TEXTI SONICS®

Because amplitude signifies only a few tens of microns, … the highest accuracy for ultrasonic manufacturing is absolutely essential for FIBC's fabrics edges sealing-cutting process.

Presented by **Pietro ABATE** C.E.O.
TEXTI SONICS SAS - FRANCE

Pietro ABATE Founder and CEO at TEXTI SONICS SAS (2003)

15 years in mechanical industry and machine-tool construction,

5 years (since 1991) as area sales manager at CALEMARD (manufacturer of slitting machines and ultrasonic devices for textiles industries)

5 years as sales manager at DECOUP+ (ultrasonic devices manufacturer for textiles industries)

Since 2003, C.E.O. at TEXTI SONICS SAS

- Inventor in 2004 of the S.T.C. "Sonics Touch Control" system.
- Inventor in 2011 of a very accurate and efficient butt to butt ultrasonic joining and ironing system.

TEXTI SONICS SAS - France

Expertise in design and manufacturing of Ultrasonic slit/seal and welding solutions

Ultra-Star 400-35

Ultra-Star 1200-35

Slitter 400-35

Hem Welder 400-35

Few devices of the range

Table

Gun

Slim

Ultra Press

Because amplitude signifies only a few tens of microns, … the highest accuracy of ultrasonic manufacturing is absolutely essential for FIBC's fabrics edges sealing/cutting process

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MAIN TOPICS OF THE PRESENTATION

PART 1

OVERVIEW OF SOME ULTRASONIC APPLICATIONS IN FIBC INDUSTRIES

PART 2

OBLIGATION OF HIGH ACCURACY IN DESIGN AND MANUFACTURING OF ULTRASONIC CUTTING DEVICES FOR PP FABRICS IN FIBC INDUSTRIES

PART 3

OPENING CIRCULAR PP FABRICS WITH ULTRASONIC DEVICES

PART 1

OVERVIEW OF ULTRASONIC APPLICATIONS IN FIBC INDUSTRIES

1.1 EDGES SEALING/CUTTING ON FLAT LOOM

1.2 AUTOMATIC CROSS CUTTING BENCH

1.3 AUTOMATIC CIRCULAR AND CROSS CUTTING ON SPECIFIC MACHINE

1.4 CONTINUOUS ULTRASONIC WELDING ON LIGHT HEMMED FABRIC

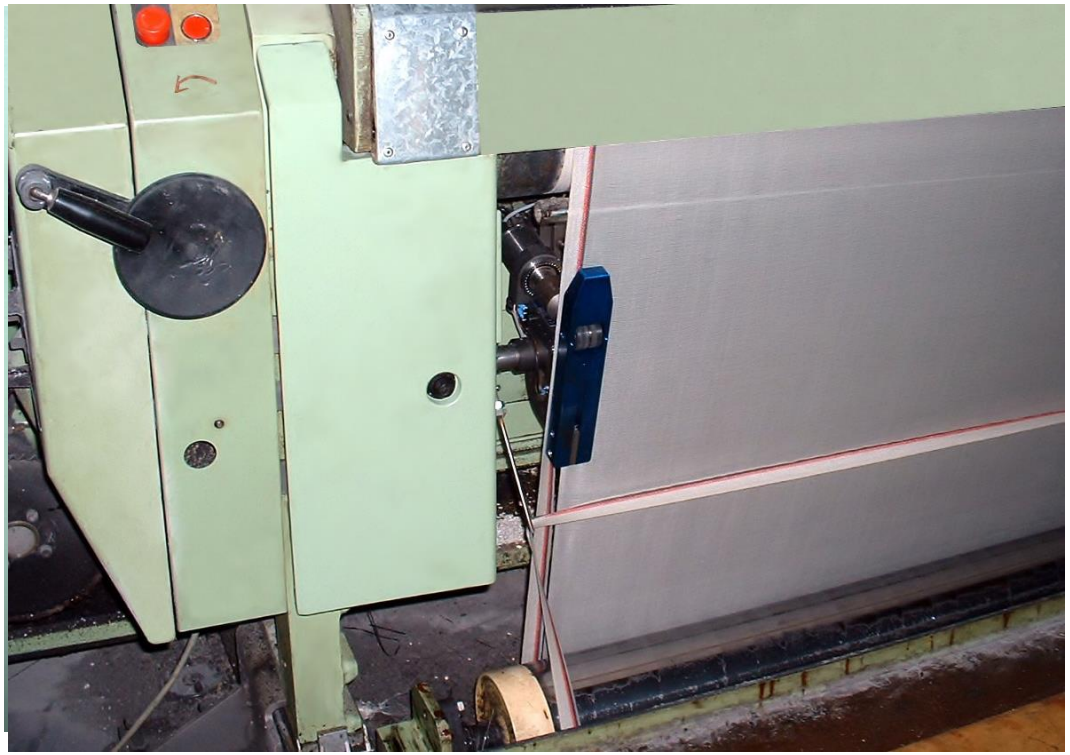
1.5 SPOT WELD ON BELT TO HELP CONFECTION

1.6 CLEAN ULTRASONIC CUT OF YARNS DURING CONFECTION ON SEWING MACHINES

1.1 EDGES SEALING/CUTTING ON FLAT LOOM

Example of devices installed on flat loom.

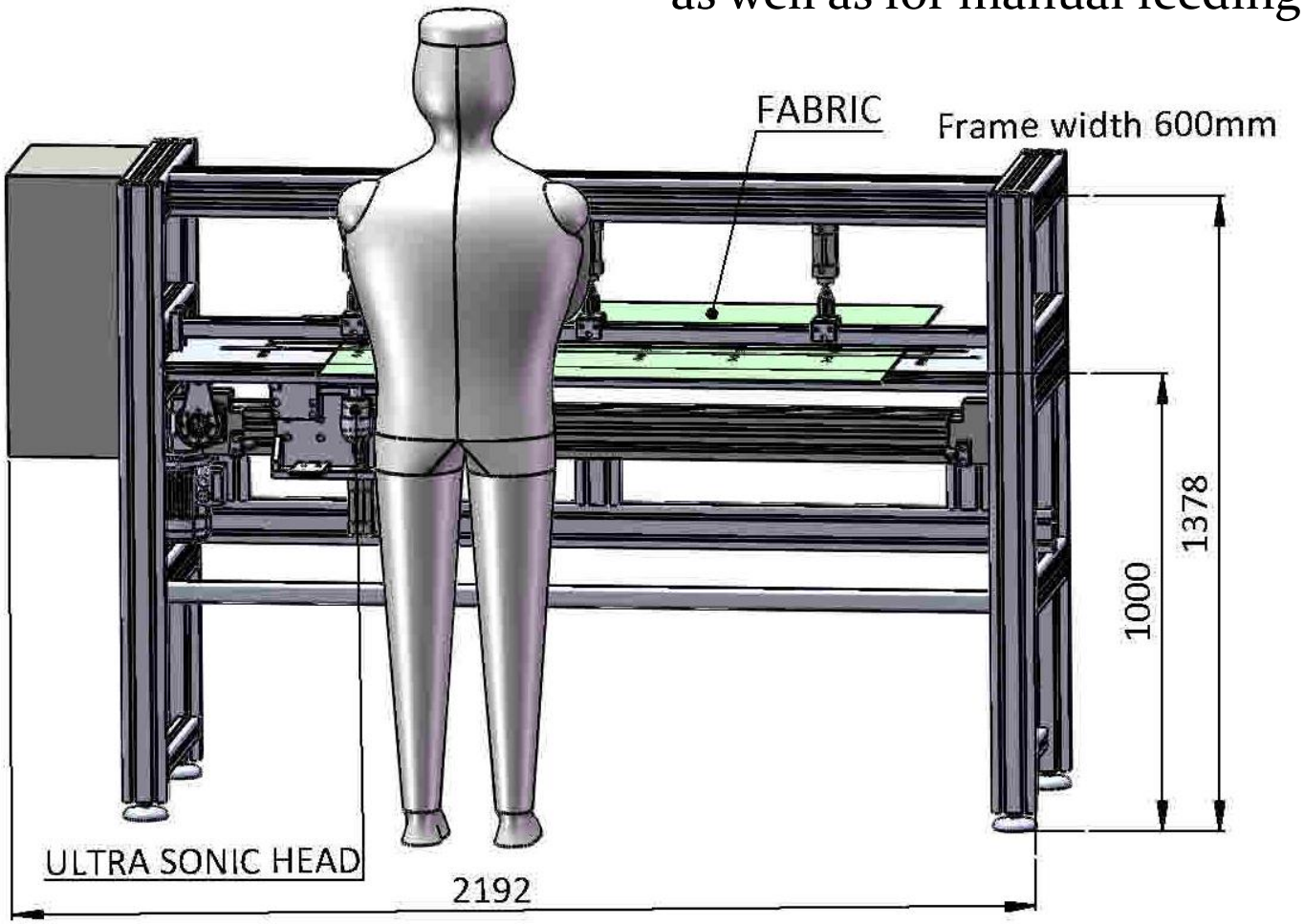
It allows the advantage of very fast positioning inside the fabric compared to usual manufacturer tucking system.



