



# The Effect of the Discretization Process on Fibber Quality Indicators

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## ABSTRACT

In this article, a practical analysis of the mechanical impact of the discretizing of a pneumo-mechanical spinning machine on the fibres of the fed skein is made. The degree of mechanical damage to the fibre at different speeds of the discrete drum was studied on a HVI machine and a histogram was built based on the results obtained. The constructed histogram was analysed and alternative values were determined.

## Keywords:

maturity, fibre, vacuum, thread, waste, air consumption, quality, linear density, purity, pressure

## Introduction

As we know, during the discretization process, which is one of the main technological processes of the pneumomechanical spinning machine, a mechanical effect is observed between the provided braid fibres and the teeth of the discretizing drum set. The mechanical effect between the fibre and the teeth of the set has a negative effect on the quality indicators of the fibre. This condition also causes the deterioration of quality indicators of the produced product (spun yarn) [1,2,3].

The properties of the produced yarn are directly related to the properties of the raw material, that is, the fibre. On the basis of previously created theories in spinning, new research is being conducted and their solutions are finding practical applications. However, the issue of applying such solutions as a constant principle in spinning or bringing them to the level of use has not yet been fully resolved.

It is necessary to emphasize that it is absolutely inappropriate to think that the scientists and

specialists who conducted such research are wrong or inadequate in their scientific approaches and chosen methods. The essence of the matter is that the spinning processes are inherently complex, and the fibre properties, which are the determining factor, are diverse and very uneven.

In particular, the formation of physical and mechanical properties of cotton fibre depends on the selection of cotton selection, growing conditions and weather [4,5-8].

For this reason, each cotton fibre has its own characteristics and is manifested in different ways in yarn and woven fabrics.

## Methodology

In this research work, practical studies were carried out to study the effect of an improved discretizing drum drum on a rotor-spinning machine.

In order to determine the fibre quality indicators of the number of teeth and the number of threads of a discrete drum, a disk provided with a single-thread, improved two-

thread and the three-thread discrete drums were carried out in the discretization process. As a sample, fibres collected in a spinning chamber from discretization processes were taken [9,10,-13].

To study the quality indicators of the obtained samples, HVI system was chosen to study the quality indicators of cotton fibre, which is one of the modern methods.

When conducting research, in terms of the state standard for measuring fibre length on a fibregraph, ASTM D1447-07 "Standard Test Method for Length and Length Uniformity of Cotton Fibers by Photoelectric Measurement Method" (official source: ASTM D1447-07 Standard Test Method for Length Uniformity and Length of Cotton fibres using (photoelectric measurements) using methods consistent with the international standard for the length of staple mass and short fibres, applied to cotton fibre by mechanical sorting and manual sorting of fibres, determination of the length by the classifier method, determination of the length using a digital fibergraph (hereinafter referred to as the fibrograph) and measurement of fibre length The identification procedure in the SITC (NVI) system was carried out according to Proprietary DSt 3295.

**Results**

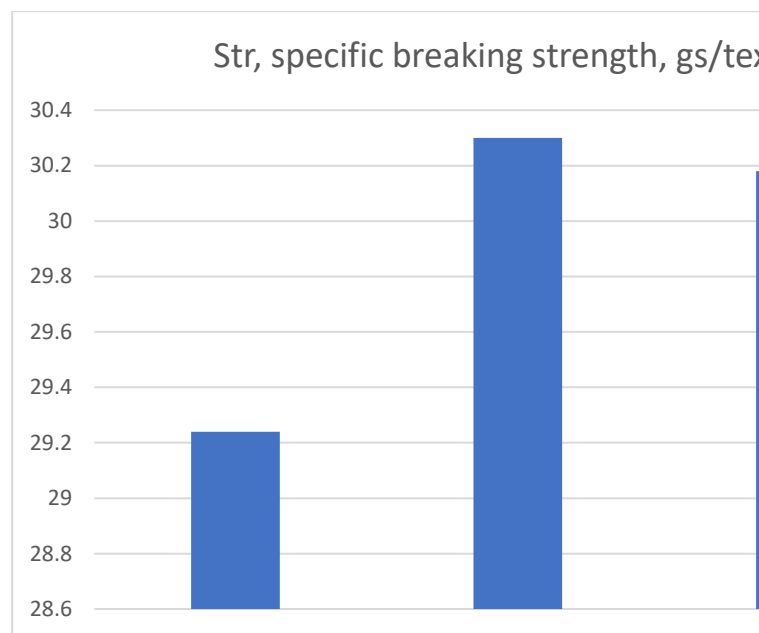
For testing, 200 g samples were prepared and tests were conducted on the HVI-900 SA system at the Namangan branch of the Agrasanoat complex [14,15,16,17,18].

The following table shows the results of testing of fibres subjected to discretization processes in one-pass, improved two-pass and three-pass discretizing drums in the HVI-900 SA system (Table 1).

**Table 1. Results of testing in the HVI-900 SA system of fibres subjected to discretization processes in discretizing drums**

1-recessed	4.5	29,24	11,1	81,7	9,
2-recessed	4.5	30,3	10,3	82,5	9,
3-recessed	4.5	30,18	12,3	80,9	9,

Based on the test results, histograms were obtained to analyze the obtained values. Figure 1 presents a histogram obtained based on the specific breaking strength (Str, gs/tex) of fibres discretized in single-wire, improved two-wire and three-wire discretizing drums. The relative breaking strength is the hardness of the cotton fibre and is expressed in gs/Tex (sN/tex) on the HVI scale of the calibrated fibre.



**Figure 1. Histogram of the relative breaking strength of fibres discretized in single-pass, improved two-pass and three-pass discretization drums**

As can be seen from the histogram analysis, based on the results of the test, the best result in terms of the relative breaking strength of the fibres of the supplied wick of the improved two-feed discretizing drum, i.e. 30.3 gs/tex, was achieved. Based on this result, an improved two-input sampling drum can be considered as an alternative option.

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Mic, Microneur	Str, specific breaking strength, gs/tex	SFl, short fibre index	Unf, Length uniformity, %	Elg, Elongation at br
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