The testing device (**StringLab**) vibrates on the stiffness of the string-bed.

IMPORTANT REMARKS :

> The **measurement only works** when the “SYSTEM” wants to **vibrate** on that spot.
The testing device will show an ERR indication in the “zero amplitude” position of the string-bed.
> Because of the difference of the friction, there will be a big difference in the tension of the cross strings directly after stringing.
> The first measurements can show a **bigger difference** because the differences in tension will level out during the measurement.

SOME ADVICE :

Level out the differences before testing by deflecting the string-bed : put the racquet on the floor and **stand on the strings** with your foot. The strings will be more stabilized.

To STRING ACCURATELY means a MINIMUM LOSS of tension :

More loss will occur :

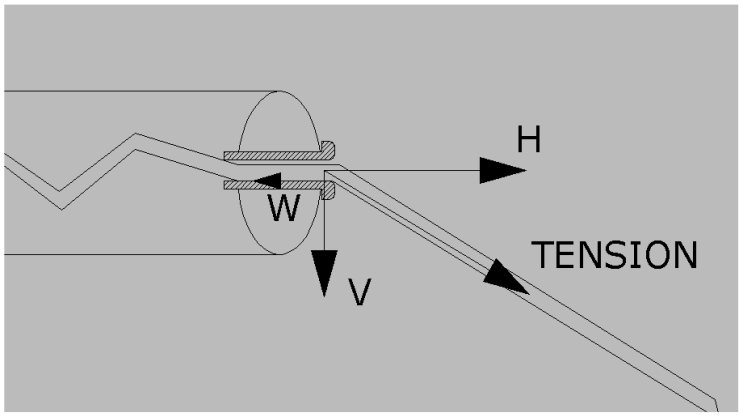
> with strings with too much remaining elongation, or **poor elasticity**

> when the cross strings **are not aligned during tensioning**, before clamping.

> with poor quality or dirty **clamps**. *(slippage, draw-back)*

> with “high speed” stringing, a string needs **about 6 seconds** to stretch correctly. *(see graphs)*

> when the **string is pulled downwards** through the grommets eyelets.



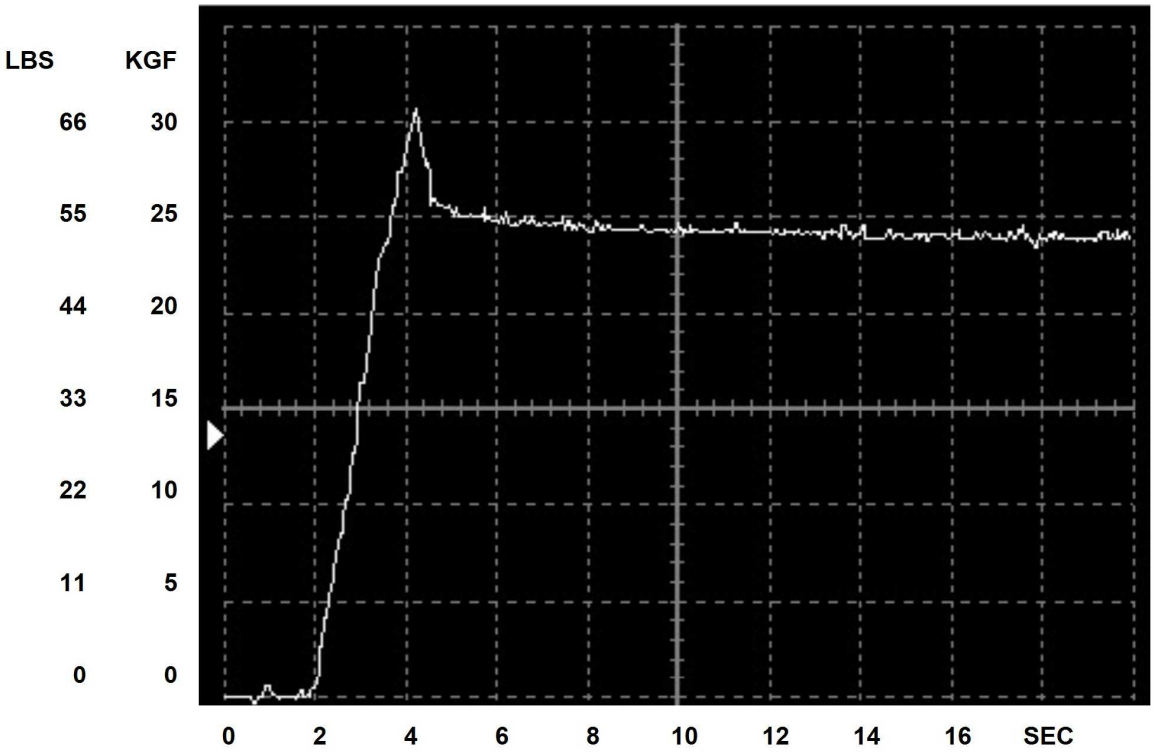
The force **V** causes loss of tension **W**.

> **without Constant Pull : no accuracy**, impossible to recuperate any **slack** on the string, the loss can be >**15lbs** depending on the qualities of **string** and the **stringer**.

