UNIVERSITY TECNICAL OF NORT

SUMMARY OF THE THESIS PRIOR TO THE DEVELOPMENT OF THE TITLE OF ENGINEER TEXTILE

TOPIC:

STUDY AND APPLICATION OF TEXTILE REGULATIONS USED IN TERMOSECCIONADOR WITH FIBER ACRYLIC WET, SHINY OF 3.3 DTEX

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Ibarra, 26 dic. 11

HOME

The study and application of the regulations used in the textile acrylic fiber thermo switch, takes place in two parts.

The theoretical part referred to the analysis of different concepts and knowledge, and the second called practical part consisting of tests, results, analysis and putting into practice the knowledge of the first part.

FIRST CHAPTER

He relates in general the process of spinning of acrylic, which begins in oil refineries, where a derivative is acrylonitrile, the same being delivered to petrochemical plants are in charge of polymerization with different chemicals for polyacrylonitrile, this product is added to a solvent to soften and spin it. Then the solvent must be removed for which two methods: These are hot air, where we get the so-called dry fibers or can be removed in a chemical bath where the fibers are obtained fibers called wet.

Of these two types of fibers the main difference is the cross section, being in the case of dry fibers a round section and the wet fiber cross section in the form of beans.

Whole acrylic fiber can be added different substances to change the fiber characteristics such as: dyes, pigments, titanium dioxide, or enzymes.

These fibers can be purchased with different thicknesses, continuous or chopped fibers.

In the first chapter also describes the properties that have these fibers, such as: reprise, density, toughness, elongation, etc.

This chapter describes the normal process of different machines by the textile spinning for a long-fiber acrylic.

This process begins with polyacrylonitrile fibers feeding the machine thermal section, which

aims to transform the filaments of wire fed, short fibers like wool fibers.

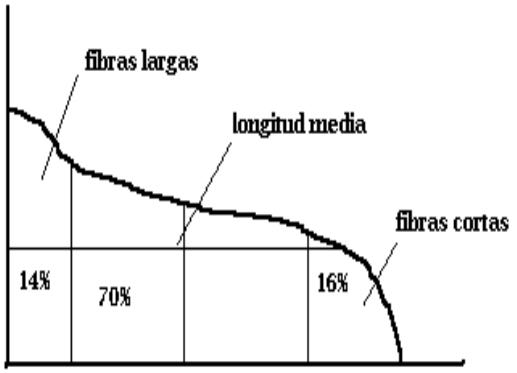

Figure 1 Distribution of long fibers.

This machine has multiple zones, one feeding, one of stretching, and a post-treatment. The areas are called area stretching heating; wire breaks preliminary zone 1 and 2, broken wire zone 1 and 2 finishers. The post-treatment area consists of: on fiber compactor, box curling, spray and cooler. This machine can get two types of fibers and non-retractable retractable.

The fibers at ease for about 4 hours to feed rebreiker passage that takes its name from a group of rollers to break the fibers become too long. It is in this machine that makes the fiber mixture retractable or retractable, bulky yarns for HB effect.

Continuing with the wicks are fed to a series of passages provided with needle heads with combs, which help to comb, mix and homogenize the fibers. The passages are divided into self-regulating and tuner. The first has a regulating device thickness of the wick and the latter are used to gradually reduce the thickness of the wicks.

The last tape passage is fed into a machine called finisor, which aims to further reduce the thickness of the wick, give false twist rubs through and place the wick tubes.

The wicks produced are fed to the spinning machine whose purpose is to give the final drafting of the fibers, twist and wrap the thread in a cop or coil.

In order to eliminate defects that have the thread, purging is done spinning and the yarn is wound on cones that help handling in other processes which include:

processes of twisting, dyeing and weaving.

CHAPTER II

Describe everything about quality considerations that should be considered in the review process of the thesis.

It begins with the origins of quality control, when for years "30 Shewhart begins the study of statistics, and then, with the momentum of Mr. Deming creates what is known as the statistical quality control.