1.2 AUTOMATIC CROSS CUTTING BENCH

For improvement of existing machine, production line, …

as well as for manual feeding



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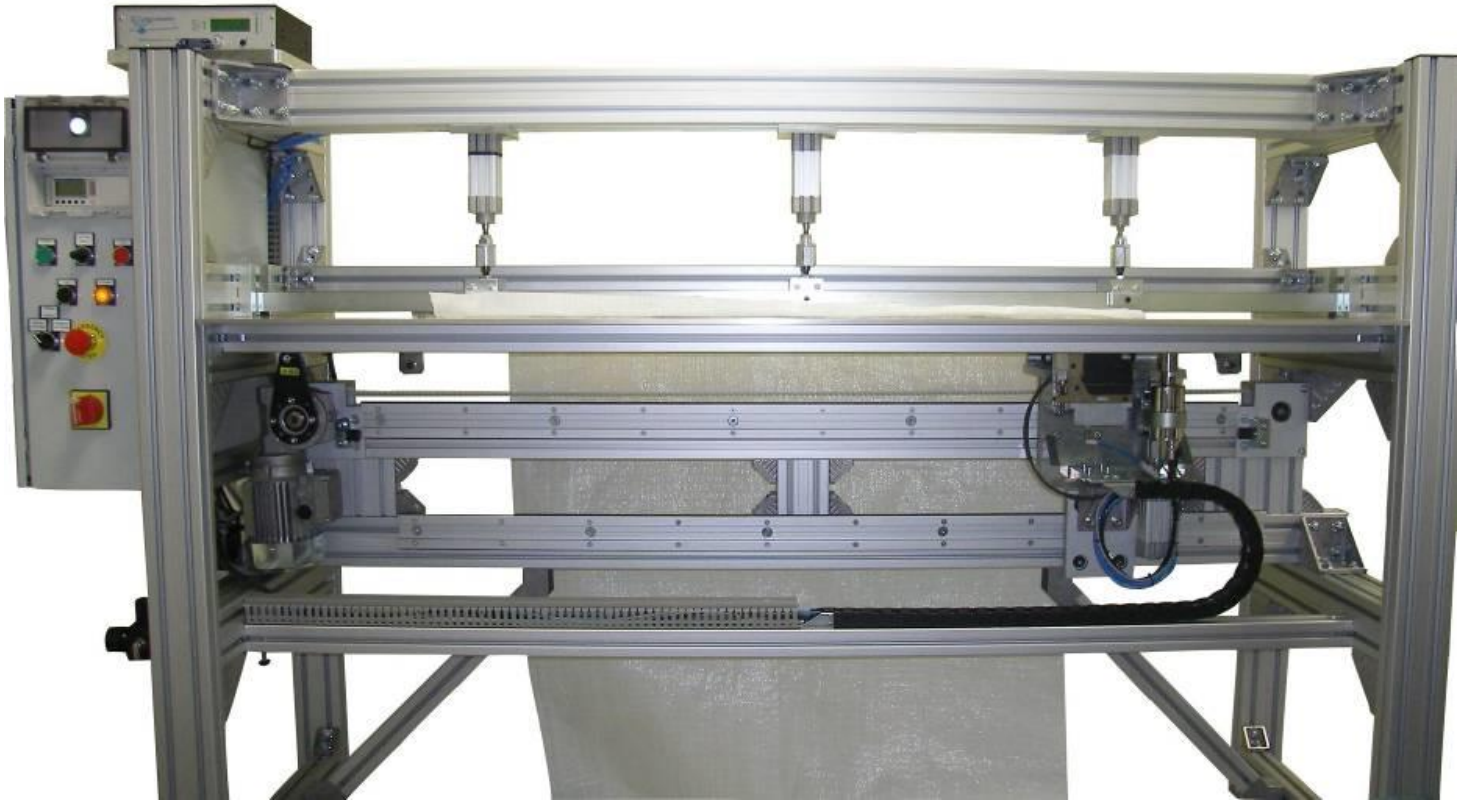
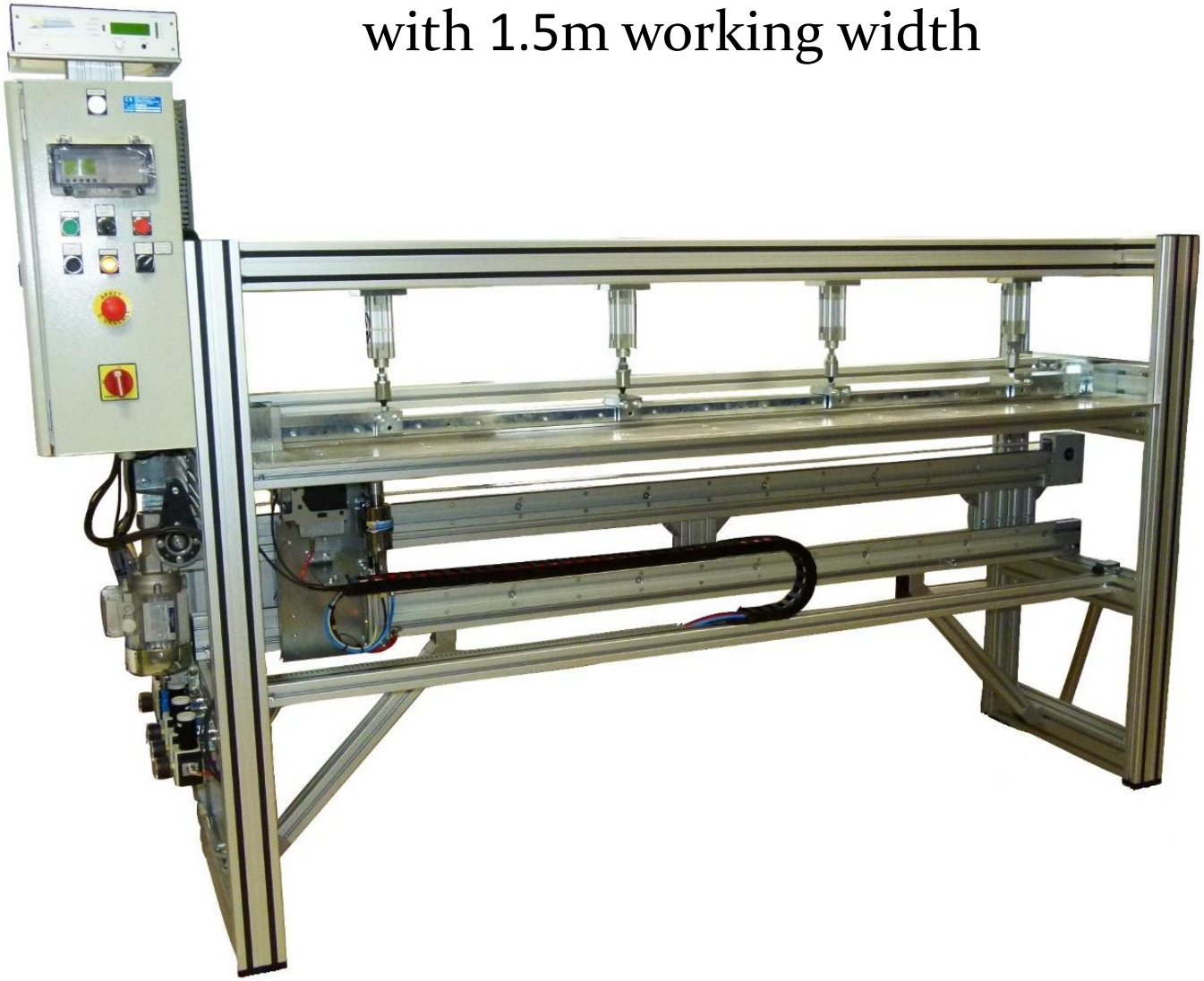
Example of ultrasonic cross cutting bench with 1.2m working width

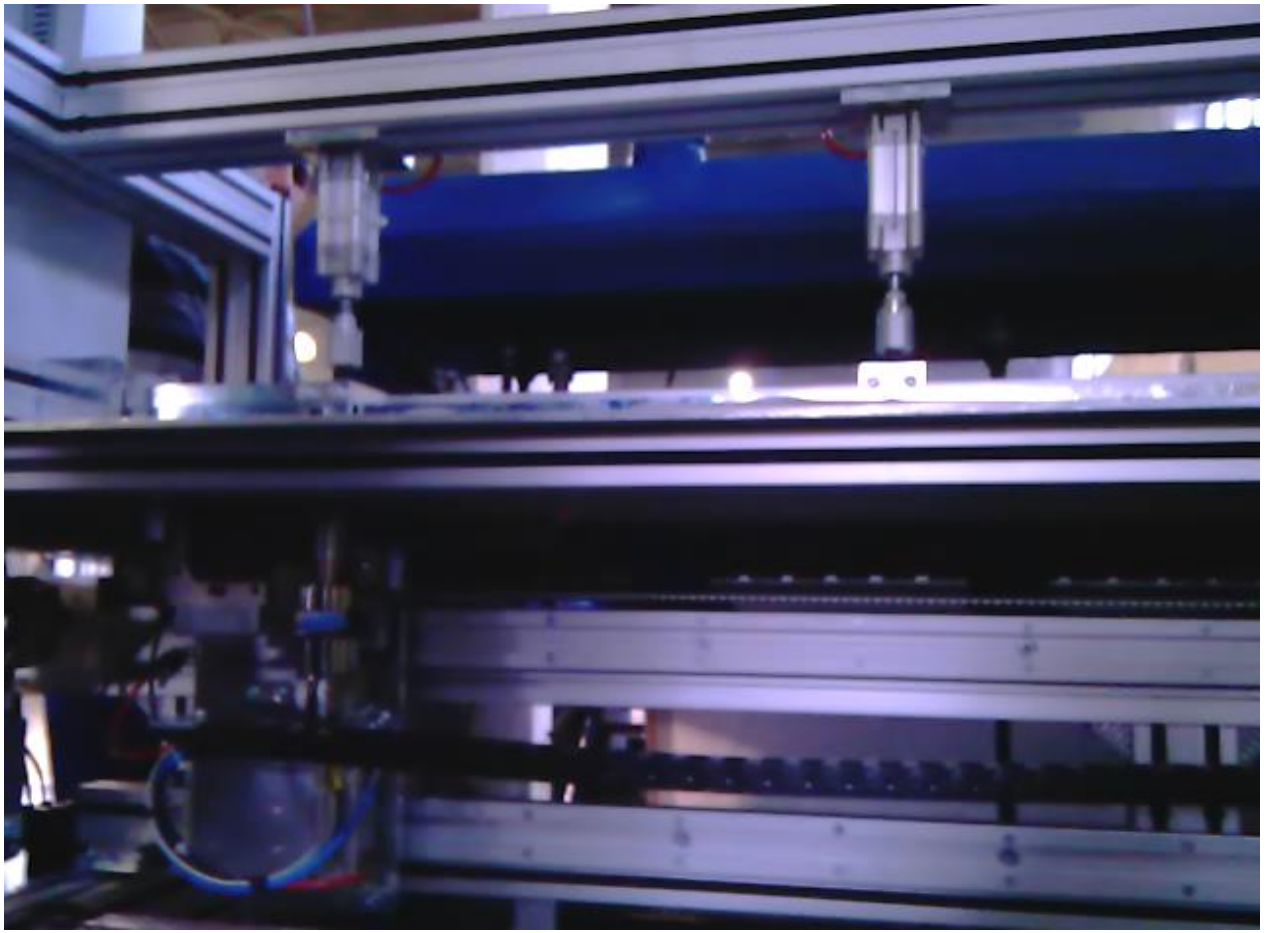


Example of ultrasonic cross cutting bench with 1.2m working width

Example of ultrasonic cross cutting bench with 1.5m working width



Example of ultrasonic cross cutting bench with 1.5m working width

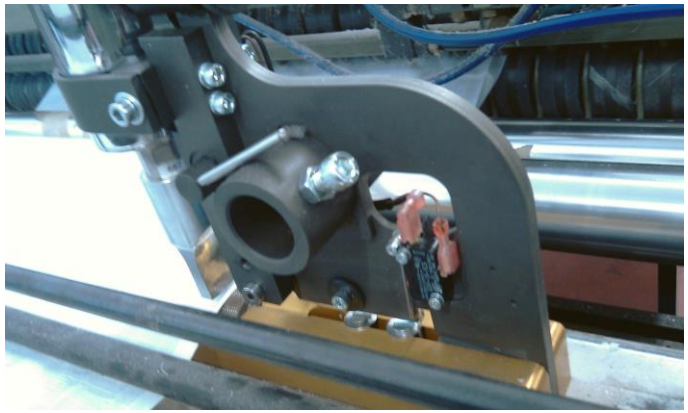


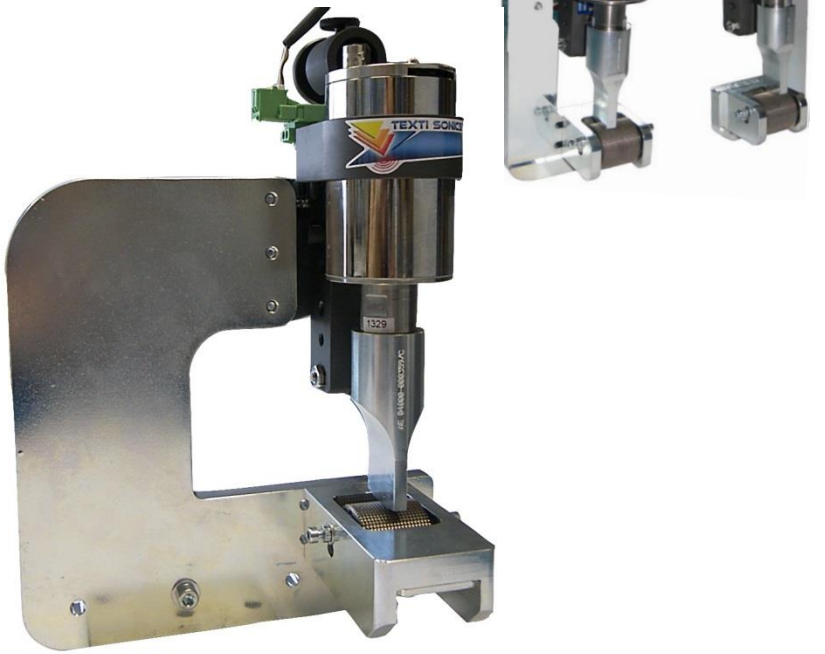
1.3 AUTOMATIC CIRCULAR AND CROSS CUTTING ON SPECIFIC MACHINE

1.4 CONTINUOUS ULTRASONIC WELDING ON LIGHT HEMMED FABRIC

For uncoated or coated fabrics

Old Device type named "**Knurling**"