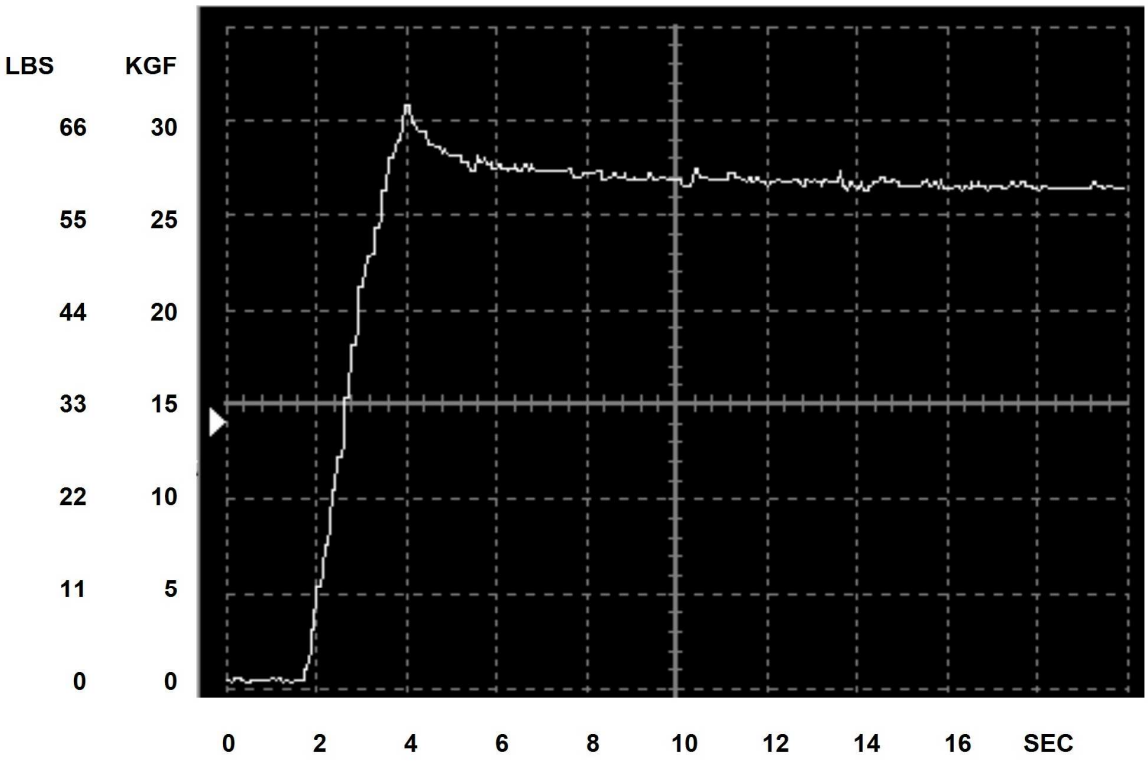
> **Mechanical Constant Pull Systems** can be as good (or better) than top quality **Electronic Systems**.

CONSTANT PULL vs LOCK OUT TENSIONERS :

LOCK OUT TENSIONER WITH NYLON MULTIFILAMENT STRINGS.

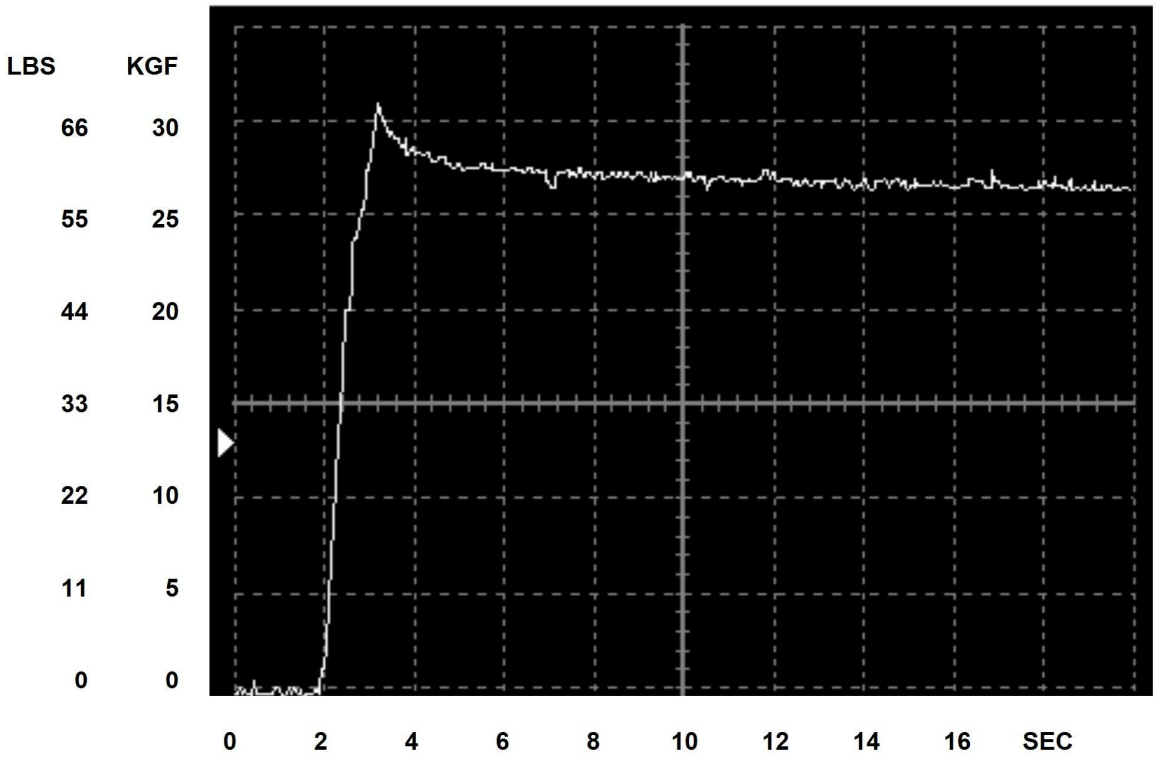


LOCK OUT; NYLON 1,8 / 4,2 % / 20 KGF. TENSION LOSS = 8 KGF (17,6 LBS)