Then Shewhart acknowledges the influence of variations in production processes and explores the development of control charts, and other researchers developed sampling techniques for quality control.

The researcher Joseph Juran introduced quality costs in production processes, establishing avoidable costs and non-preventable.

With all this knowledge about the quality Armand Freigenbaum contributes in developing the organization's management of quality, creating the philosophy of quality, and the concept of total quality control.

For 60 years Philip Crosby offers a quality program based on 14 points which call zero defects.

This is how the quality comes to occupy a strategic role in the world, creating a global cultural change, and begin to create a series of streams of strategic management of quality to suit all types of businesses and daily living of mankind.

Continuing in this chapter describes the definitions of quality, total quality control; develop an analysis of the quality change in production processes, the processes of total quality control.

Later specifies the statistics needed for total quality control, statistical formulas established for quality control are: the arithmetic mean, standard deviation, and coefficient of variation.

To conclude this chapter describes the controls required in the textile spinning process of long-fiber acrylic.

- The controls described are:
- Control of cord retraction
- Fiber length
- Weight per unit length
- Regularity of wicks
- Count neepes
- Regularity thread
- Qualification thread
- Study burst
- Twist in spinning
- Yarn resistance
- Yarn hairiness
- Purge yarn
- Aspect yarn

CHAPTER III

As the last chapter of the theoretical part we have regarding the machine investigated the thermal switch, the utility is described here, the constitution of it, the working areas of the machine.

The thermo-mechanical description of the switch is centered by the construction and use of the different movements of the gears, materials with which it is manufactured mechanical parts, and mechanical aspects are noted that may affect the fabric worked.

Continuing this chapter, describing the process of thermo sectioning of textile fibers, starting with the cable over the creel, the usefulness of the work areas of the machine, stretching areas, the different elements of post-treatment such as: the compactor, the box curling, the vaporizer and the cooler material

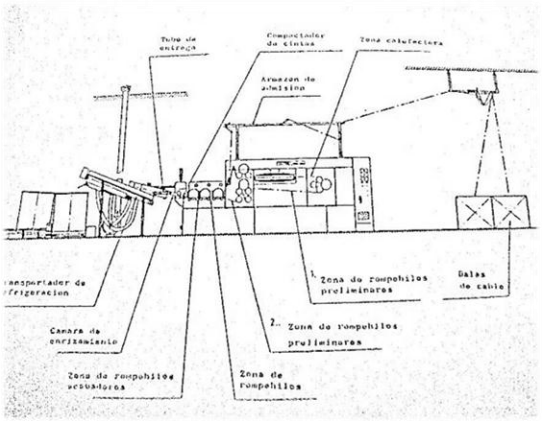

Figure 2 Parts and zones constituting the thermal switch

In all areas of work is theoretical and technical considerations that are important to take them into account for the proper working of the machine, the normal conditions described are:

- Feed Machine
- Areas stretching
- Steam Power
- Water Supply
- compressed air supply
- Hydraulics

Continuing this chapter describing the regulations that has the heat machine sections as are:

- Regulations in the heating zone
- Regulation broken wire in the preliminary 1
- Regulation in the preliminary 2-wire breaks
- Regulations ripple in the chamber
- Setting the steam chamber
- Control of cooling conveyor

From these theoretical ends the theoretical part of the thesis, and began the practice.

CHAPTER IV

It begins with a description of the raw material used for the investigation and the reasons why it chose. The machine model used for testing, regulatory conditions and some basic materials as the starting point of the tests studied, these are:

Adjustment	Value
Pine	28-33-24-50-42-35
Stretching	1.20 - 1.38 - 1.47 - 1.19 - 1.52
Total stretching	4.39 * 1.07 = 4.72
Plate temperature	115 ° C
Vapor pressure of	1.5 bar at sea level
Ecarte	160-120
Machine speed	150 m / min

Figure 3 Table with initial conditions

Then I check the conditions of the company and obtained the following data:

FEATURE	PREVIOUS PROCESS
PAROS by entanglement in cylinders (see Attachment # 6)	1.7 STOPS / TURN
PRESSERS CYLINDER LIFE	BETWEEN 1 AND 4 MONTHS
Ktex and CV. WEIGHT OF WICK S (see Attachment # 7)	1.9% 29.56 Ktex
Ktex and CV. WEIGHT OF WICK N (See Attachment # 7)	3.8% 35.31 Ktex
KG. / DAY	4500 KG.
CV. 37.5 CARIBBEAN YARN (See Attachment # 8)	14.39
RMHH (See Attachment # 9)	RMHH. 61
LINT IN THE ENVIRONMENT	Notable
APPEARANCE OF THE FINISH YARN	REGULAR, FLUFFY, VOLUMINOUS
BEHAVIOR IN MACHINES THREAD AVERAGE (ORAL FINDINGS IN THE TEXTILE COMPANY THE RAY)	NEEDLE, SHAPE LINT
WASTE SPINNING (See Attachment # 10)	4.3%

Figure 4 initial conditions of the sponsoring company.

Tests are 3 for each studied regulation, and the parameters and test results are placed in tables for easy understanding. Thus we have:

TEST #	STRETCHING	GEAR CHANGE	% SHRINKAGE	VALUATION OF MAX (+++++)
1	1.20	G1= 28	19%	++
RESULTS	There was a lot of fiber breaking irregularly, the machine makes the engine very strong, sometimes slows down the machine. It feels like bursting the fibers and lint is formed in the environment.			
2		G1 = 30	20%	++
RESULTS	Significant presence of broken fibers, machine effort to break the material, there is the presence of loose fibers along the entire area.			
3		G1=32	20.5%	+++
RESULTS	Great fiber breakage in this area, the breakup is more homogeneous with respect to the above tests, there is effort to cut the material machine.			

TEST #	TEMPERATURE	% OF SHRINKAGE	VALUATION MAX (+++++)
4	115 °C	19%	+++
RESULTS	In this area appears large amount of tearing of fibers, the material has a feel stiff in the output plates. The temperature of the material at the exit of the plates at 90 ° C.		
5	120 ° C	20.3%	+++
RESULTS	Decreased broken fibers in this area, presence of long single fiber groups in the area, the material has a little touch at the output of plastic plates. Material temperature measurement at the exit of the plates is 95 ° C.		
6	130 ° C	20.5 %	++++
RESULTS	Breaking uniform minimum fiber in this area, presence of clusters of loose fibers between the plates. The material has a touch more plastic than previous tests. Material temperature measurement at the exit of the plates is 95 ° C		

TEST #	STRETCHING	SPROCKETS G1-G2-G3	VALUATION (+++++) MAX
7	1.29	28 – 31 - 24	++
RESULTS	There was little disruption of fibers, variation in the width of the wick worked, the presence of entangled and textile inappropriate way by the third roller ceramic cylinders.		
8	1.38	30-33 - 24.	++

RESULTS	There was the passage of a stable material at times presents a high mechanical stress on the machine, forming large groups of fibers cut		
9	1.46	32-35 - 24	++++
RESULTS	There was a very stable over textiles with homogeneous fiber breakage, except instances when there is shedding fibers to the sides of the wick worked		

TEST #	STRETCHING	SPROCKETS G1-G2-G3-G4	VALUATION (+++++) MAX
10	29.01	32-31 - 21 – 50	+++
RESULTS	There was a proper transfer of the fibers; the material in this area is well tempered.		
11	1.41	31-33 - 23 – 50	++++
RESULTS	There was a proper transfer of the fibers; the material in this area is temperate.		
12	1.47	32-35 - 24 – 50	+++
RESULTS	There was a proper transfer of the fibers; the material in this area is temperate.		

TEST #	ENCARTACIONES	STRETCHING	GEAR G5
13	170 mm	1.32	38
RESULTS	Fibers result is long fiber length 172mm. And the number of long fibers is important.		
14	165 mm	1.25	40
RESULTS	Fibers result is long fiber length 166mm. And the number of long fibers is low.		
15	160 mm	1.19	42
RESULTS	Fibers result is long fiber length 165mm. And the number of long fibers is lower compared with previous tests.		