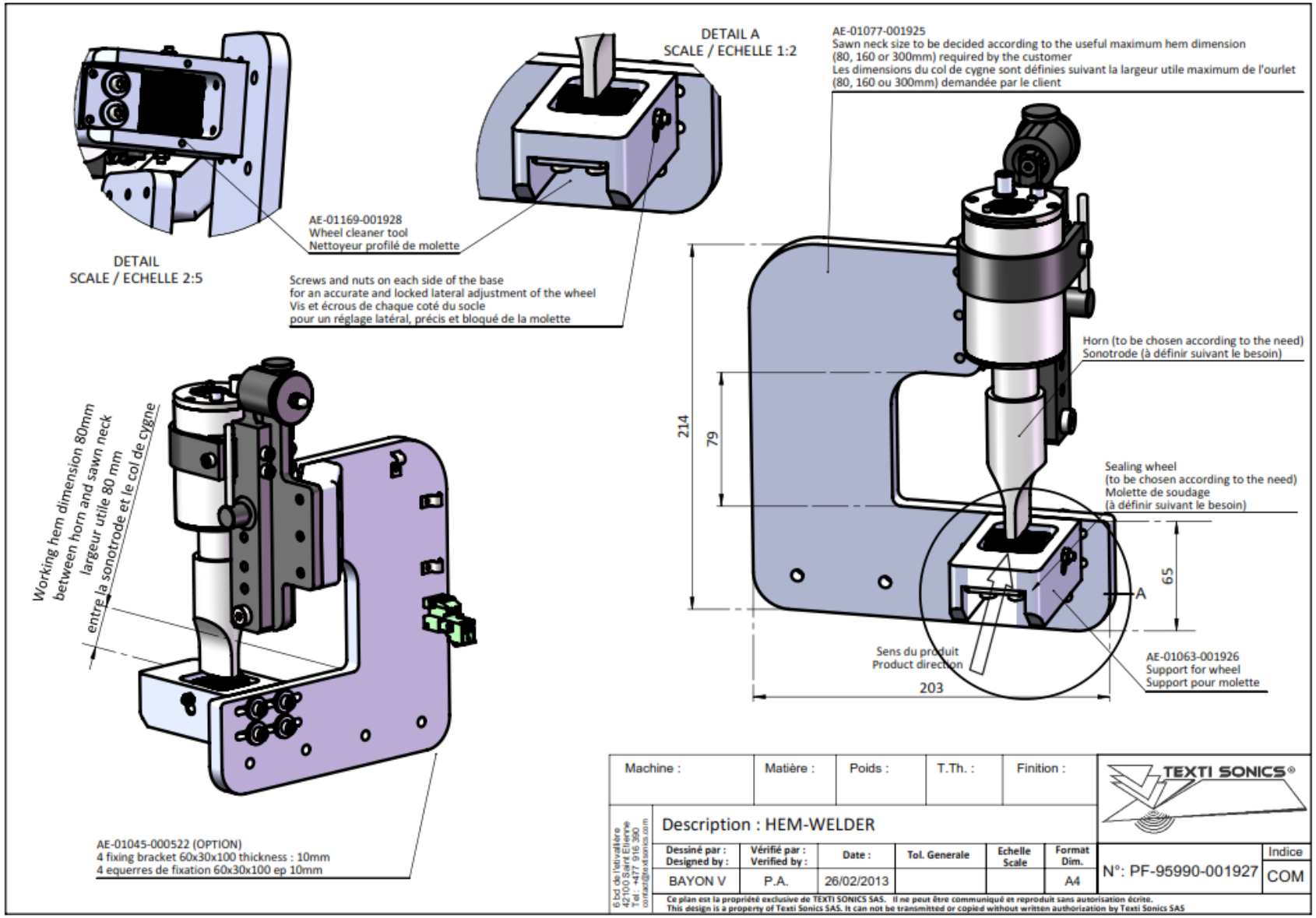


"Hem Welder" device with new design

Because amplitude signifies only a few tens of microns, … the highest accuracy of ultrasonic manufacturing is absolutely essential for FIBC's fabrics edges sealing/cutting process

1.4 Continuous ultrasonic welding on light hemmed fabric

WHEEL CLEANER OPTION



1.4 Continuous ultrasonic welding on light hemmed fabric

Video 1

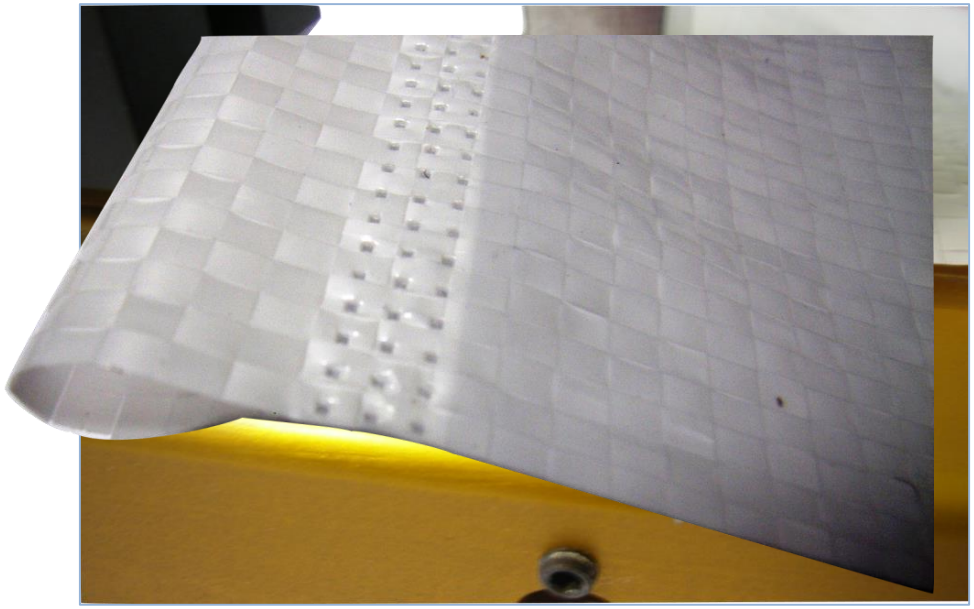
1.4 Continuous ultrasonic welding on light hemmed fabric

Video 2

Because amplitude signifies only a few tens of microns, … the highest accuracy of ultrasonic manufacturing is absolutely essential for FIBC's fabrics edges sealing/cutting process

Hemmed fabric welded by ultrasonic

Final result



1.5 WELDED SPOTS ON BELT TO HELP CONFECTION

The goal is to secure the belt in the exact position that must be kept while sewing on the big-bag.

Pre-positioning of the folded belt is important to facilitate the work of the operator during the sewing of the big-bag.

Belt secured in position by means of ultrasonic welded spots

1.6 CLEAN ULTRASONIC CUT OF YARNS DURING CONFECTION ON SEWING MACHINES

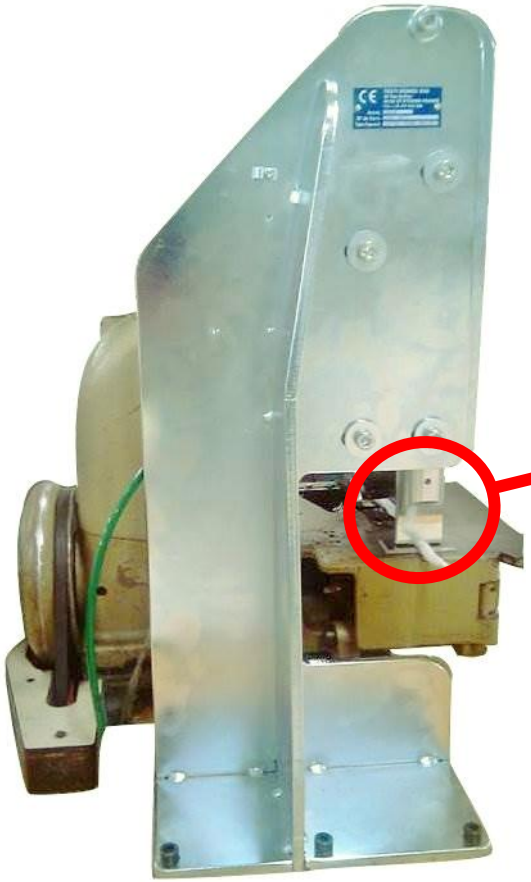
USUAL SITUATIONS

Unsafe situation. Inconsistent with the requirements of industries such as pharmacy, food, etc…

Standard method using heat elements to cut the yarns on the sewing machines

1.6 Clean ultrasonic cut of yarns during confection on sewing machines

For users requiring very clean big-bags
→ Ultrasonic cutting solution by TEXTI-SONICS



The converter-horn assembly is fitted on a frame located just behind the sewing machine

1.6 Clean ultrasonic cut of yarns during confection on sewing machines

Ultrasonic cut video

Because amplitude signifies only a few tens of microns, … the highest accuracy of ultrasonic manufacturing is absolutely essential for FIBC's fabrics edges sealing/cutting process

No any more fraying for the sewing yarns

Ultrasonic technology provides perfectly sealed and clean cuts

Because amplitude signifies only a few tens of microns, … the highest accuracy of ultrasonic manufacturing is absolutely essential for FIBC's fabrics edges sealing/cutting process

PART 2

OBLIGATION OF HIGH ACCURACY IN DESIGN AND MANUFACTURING OF ULTRASONIC CUTTING DEVICES FOR PP FABRICS IN FIBC INDUSTRIES

2.1 WHY ACCURACY OF THE "STC" APPROACH SYSTEM (TEXTI SONICS PATENT) IS SO ESSENTIAL FOR THE FABRIC SEALING PROCESS ?

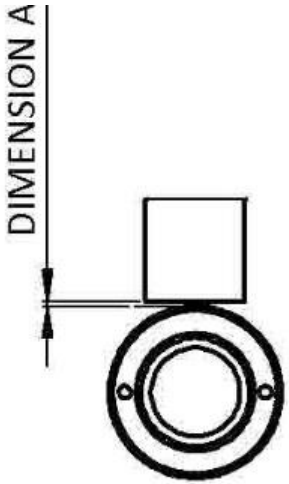
2.2 WHY HAVE THE WHEEL AND IT'S AXLE TO BE VERY ACCURATE?