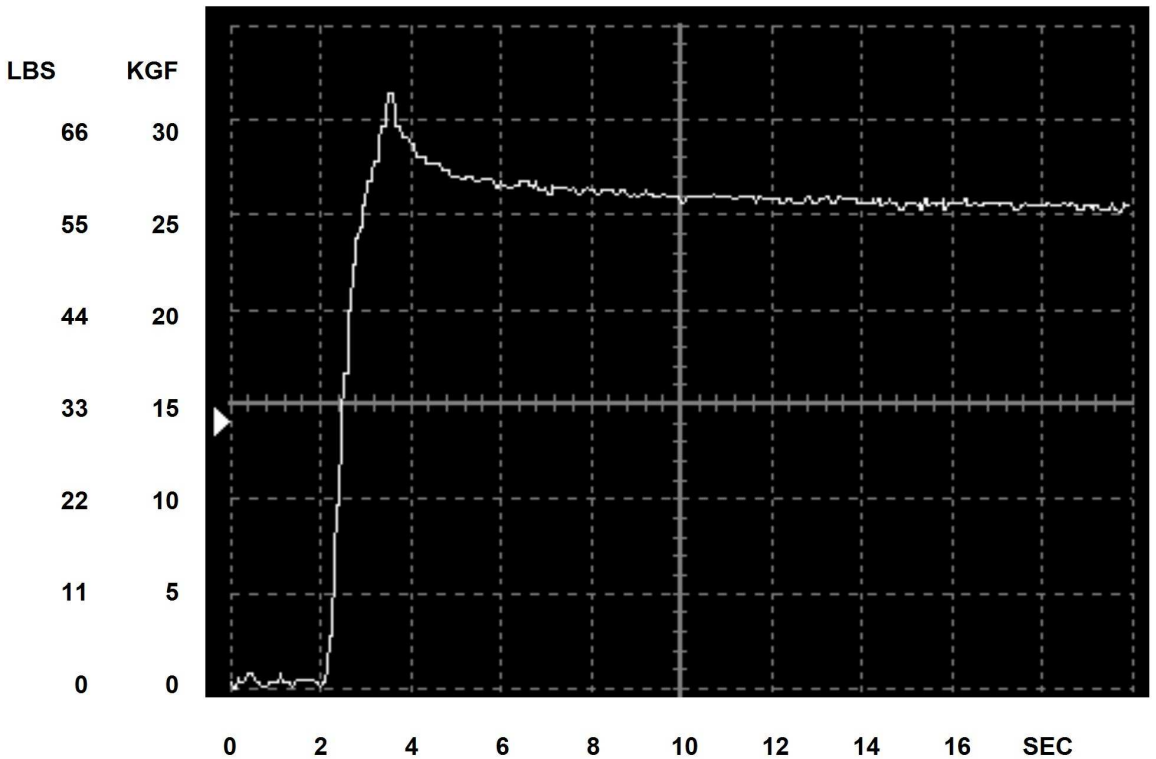


LOCK OUT; NYLON 1,6 / 3,4 % / 20 KGF. TENSION LOSS = 5 KGF (11 LBS)

LOCK OUT TENSIONER WITH MONOFILAMENT STRINGS.