TEST #	ENCARTACIONES	STRETCHING	TOP GEAR G6	VALUATION (+++++)
16	115 mm.	1.49	34	+++
RESULTS	The result is fiber short fiber length 5.5mm. And the amount of short fibers is evident. The average length of the fibers are of 10cm.			
17	120 mm	1.49	35	+++
RESULTS	The result is fiber short fiber length 5.5mm. And the amount of short fibers is evident. The average length of the fibers is 10.5cm. There are also a greater			

	number of fibers above the test average.			
18	1.25 mm	1.41	36	+++++
RESULTS	The result is fiber short fiber length 5.5mm. And the amount of short fibers is evident. The average length of the fibers is of 11cm. There is also a greater number of fibers average than previous tests.			

# TEST	DIAMETER LINE	**RESULTS**
19	5.5	The wick obtained is presented fibers separate from the tape group. The wick has a shrinkage of 2%
20	6.5	The wick is compact and uniform throughout its length. Shrinkage obtained is 1.5%.
21	7.5	The wick has away from the core fibers of the tape. There is a wick slimmer to previous tests of this regulation. Shrinkage obtained is 1.3%

TEST #	SPRING SETTING	CRIMPING FOR CM	VALUATION (+++++) MAX
22	Under	4.0	++
RESULTS	The supply tension in re breaker creel was too loose.		
23	Middle	5.5	+++++
RESULTS	The supply tension in re breaker creel was in middle position.		
24	High	6.3	+++++
RESULTS	The supply tension in the creel of the machine was re-breaking high.		

TEST #	SCALE OF POT	VALUATION (+++++) MAX
25	3.5	Fiber Type S +++++ N-type fibers +++++
RESULTS	S-type fibers The outlet temperature of the material produced boat is 57 ° C. . The fuse is carried evenly. N-type fibers The outlet temperature of the material the boat 69 ° C. The wick is transported pauses in which no material is transported accumulation of bits on the conveyor belt.	
26	6.5	Fibers Type S + + + + Fiber type N + +
RESULTS	S-type fibers The outlet temperature of the material produced boat is 59 ° C. The wick is transported in a tensioned. N-type fibers The outlet temperature of the material the boat 73 ° C. The wick has little pauses transported in	

	which no material is transported and then out into small cakes that do not produce tangled strands.	
27	9.0	Fiber Type S + + + + N +-type fibers +
RESULTS	S-type fibers The outlet temperature of the material produced is of the boat 60 ° C. . The fuse is stressed when the boat comes down rub between the wick and the conveyor belt. N-type fibers The outlet temperature of the material the boat 78 ° C. The wick is transported pauses in which no material is transported by turning the band without moving material and then get the cakes producing textile material accumulation that generates entanglement strands that hold the work of re-breaking.	

Figure 5 Tables of tests of the investigation.

CHAPTER V

Analysis is performed quality and production of research results.

For quality analysis is performed for each group of graphic evidence, in which we observe the behavior of the fabric being tested for. Figures are

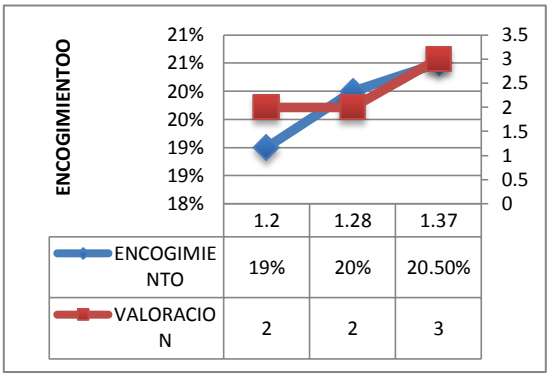

Figure 6 Figure shrink and tear in heating zone at 115 ° C.