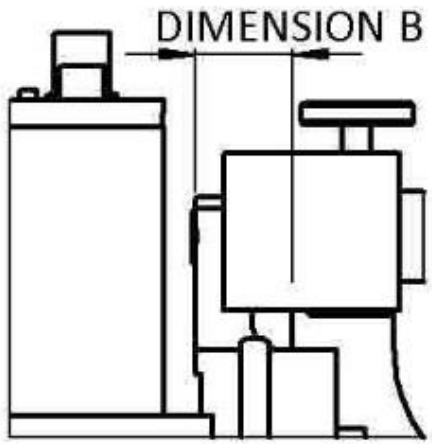
2.3 WHY THIS CHOICE OF WORKING WITH PRE-SET GAP INSTEAD OF WORKING WITH UNMANAGEABLE PRESSURE ?

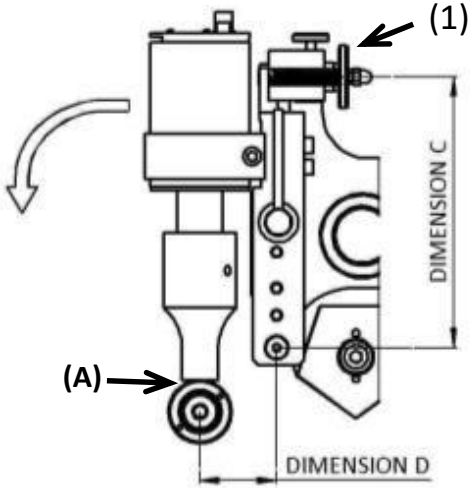
2.1 Why accuracy of the approach system (Texti Sonics Patent) is so essential for the fabric sealing process ?

The precision of the approach system is based on a clever and innovative design.

- the accuracy of the adjustment of the horn's position (A), just by turning (1) by steps of 10 degrees, the system permits to the sonotrode to approach towards or to recede the welding wheel by gap of approximately 0.01mm.
- With this exclusive advantage of accuracy, the operator can control exactly the quantity of weld he needs for his edges.

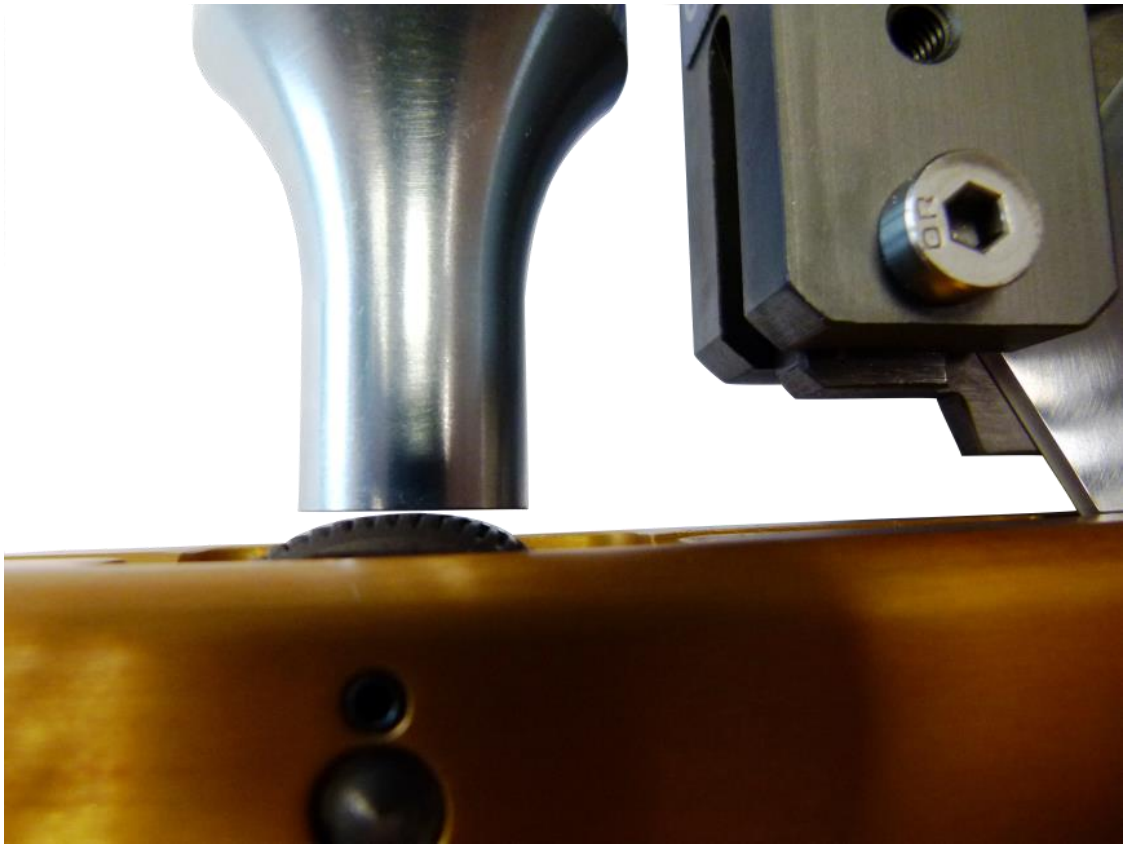






2.2 Why have the wheel and it's axle to be very accurate ?

- **Due to our choice of welding with pre-set gap, and because the thickness of the babric can be only few cents of mm, consequently**
  the concentricity of the sealing wheel is the vital parameter during welding.



2.3 Why this choice of working with pre-set gap instead of working with uncontrollable pressure?

2.3.1. Drawback by working with pressure

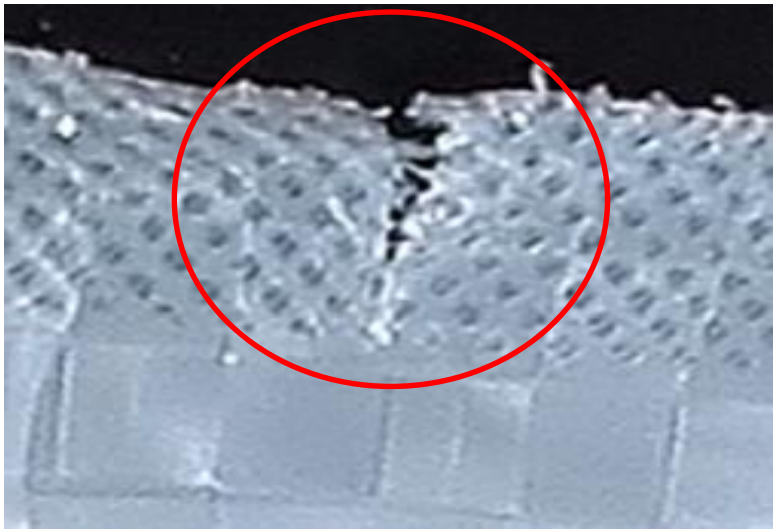
- Many FIBC companies are meeting troubles and wastes, due to fabrics ruined by ultrasonic devices working with uncontrollable pressure.

- While the melting point is reached on PP fabrics and then it comes back to simple plastic.

- **Because the compression of the internal spring is not controlled, this "pressure working" method means that the sonotrode is pushing without any precaution on the fabric, creating as a result a too important heat which deteriorates the sealed area on the fabric**

2.3.1. Drawback of working with pressure

- The main disadvantage of working by pressure is that it is difficult to produce a sealed edge of good quality. Even if the sealed edge looks not bad, the PP tapes properties are destroyed most of the time.

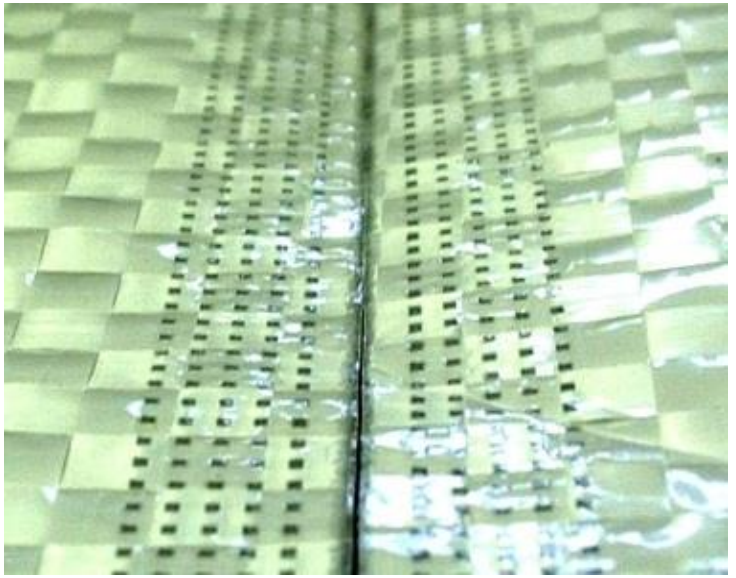


- **As a result, as soon as the welding area is too much plasticized, the edges become very weak and are consequently easily torn.**

2.3.2. Advantage by working with a pre-set gap

Conversely, if ultrasonic horn is applied with an adjustable pre-set gap, it avoids to run through the fabric and provides the improvement of a perfectly controlled welding pressure.

This “pressure” is perfectly controlled by the pre-set gap: very thin for light fabrics and thicker for heavier fabrics.



"STC" SONIC TOUCH CONTROL system guarantees a perfect welding by keeping the right distance between the horn and the welding wheel.

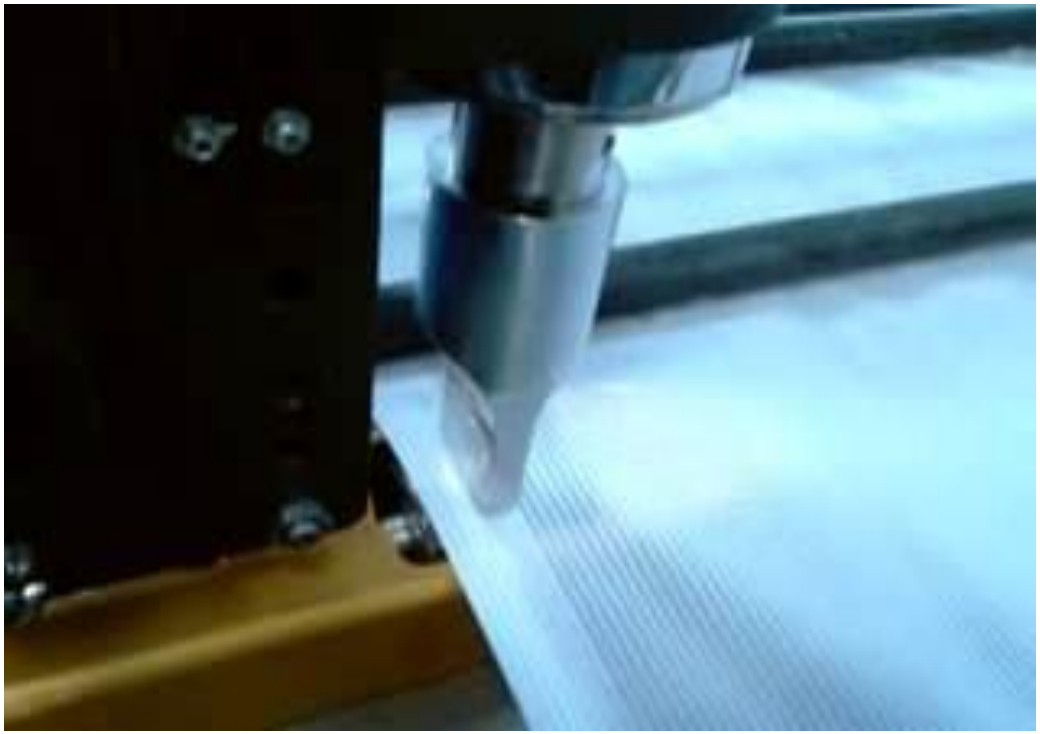
This way of working with a pre-set gap reduces considerably the frictions due to the welding of the tapes, thus it reduces also the resulting increase of the temperature of all the concerned mechanical parts and obviously of the ultrasonic converter.