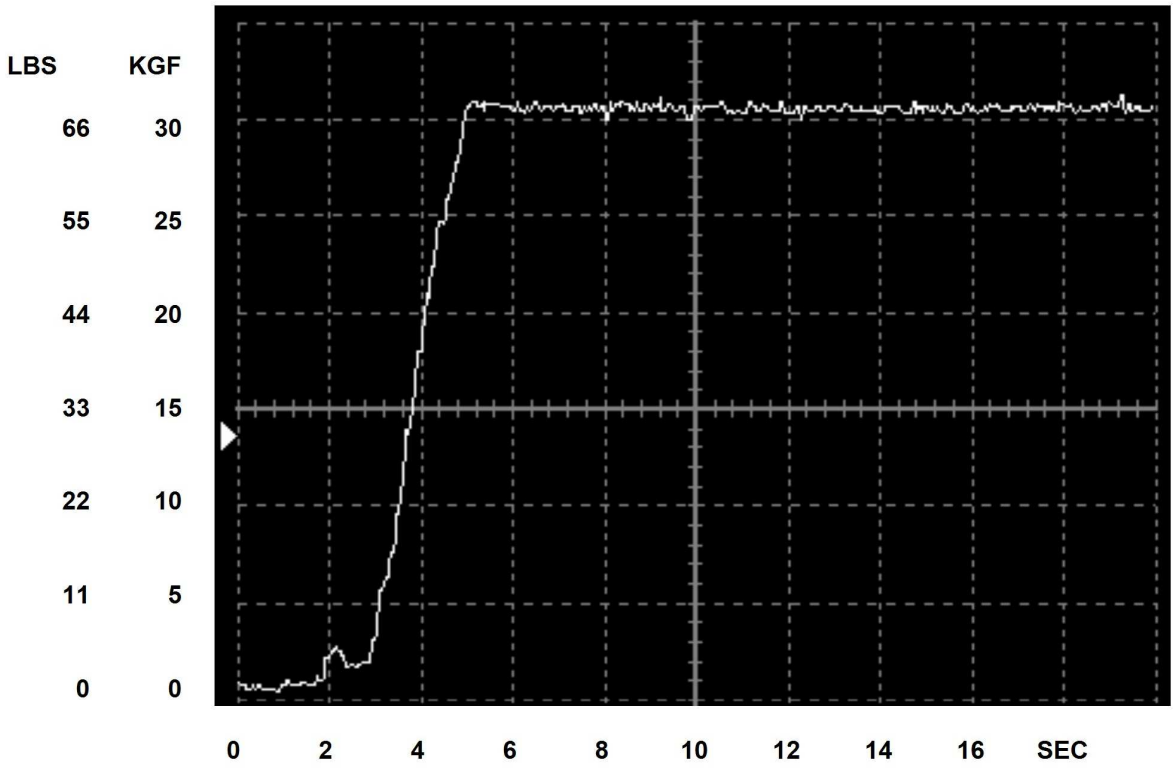


LOCK OUT; MONOFIL. 1,0 / 2,7 % / 20 KGF. TENSION LOSS = 4,5 KGF (10 LBS)

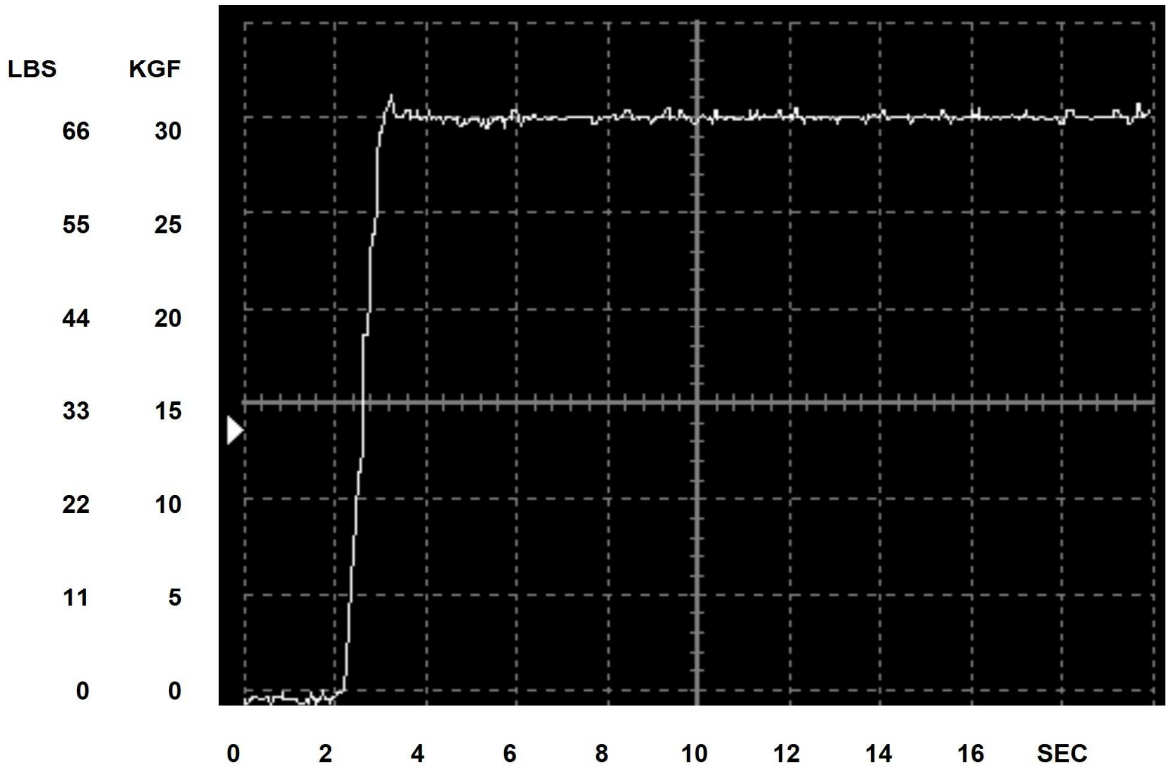


LOCK OUT; MONOFIL. 1,0 / 6,0 % / 20 KGF. TENSION LOSS = 6 KGF (13,2 LBS)

"SMART-SPRING TENSIONER"