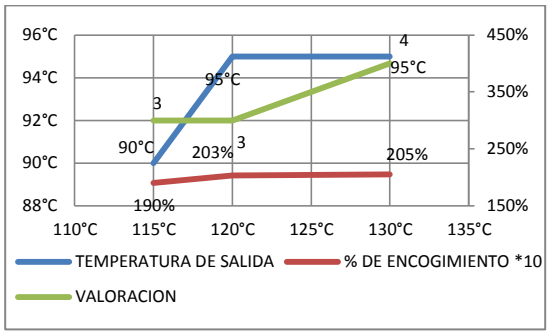

Figure 7 Figure outlet temperature, shrinkage and measurement of tear D1. 1.20

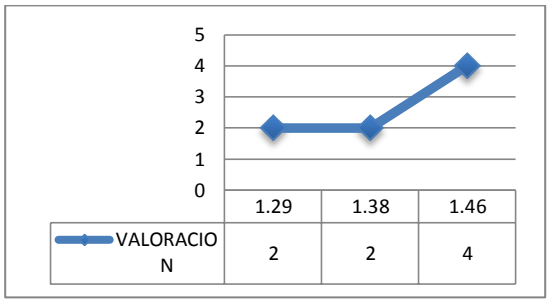

Figure 8 Graph of changing fiber tear D2

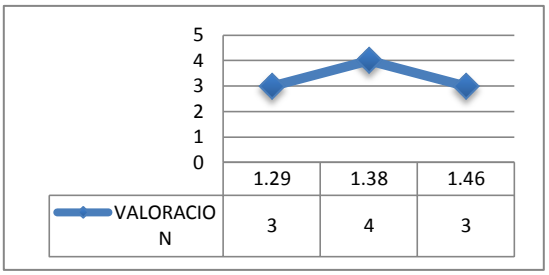

Figure 9 Graph of changing fiber tear D3

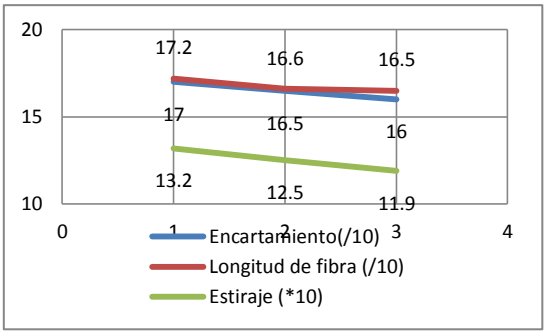

Figure 10 Graph of the relationship between Encartaciones, stretching and fiber length in D4 area

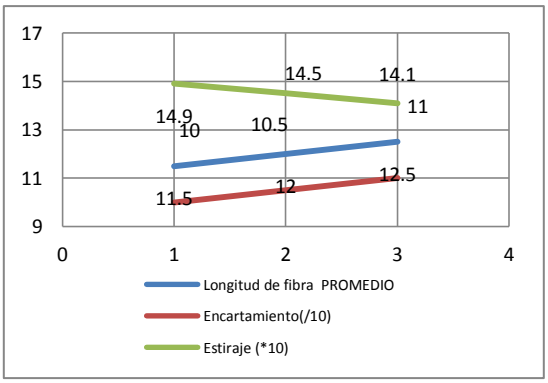

Figure 11 Graph of the relationship between Encartaciones, stretching and fiber length in zone D5

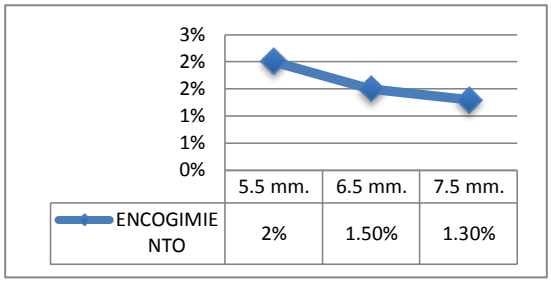

Figure 12 Graph of the percentage of shrinkage of the fibers vs vaporized. Swath width