Reminder: **THE HEAT IS THE WORST ENEMY OF THE LIFETIME OF THE CONVERTER.**

2.3.2. Advantage by working with a pre-set gap

Example of application working with a pre-set gap:

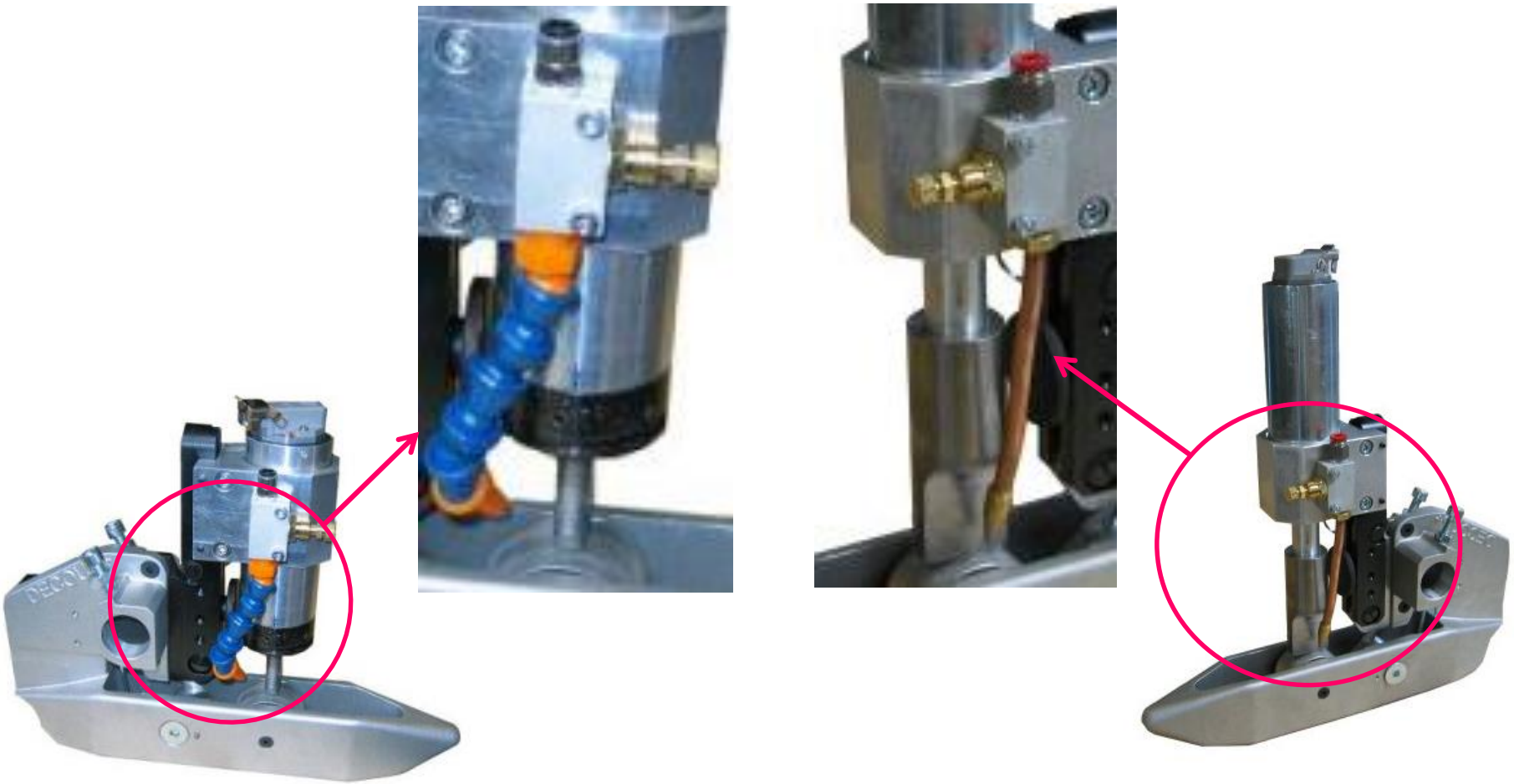
Continuous ultrasonic welding on hemmed fabrics.
Thanks to working with pre-set gap, efficient speeds of around 50m/mn on ± 100 GSM PP fabrics can be easily achieved.



2.3.2. Advantage by working with a pre-set gap

Another important disadvantage of the "pressure method":

Obligation of cooling with expensive air pressure (at customer's charge).

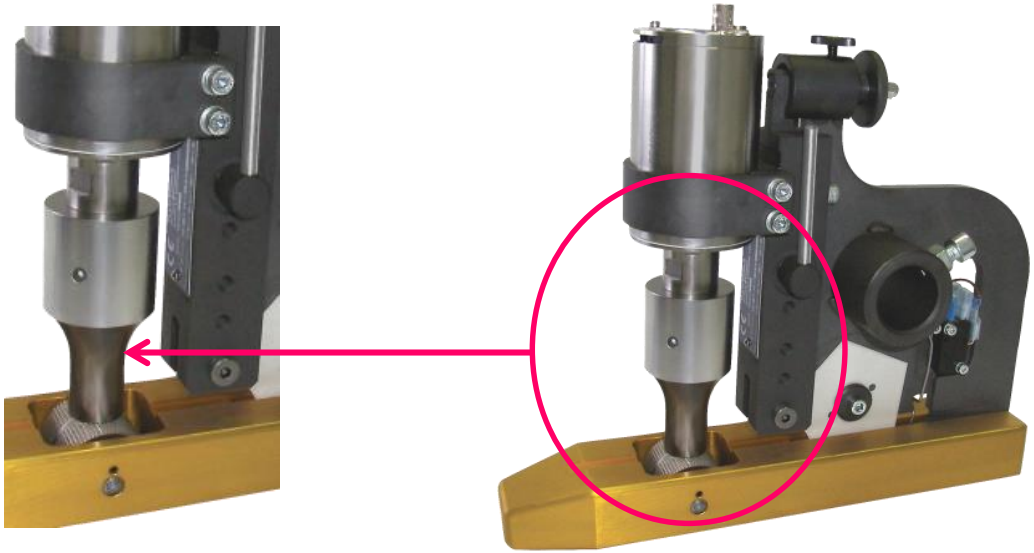


2.3.2. advantage by working with a pre-set gap

Example of advantage obtained with pre-set gap method:

No need of any cooling with expensive air pressure.

The combination of all these accurate mechanical components **allows the device for looms** to do its job without any help of compressed air for cooling.



This exceptional advantage allows our customers to save a substantial amount of several hundred euros per year and per each ultrasonic device.

PART 3

OPENING CIRCULAR PP FABRICS BY ULTRASONIC

3.1 DEVICES INSTALLED ON LINES OR ON MACHINES

3.2 DEVICES INSTALLED ON CIRCULAR LOOMS

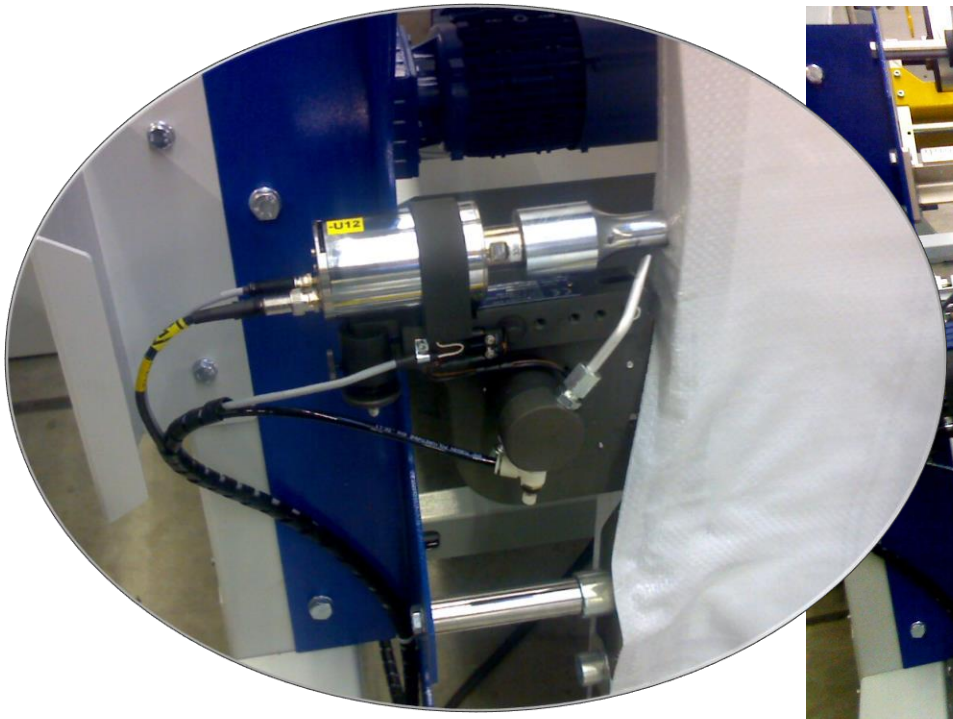
3.3 DEVICES WORKING WITH USUAL TECHNIQUE BY PRESSURE

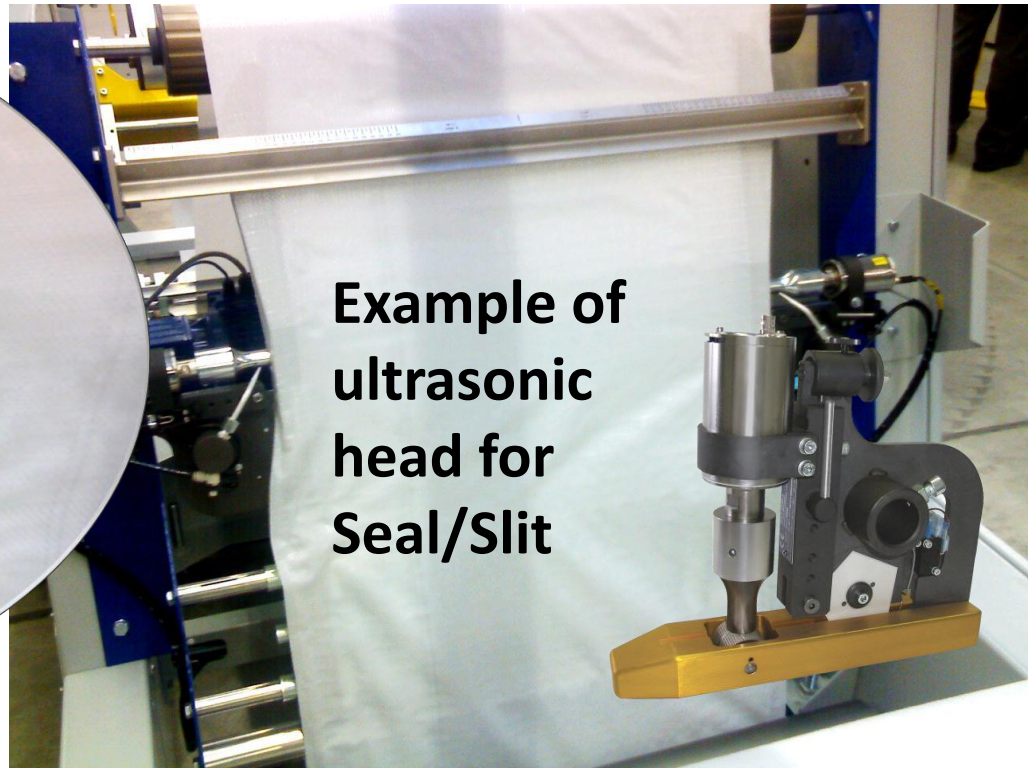
3.4 "STC" Sonic Touch Control System
A TEXTI SONICS PATENT FOR SEALED CUT