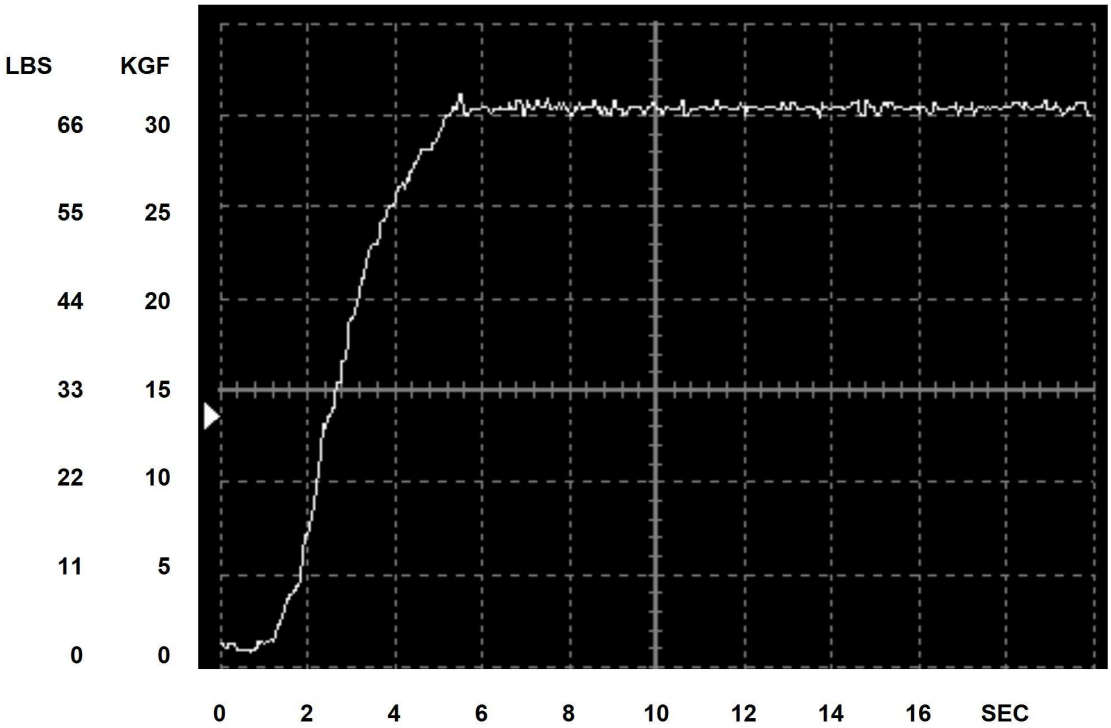


MS150 NYLON 1,8 / 4,2 % / 20 KGF. NO TENSION LOSS



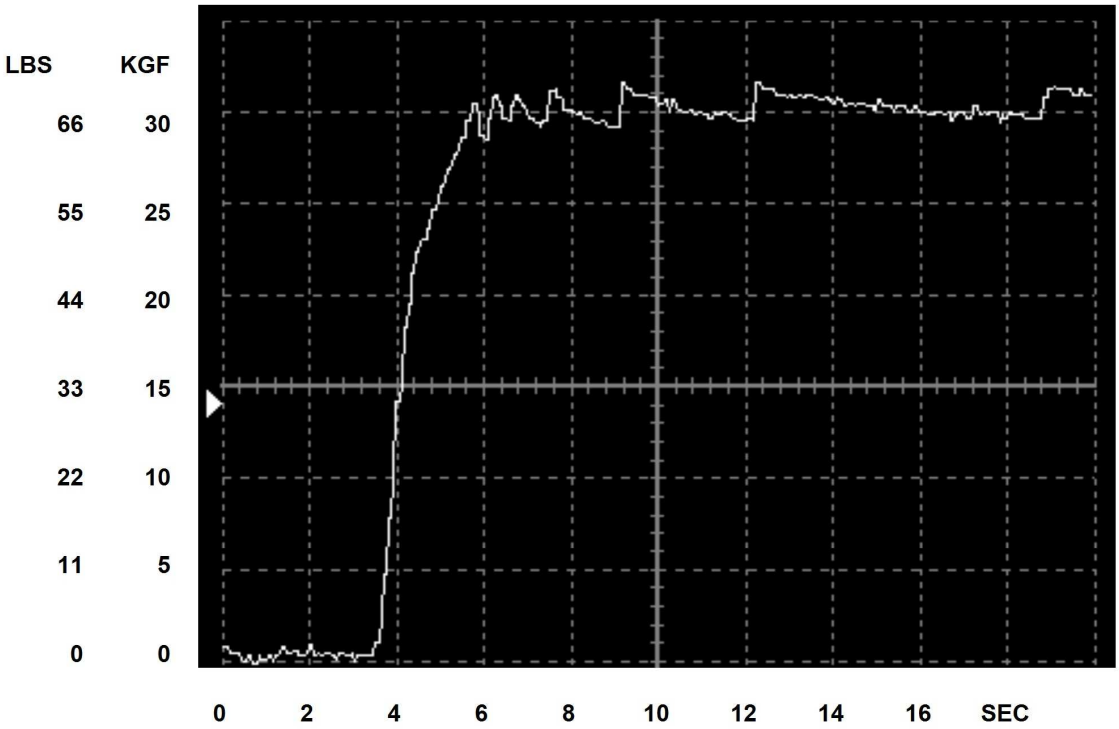
MS150 MONOFIL. 1,0 / 6,0 % / 20 KGF. NO TENSION LOSS

"SMART-WEIGHT" DROPWEIGHT-TENSIONER



MS150 MONOFIL. 1,1 / 8,4 % / 20 KGF. NO TENSION LOSS

HIGH END ELECTRONIC TENSIONER



EM450 MONOFIL. 1,0 / 6,0 % / 20 KGF. LOSS OF TENSION +1,5 - -0,5

OVERPULL CAN KILL THE STRING :

The **graphs** show that a lock-out machine needs up to **15lbs extra tension** to achieve the **same string-bed stiffness.**

This means that **all the elongation** at this higher tension **is pulled out of the string**.