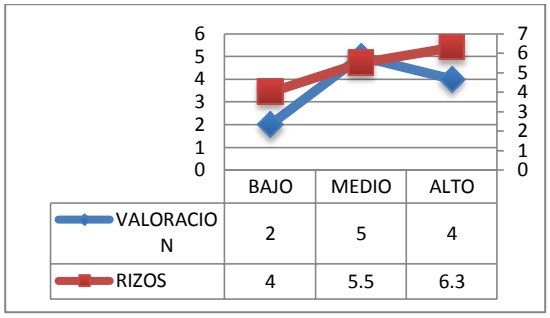

Figure 13 Graph of the number of loops and evaluation of evidence

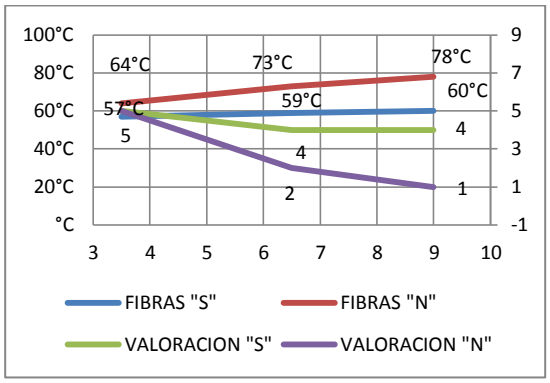

Fig. 14 Chart outlet temperature of the material and assessment of tangled with the speed of the cooling telera

Then he describes the analysis of production as follows:

Stretching tests and their impact on production.

Because the proper functioning of the machine calibrations Stretches improves durability vulcolan rollers, wear of the gears, shafts and bearings is more homogeneous and eliminate the amount of fibrils somewhat loose waste are reduced . And finally increases the weight of the wick produced causing an increase in the number of kilos produced.

Tests of vaporization and its influence on production.

Vaporization tests have no influence on the production of the machine. What is to be recommended vaporized material as much as possible, to avoid shutting down the machine by changing the material vaporized material thermo retractable.

Testing Ripple and its influence on production.

Curly tests do not influence the production of thermo sectional. But if we can say that influences rebreiker feed rate, affecting the number of wicks fed, therefore the total stretch and weight of the wick produced.

Evidence of cooling conveyor and its influence on production.

We note that the speed of cooling belt is less than the speed of the machine, this, so you have time to cool down the wick, which is looking to reduce the temperature of the tape and avoid cakes produced material in the vaporizer,

And hence the number of tangles or knots of the wick produced. Thus we can determine that it does not affect the number of kilos produced thermal machine sections, which can affect the productivity of rebreiker.

Analysis of the results of production.

Besides the production of other sections due to increases in the

area of preparation will avoid entanglements, resulting in increased efficiency. In the area of spinning decreases the amount of RMHH by what you get as many kilos delivered and less waste. In the area of coner of yarn imperfections are minor, so you bleed less in a row increasing the efficiency of it.

To end this chapter proceeds to place a table showing the new features of the plant and these are:

FEATURE	RESULT
PAROS BY ENTANGLEMENT IN CYLINDERS (SEE EXHIBIT # 6)	0.5 SHIFT
PRESSERS CYLINDER LIFE	3 TO 4 MONTHS
KTEX AND CV. WEIGHT OF MECHA S (SEE EXHIBIT # 7)	33.57 KTEX 1.7%
KTEX AND CV. WEIGHT OF MECHA N (SEE ATTACHMENT # 7)	37.46 KTEX 2.3%
KG. / DAY	5200 KG.
CV. 37.5	13.07
CARIBBEAN LINE (SEE ATTACHMENT # 8)	
HYLAS RMHH (SEE ATTACHMENT # 9)	RMHH. 35
IN THE ENVIRONMENT LINT	WELL-KNOWN
APPEARANCE OF THE FINISH YARN	FLUFFY, REGULAR VOLUMINOUS
BEHAVIOR IN MACHINES THREAD AVERAGE (ORAL FINDINGS IN THE TEXTILE COMPANY THE RAYO)	LESS NEEDLE BREAKAGE, REDUCED FORMATION OF FLUFF
WASTE SPINNING (SEE EXHIBIT # 10)	3.9%

Fig 15 Table of results of production.