3.1. Devices installed on LINES or on MACHINES

The goal is to open circular PP fabrics in order to get 2 layers of flat fabric

Remark: higher speed creates misaligned cuts and edges





Because amplitude signifies only a few tens of microns, … the highest accuracy of ultrasonic manufacturing is absolutely essential for FIBC's fabrics edges sealing/cutting process

TEXTI SONICS®

CONCERNED FABRICS FOR SLITTING MACHINES:

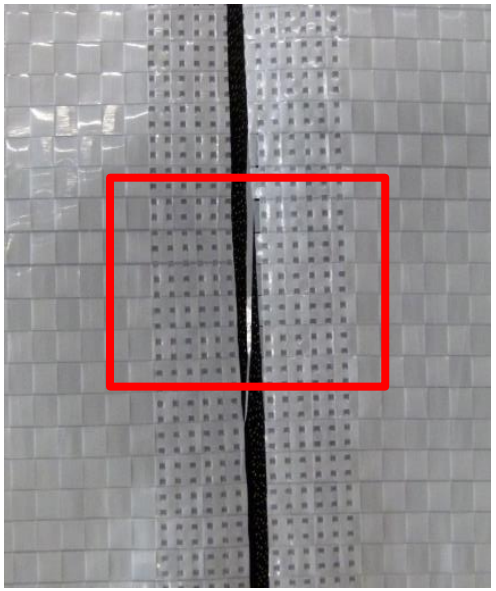
- Usually from 60 to 150 GSM

ADVANTAGES:

- This method of sealing/slit allows a production speed of around 30 to 40 m/min

WEAKNESSES:

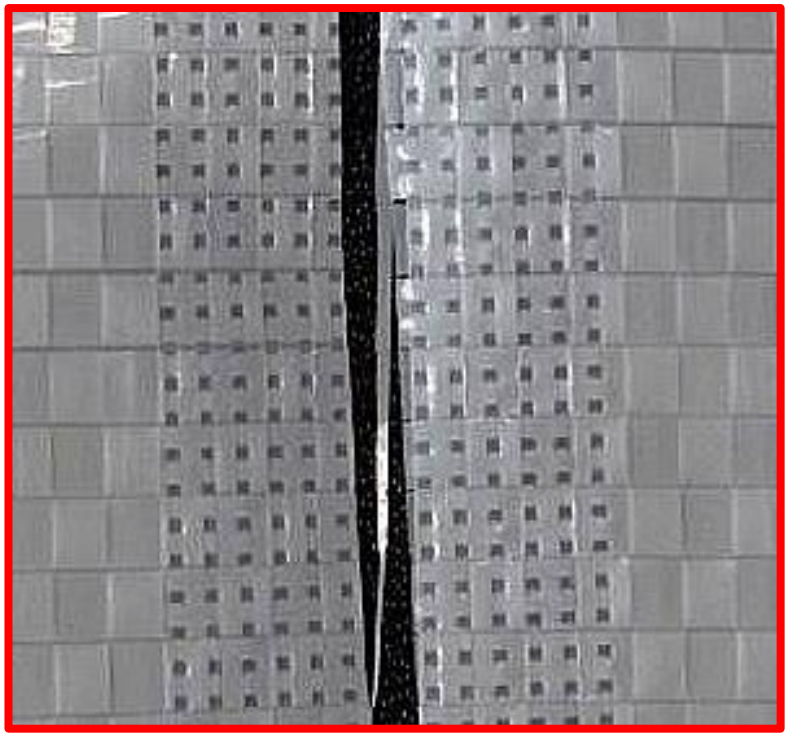
- Risk of converter damage due to high temperature coming mainly from the high quantity of heat created by the sealing of the fabric at high speed.
- No central sealed track: thus, strong edges but with poorer quality of the border of the sealed edges *(picture next page)*
- extra labor costs for at least one operator (± full time)



Seal/Slit made with slitting machine

WEAKNESSES

- No central sealed track: Because of the higher speed and of the lateral movement of the fabric, some tapes could be slit and lost just



because it is not possible to follow a narrow central sealed track.

Seal/Slit made by slitting machine

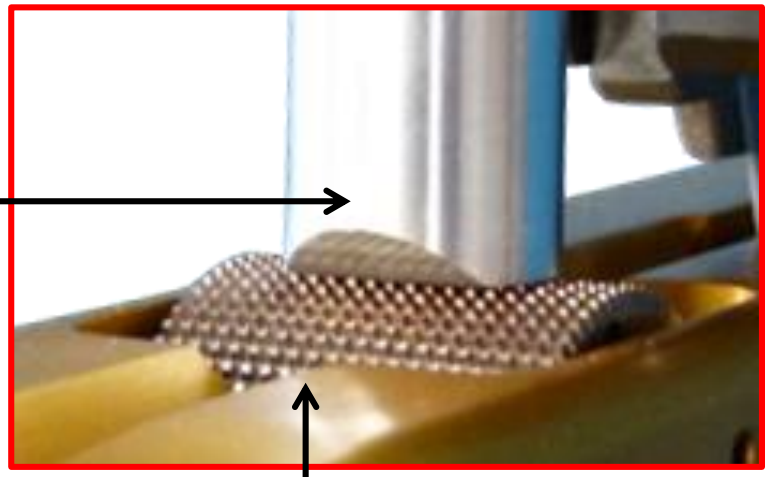
WEAKNESSES

- Fraying yarns:

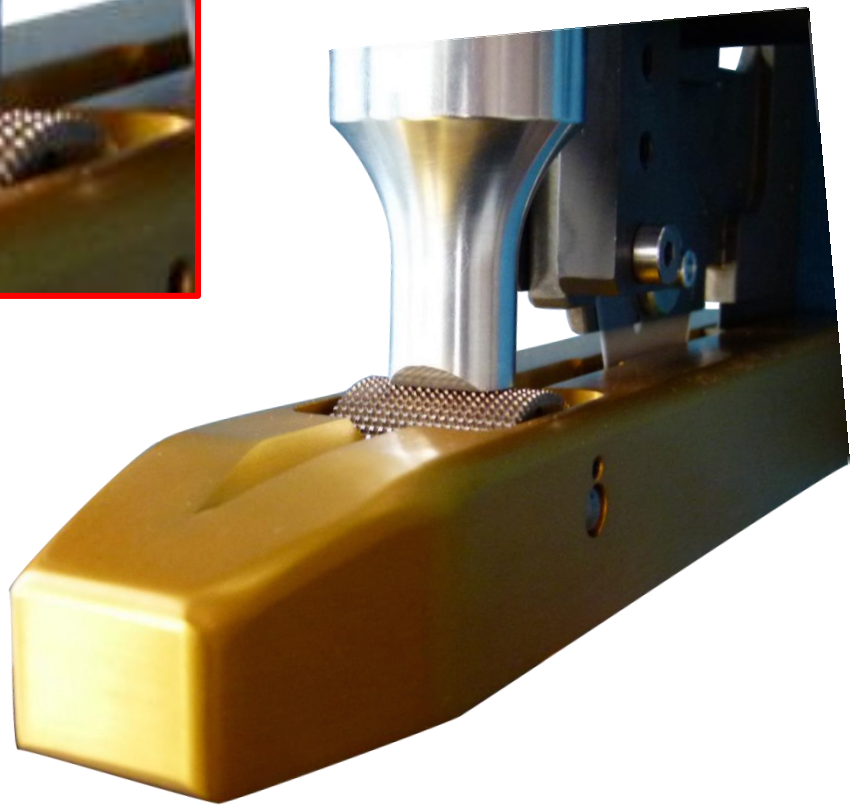
  because of no central sealed track, many lengthwise cut yarns become free due to no sealing and thus are going out of the edges.

Seal/Slit made by slitting machine

Special horn with chamfers for use on slitting machines



Sealing wheel (without central track)



Because amplitude signifies only a few tens of microns, … the highest accuracy of ultrasonic manufacturing is absolutely essential for FIBC's fabrics edges sealing/cutting process

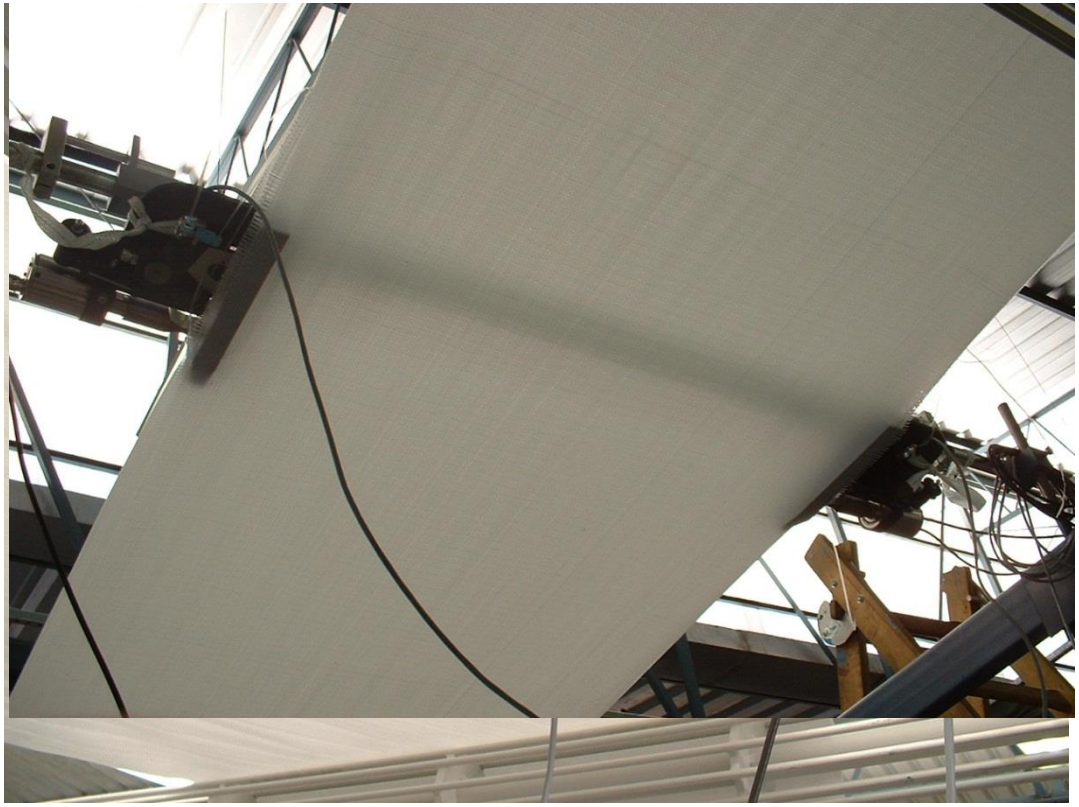
3.2. Devices located on CIRCULAR LOOMS

Remark: highest sealing quality but lower speed

3.2.1. with one device per loom

Circular fabric becomes one SINGLE layer of fabric with two reinforced sealed edges.