The string's **playability** is permanently **damaged**.

The string is actually always pre-stretched !!

THE RIGHT STIFFNESS FOR EVERY PLAYER :

The stiffness is **different** for every **type of player**

LOWER STIFFNESS OFFERS :

> Easier **ball acceleration**.

> Longer **contact** with the ball, **more spin**

> **More comfort**.

> More movement of the strings in the string-bed.

> Shorter string life.

> Better use of the **elongation qualities** of the string.

> More vibration of the string-bed (use a vibration damper)

HIGHER STIFFNESS OFFERS :

> More **control** on the **speed** and length of the ball.

> Longer **string life** with spin play

> Less **vibrations** in the string-bed

HOW TO FIND THE RIGHT STIFFNESS FOR A PLAYER

The stiffness of the string-bed must be adjusted to the elongation of the string.

>>>>>>>SW RouteMap :

String and String-bed stiffness :

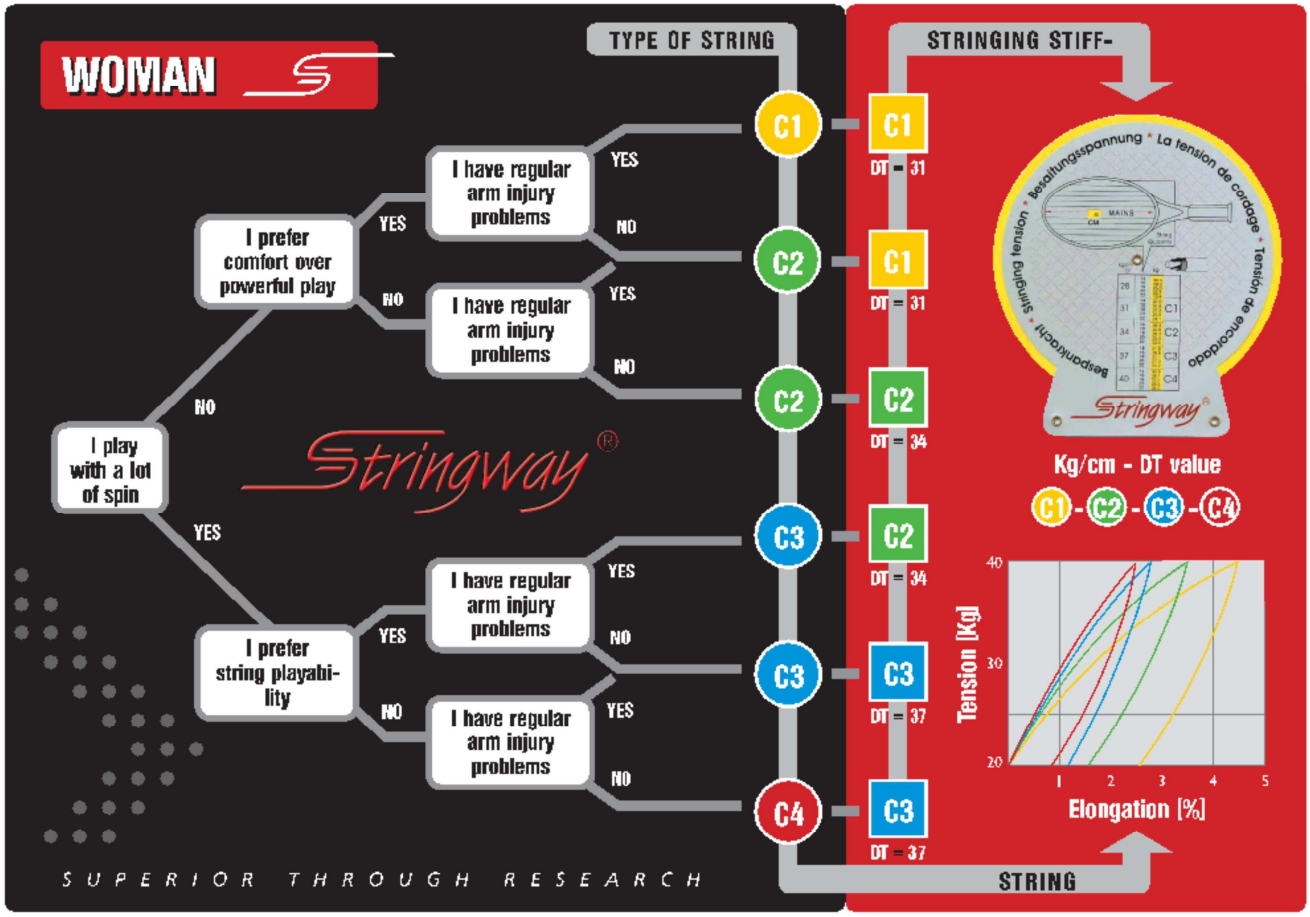
> a “**comfort-string**” (more elongation and more ball speed) should be strung at a **lower tension** so that the **stretch qualities** of the string are **used to advantage**.

> a “**control string**” (stiffer string, less power) should be strung at a **higher tension**, for **maximum string life** and **maximum control** on the ball.

Ask the player some simple questions :

The STRINGS and the STRING-BED STIFFNESS can be CLASSIFIED in 4 CLASSES.

The ROUTE MAP helps to choose the SBS value and also the most appropriate string.



THE STIFFNESS AND THE STRINGING TENSIONS :

The combination of tension for the mains and cross strings must meet 2 demands :

1.