Chapter VI

Proceed to the standardization of the new work process and appropriate regulations to work.

First are scored the best test results in the stretching area are:

- 1.28 drafting zone heating plate temperature 130 ° C.

- Area breaks preliminary 1 stretching less than 1.45
- Area breaks preliminary 2 stretching 1.29
- Area breaks finishers 1 encartaciones distance of approximately 165mm and the drafting of 1.25
- Area breaks finishers 2 encartaciones distance approximately 125mm and the drafting of 1.45.

With this information we proceed to fit the appropriate gears to put the values of the stretching, are summarized in the following table:

PINION	TOOTH	STRETCHING	VALUE
G1	31	D1	1.28
G2	30	D2	1.43
G3	21	D3	1.29
G4	50	D4	1.25
G5	40	D5	1.45
G6	35	TOTAL	4.55

Fig 16 Table of pine nuts and stretching.

Then write down other form suitable for the thermal sections of the test fiber. Such as: the temperature of 130 ° C. The row compaction of 6.5 mm. The ripple of 5.5 fibers per cm. linear. Fiber diagrams obtained with the conditions already described in areas of broken wires 1 and 2 finishers. Cooling beat Speed 3.5. Machinery speed 8.5.

Finally, a comparison between the previous process and the new process which was an improvement or optimization, except lint parameters of the environment and appearance of the thread where you can qualify it stays like this:

FEATURE	RESULT
PAROS BY ENTANGLEMENT IN CYLINDERS (SEE EXHIBIT # 6)	OPTIMIZED
PRESSERS CYLINDER LIFE	IMPROVED
KTEX AND CV. WEIGHT OF MECHA S (SEE EXHIBIT # 7)	IMPROVED
KTEX AND CV. WEIGHT OF MECHA N (SEE ATTACHMENT # 7)	IMPROVED
KG. / DAY	OPTIMIZED
CV. 37.5	IMPROVED

CARIBBEAN LINE (SEE ATTACHMENT # 8)	
HYLAS RMHH (SEE ATTACHMENT # 9)	OPTIMIZATION
LINT IN THE ENVIRONMENT	MAINTAINED
FINISH YARN APPEARANCE	MAINTAINED
BEHAVIOR IN MACHINES THREAD AVERAGE (ORAL FINDINGS IN THE TEXTILE COMPANY THE RAYO)	OPTIMIZED
WASTE SPINNING (SEE EXHIBIT # 10)	OPTIMIZED

Fig 17 Table of results of the investigation.

FINAL CHAPTER

CONCLUSIONS

- Develop your own plan to cut.
- Drafting of 1.28 and 130 ° C in heating zone. Shrinkage 20.3%.
- 1.43 In drafting preliminary breaks in zone 1.
- Area breaks preliminary 2 stretching of 1.29.
- In area 1 finishers breaks, stretching of 1.25, Encartaciones 165mm.
- Area breaks finishers 2 stretching of 1.45, Encartaciones 125.
- Steam Row 6.5mm to 1.5% residual shrinkage.
- Cooling speed 3.5
- Quality is improved and meets the needs of customers.
- Increased production less maintenance, less waste.
- Competitive Advantages less waste, performance preparation area, less RMHH, Less coner cuts, increased regularity.
- You must check the quality of: Shrinkage N y S for each day, fiber length, weight for each shipment.
- Dralon fiber bte L900. Fiber is a very ductile.
- The cut material should stand at least 4 hours.

RECOMMENDATIONS

- ❖ Maintain condition excellent mechanical parts.
- ❖ Clear all items before each shift change
- ❖ Maintain control of the boats rested from time cut, indicating the date and time to work.
- ❖ Providing ongoing training to employees on issues related to industrial safety and production.
- ❖ Acquiring a water cooler to cool the various mechanical parts of the machine.
- ❖ To investigate the thermal behavior in the sections of the dry fibers.

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