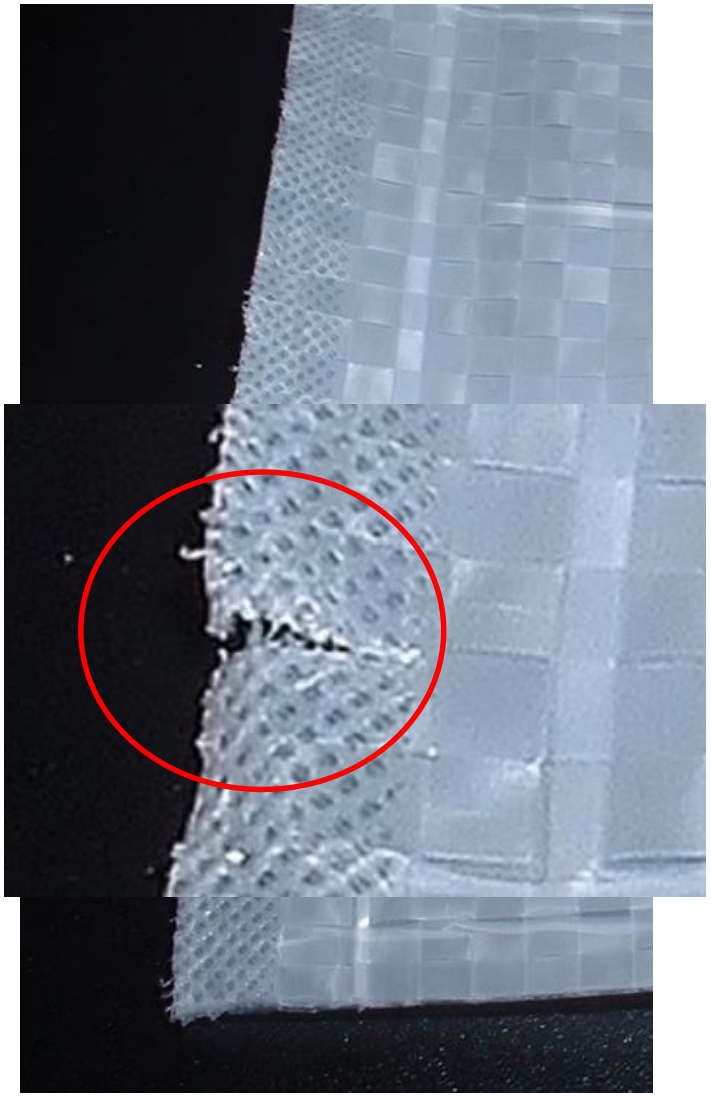
3.2.2. with TWO devices per loom



CIRCULAR fabric becomes two **SINGLE** layers with **2** very reinforced sealed edges

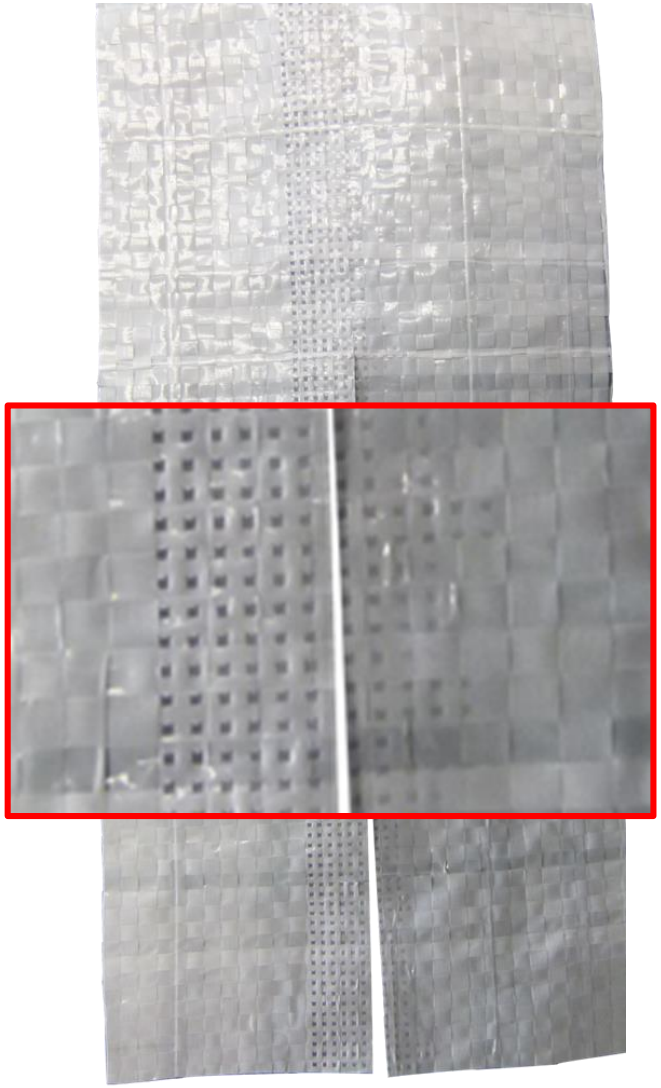
3.3. Devices working with usual technique with pressure

Main WEAKNESS : As soon as horn and sealing wheel temperatures are high enough, a good quality of the sealed edge becomes very difficult to obtain.



WHILE SEALING BY PRESSURE → THE PP TAPES ARE VERY QUICKLY DESTROYED

When the sealing is too much plasticized, the edges become weak and are therefore very easily torn.



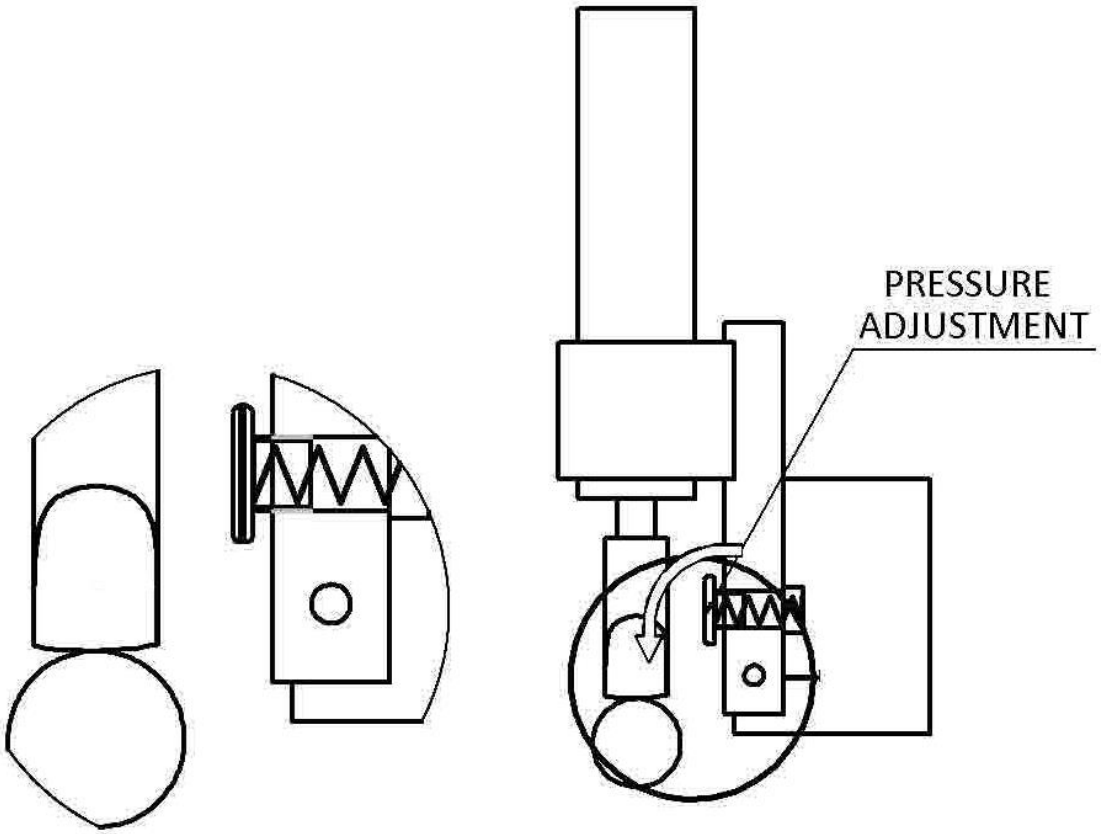
OTHER MATTERS :

IRREGULAR SEALING

Due to a **lack of parallelism** between the sonotrode and the sealing wheel, the sealing is not efficient enough on one side and can cause fraying of the fabric.

REMINDER OF THE FUNCTIONAL PRINCIPLE OF DEVICES WORKING WITH USUAL METHOD WITH PRESSURE

Due to "pressure method", no possibility of gap adjustment



3.4. "Sonic Touch Control" the TEXTI SONICS PATENT for SEALING CUT

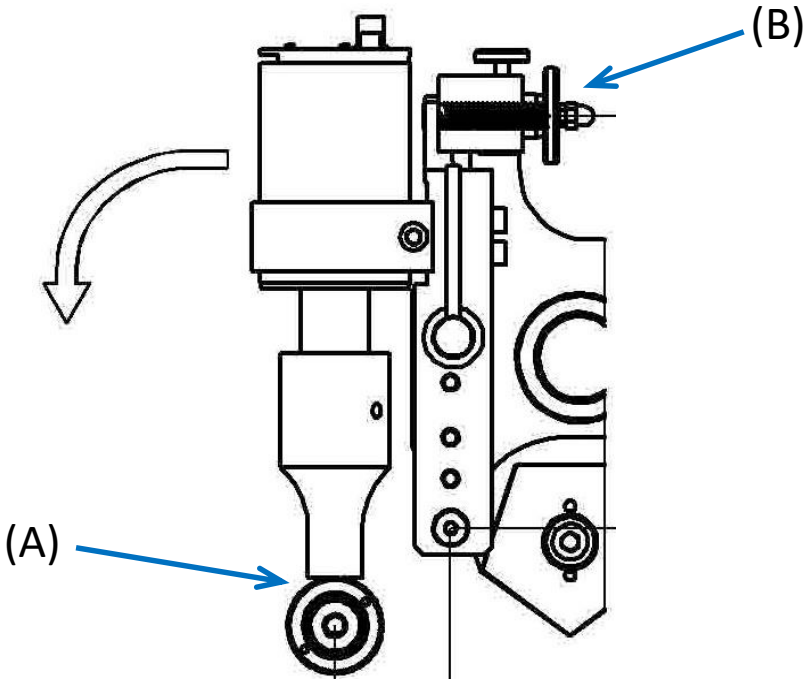
Operating Principle

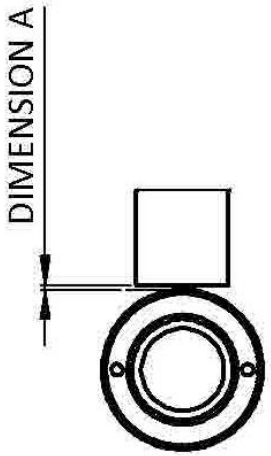
"STC" system guarantees the perfect sealing by keeping the right distance between horn and the sealing wheel.