2. **Minimal stress in the material of the racquet.**

3.

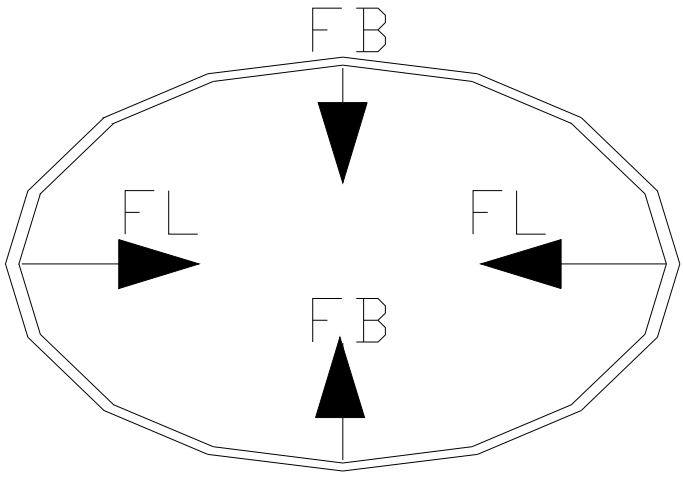
4. **The string-bed stiffness must be right for the player.**

Stringing tensions and the bending of the racquet :

> The **tensions** on the **main-strings** will make the string-bed area shorter and wider.

> The **tensions** on the **cross-strings** must **undo** this change of shape of the string-bed.

Forces > frame : FB = Force Width FL = Force Length



The **difference in the tension** for **main** and **cross** strings depends on :

> The length and width of the string-area.
The longer of the **length** of the string area, in relation to the **width**, the larger the difference in tension between the mains and the crosses.

> The number of the main and cross strings.
The **more cross strings**, the lower the tension on the **crosses** that is **needed** to undo the widening of the frame.

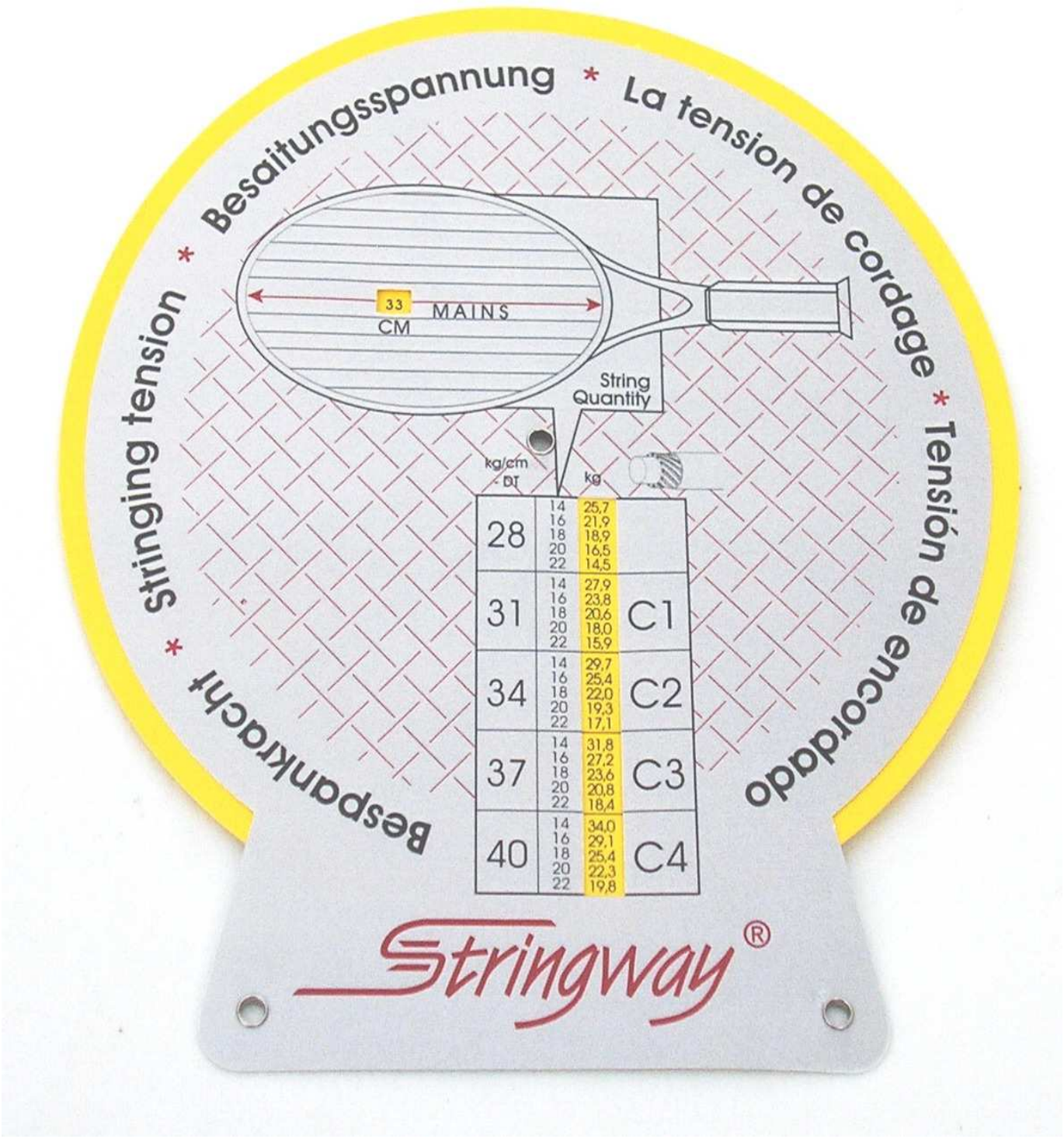
THE RELATION BETWEEN STRINGING TENSION AND STRING-BED STIFFNESS :

For the same tension the stiffness depends upon :

> Higher stiffness with higher density string pattern, (smaller pitch between the strings). With more strings a lower tension is needed for the same stiffness.