This technique allows avoiding the troubles explained above with pressure system.

FUNCTIONAL PRINCIPLE OF DEVICES WORKING WITH "S.T.C." SONIC TOUCH CONTROL SYSTEM

Thanks to the position of the adjustment wheel (B), the **accuracy** of the horn position adjustment (A) (dimension A) **is multiplied by 3.5**





"STC" SONIC TOUCH CONTROL

"worldwide patented system"

Thanks to its clever and innovative design,

1) **it allows big savings to production dpt.:**

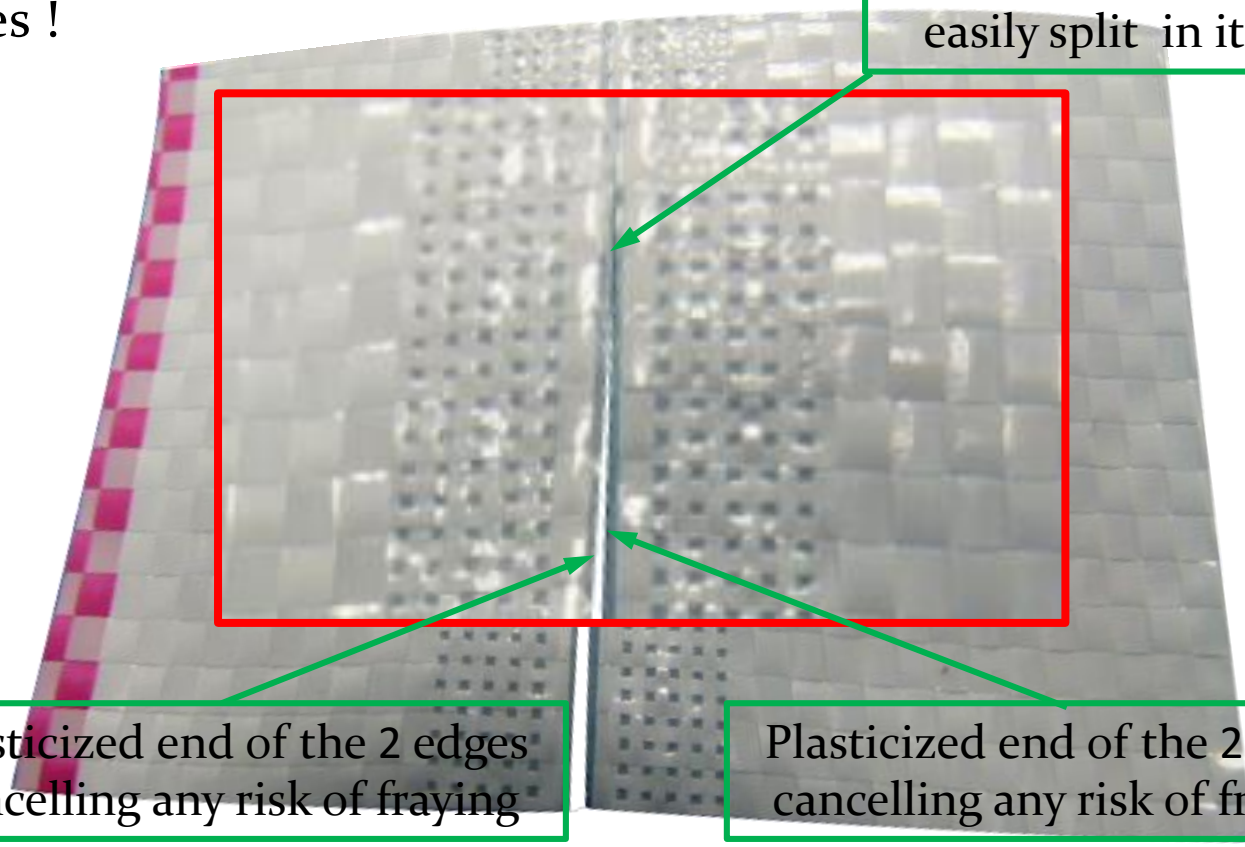
- No need of expensive extra air cooling while used on loom
- Thanks to the controlled distance → huge reduction of the wear between the horn and the wheel, or tool, …
- High reliability never equaled or even approached by competitors,
- Very easy to install and to use. Fast and simple to adjust.

3.4. "Sonic Touch Control" the TEXTI SONICS PATENT for SEALING CUT

Thanks to its clever and innovative design,

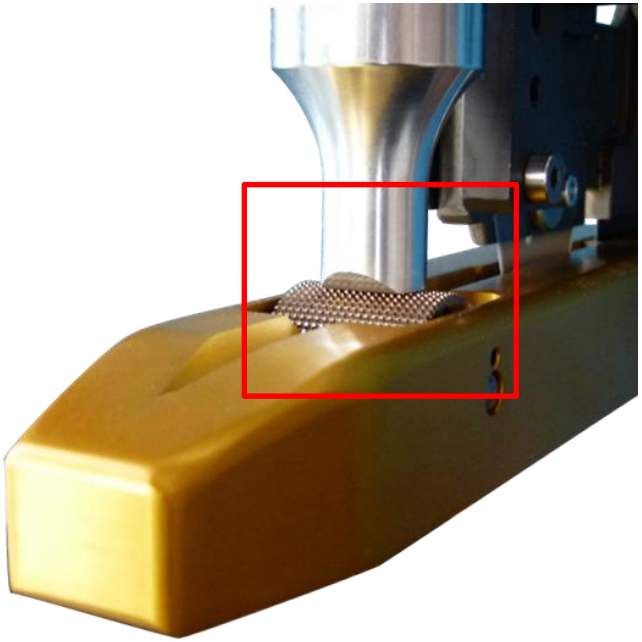
2) it provides to quality dpt. and sales dpt.:

- Very strong edges instead of fraying fabrics !
- Very clean and soft edges instead of overheated and thickened edges !

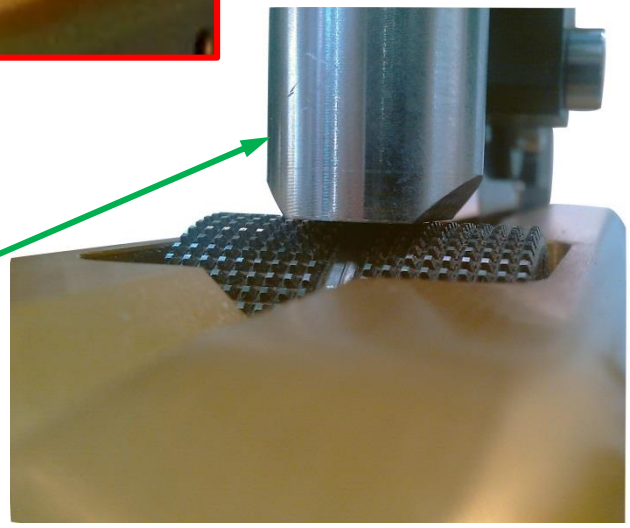


POSSIBILITY OF EASY MODIFICATION OF THE WELDED AREA WIDTH

Device with typical set-up for use on slitting machine (higher speed). The sealed track is 20 mm.



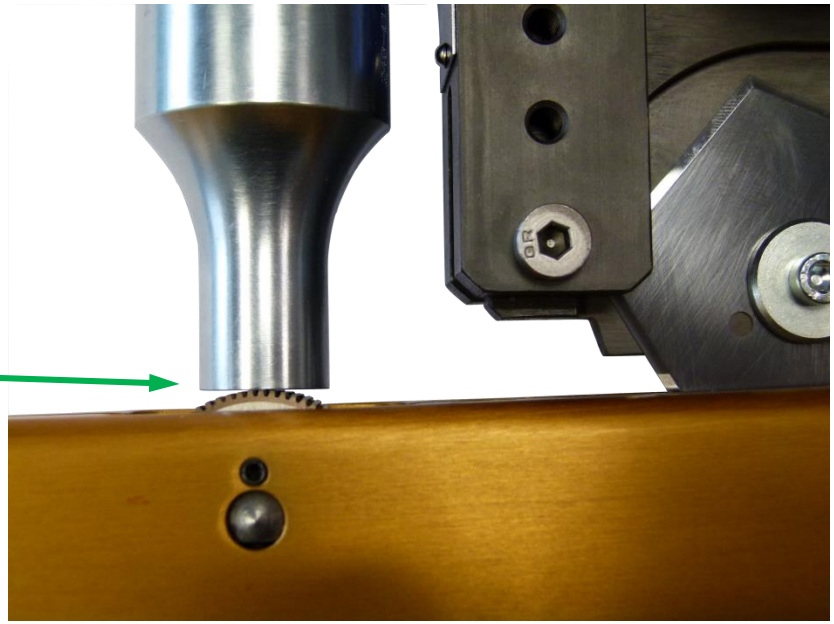
Just by turning this type of horn by 90°, the welded area is reduced from 20 mm to 10 mm



ADJUSTMENT ACCORDING TO THE GRAMMAGE OF THE FABRIC

With its ability to adjust very accuratly its gap, the STC system can cut and seal fabrics from **40 to more than 300 G/SM.**

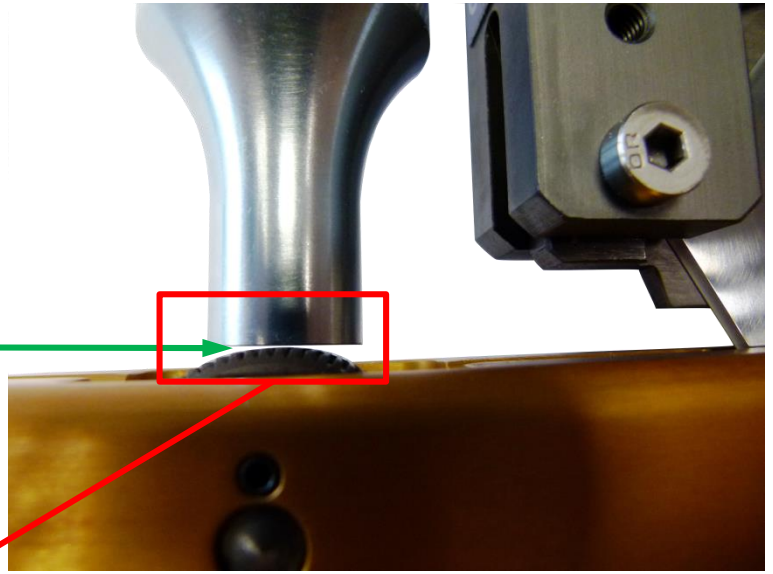
For light fabrics:
a light contact between horn and wheel is convinient



This type of adjustment is usually done in less than 1 minute.

ADJUSTMENT ACCORDING TO THE GRAMMAGE OF THE FABRIC

For heavy fabrics: a suitable gap has to be fitted between the horn and the wheel



This type of adjustment is usually done in less than 1 minute as well.

INNOVATION CAN'T BE ONLY AN OPPORTUNISTIC ANNOUNCEMENT

As demonstrated with the above information, photos and videos, innovation and accuracy it is our constant way of working.

By using the best compromises of high technologies, efficiency of conception and construction, the goal of Texti Sonics has always been designing and building devices for the life time

THANK YOU VERY MUCH FOR YOUR KIND ATTENTION

and I wish you to also take the best advantage of

previous and upcoming presentations