> Lower stiffness for a larger string area.
Higher tensions are needed for the same stiffness when the string area is bigger.

THE “TENSION ADVISOR” CAN BE USED TO CALCULATE THE CORRECT TENSIONS :



THE “TENSION ADVISOR” CALCULATES :

> the **stringing tensions** for <u>mains</u> and <u>cross strings</u>,

> for **5 different classes** of **string-bed stiffness**.

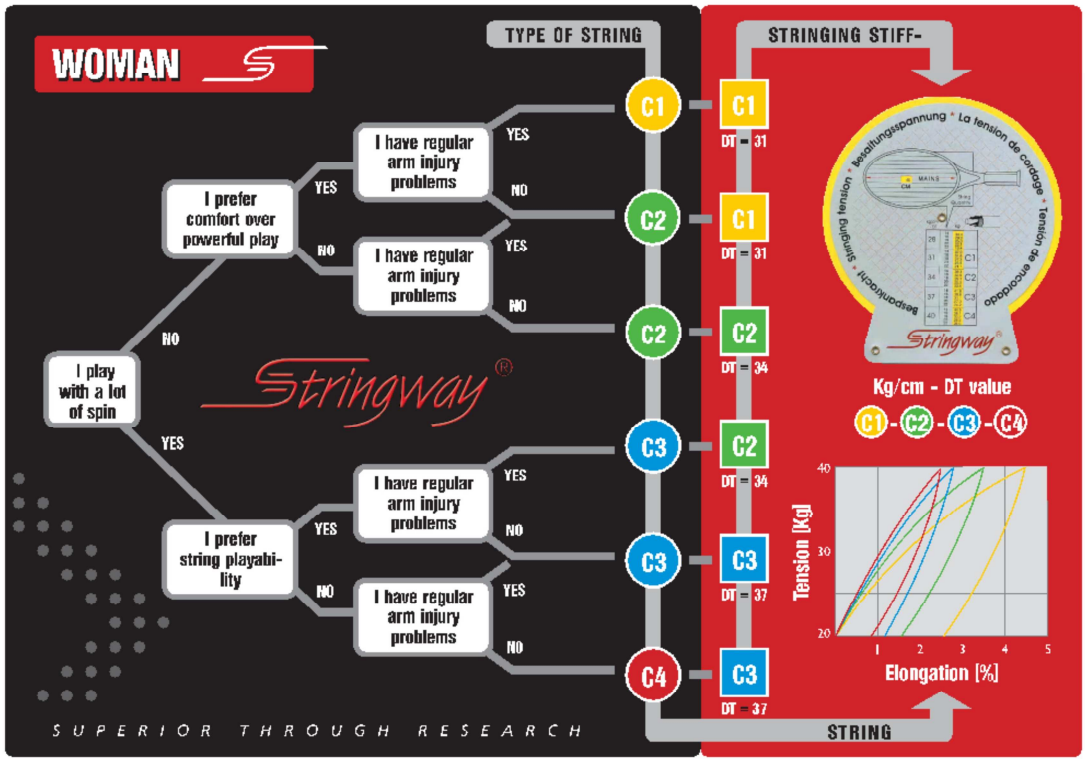
Totally independent of the brand of the racquet . . .

TAKE THIS EXAMPLE OF A TYPICAL FRAME :

Length inside of the frame : 34cms – width 24cms :

- number of main-strings = 16
- number of cross-strings = 19

For a **woman** who has had problems with <u>an arm injury</u> :



String : **C1** Stiffness SBS : **C1**
Tension for mains = **24.8kgs** (55lbs)
Tension for crosses = **21.8kgs** (48lbs)

It is easy to check the result :

The length and the width of the **stringing area** must be the same as before stringing, **without the strings**.

To adjust stringing tensions :

> When the width of the string-area has become smaller
>> use a lower tension on the cross strings next time.
> When the width of the string-area has become BIGGER :
>> use a higher tension on the cross strings for this racquet next time.

Hybrid Stringing :

The tensions in the strings are maintained by the elastic elongation of the strings.
When different strings are used for the mains and crosses it is difficult to calculate the right tensions.
One can only find the right difference by trying.

Advice of a racquet manufacturer :

When someone wants to follow the recommendations of the racquet manufacturer, and still get the right stiffness, the following method can be used :
> Use the calculated tensions for the cross strings.
> Use the difference in tensions for mains and crosses as advised by the manufacturer.

MONOFILAMENT STRINGS :

Many mono-filament strings lose less tension and have lower elongation than most nylon multi-filament strings.
It is better to lower the calculated tensions **for the mains**.
When using the **SW Tension Advisor** :
>> reduce the inside frame length by -1cm to give the correct calculated tension for the monofilament mains.