# Analysis Of Characteristics Of Fibered Waste Produced By The Carding Machines

**Mirzabayev Baxriddin**
**,Mirzaboyev Jamoliddin,**
**Ergashev Xasanboy**
*Namangan Institute of Engineering and Technology*

## INTRODUCTION

Investment projects to be implemented at the initiative of President Shavkat Mirziyoyev in 2020-2025, as well as the provision of working capital to textile and garment enterprises will be financed by credit lines of the Fund for Reconstruction and Development of the Republic of Uzbekistan in the amount of $ 300 million. It is financed by loans from commercial banks opened for the textile and clothing industry [1]. The project has created a perfect system of additional sources of income in the textile industry.

Most of the raw materials supplied in the production of yarn from cotton fiber spinning mills are separated into fiber waste. In particular, according to the spinning system, the average amount of waste is about 20% of the mixture, in the carding spinning system - 12-18%, in the combing system - up to 32% [2].

In the textile industry, the process of carding is one of the main processes that affect the quality of products. This is because, as a result of the carding process, the short fibers in the fibrous products are separated and the fibers in the product are straightened and placed parallel to each other. Also, the carding process in the yarn production process has a significant impact on product quality. The unevenness of the card sliver coming out of the carding machines is flatter than that of the roughing products obtained from other processes, and the unevenness is less [3].

Modern carding machines are designed to improve the quality of products and to carry out post-cleaning measures for fibrous products. To do this, it is equipped with stationary flats to increase the level of carding from one surface to another. The number of feed roller has been increased to 3, and the level of cleaning of the machine has been increased. These parameters directly affect the quality of the product and improve the strength and purity of the finished yarn [4].

Experiments have shown that fibers that have the property of spinning are also added to the waste from the process of carding fibrous products [5].

The speed of the current carding machines is more than three times faster than the previous carding machines, ie the cylinder is from 200 $min^{-1}$ to 900 $min^{-1}$, the feed roller is from 700 $min^{-1}$ to 2700 $min^{-1}$, and the speed of the flats is 100 mm/min to 400 mm/min resulted in a sharp increase in the productivity of the combing machine. For example, it is proposed that the kinematic performance of Trutschler (Germany) TS-11, TS-15 carding machines can reach up to 260 kg/h [6].

The Swiss company Rieter claims that the C70 carding machines has a cylinder diameter of 814 mm and a rotational speed of 600-900 rpm, which can increase productivity to 240 kg/h [7].

In a spinning system, a simple carding machine is the final step in cleaning the fibers from contaminants and defects, but to a certain extent, debris, foreign bodies, and short fibers remain in the spinning system. Simultaneously with the removal of debris and defects in the fiber, a certain amount of waste and spinning fibers are released during the cleaning process [8].

Using the results of the study in production, the yarn breakage was reduced by 12-13%, the yarn properties were improved by 8-10% and the waste was reduced by 3-4% [9-12].

BASIC MATERIALS

In this research work, the properties of wastes from different types of carding machines were determined and the results were analyzed. For this purpose, the waste from the C601SN, manufactured by the Italian company Marzoli, TC-03, manufactured by the German company Truetzschler, and C-4, manufactured by the Swiss company Rieter, was cleaned and separated from its fibers. The properties of the isolated fibers were determined experimentally 3 times and their averages were calculated. The results obtained from the experiments are given in Table 1.

Table 1. Results of Marzoli (NAM TEX) carding machine

| Parameter | 50% | 50% Sl Unif | 2,5% Sl | SFI | Amount | Micronaire |
|---|---|---|---|---|---|---|
| Standard 7 | | | | | | |
| Test 1 | 44,2 | 11,48 | 25,96 | 9,4 | 487 | 4,7 |
| Test 2 | 46,7 | 12,76 | 27,32 | 8,4 | 466 | 4,6 |
| Test 3 | 46,7 | 12,65 | 27,1 | 9,2 | 382 | 4,7 |
| Average | 45,87 | 12,30 | 26,79 | 9 | 445 | 4,67 |

Table 2. Results of Truetzschler (ANTEKS) carding machine

| Parameter | 50% | 50% Sl Unif | 2,5% Sl | SFI | Amount | Micronaire |
|---|---|---|---|---|---|---|
| Standard 7 | | | | | | |
| Test 1 | 40,4 | 9,47 | 23,46 | 16,9 | 401 | 4,8 |
| Test 2 | 41,5 | 9,35 | 22,54 | 19,5 | 432 | 4,9 |
| Test 3 | 41,5 | 10,1 | 24,35 | 15,2 | 401 | 4,8 |
| Average | 41,13 | 9,64 | 23,45 | 17,2 | 411,33 | 4,83 |

Table 3. Results of Rieter (MEGA TEXTILE) carding machine

| Parameter | 50% | 50% Sl Unif | 2,5% Sl | SFI | Amount | Micronaire |
|---|---|---|---|---|---|---|
| Standard 7 | | | | | | |
| Test 1 | 49,7 | 13,09 | 26,36 | 9,1 | 373 | 4,8 |
| Test 2 | 47,8 | 12,49 | 26,13 | 7,9 | 371 | 4,8 |
| Test 3 | 45,3 | 13,46 | 29,73 | 7,7 | 359 | 4,7 |
| Average | 47,60 | 13,01 | 27,41 | 8,23 | 367,67 | 4,77 |

From the analysis of the parameters given in the table, it is known that the micronaire index of fibers in nut and fluff (ST-3) and waste (ST-7) fibers from carding machines does not differ much from 4.67 to 4.83 in all types of carding machines has an index of up to. The share of yarn suitable for spinning was 26.79% and 27.41%, respectively, in the ST-7 waste from C601SN and S-4 carding machines. The TS-03 carding machine produces 23.45% of spinning fiber.

## CONCLUSION

In conclusion, it should be noted that it is advisable to use the German company Truetschler TS-03, because the amount of fiber in the waste is the lowest, the output is higher than other types of carding machines and the quality of the sliver meets the standard requirements responds.

The analysis of the results of the study showed that the efficient use of raw materials in the enterprise can be achieved by using spinning fibers in the waste. Therefore, it is recommended to use the usable fibers in the waste from the carding machine as raw material.

## REFERENCES

1. Decree of the President of the Republic of Uzbekistan No. PF-5989 of May 5, 2020 "On urgent measures to support the textile and clothing industry." National Legislative Database, 06.05.2020, No. 06/20/5989/0533; National Legislative Database, 17.11.2021, No. 06/21/14/1053; 21.01.2022, 06/22/53/0052.
2. S.L. Matismoilov, Q.G. Gafurov, A. Pirmatov, K. Jumaniyazov. (2018). Preparation of raw materials for spinning. Tashkent.
3. Ashnin N.M. (1985). Carding of fibrous materials. *M.: Light industry and consumer services.*
4. Pirmatov, S.L. Matismoilov, Q.G ’. G’ofurov, SH.R. Maxkamova. (2018). Textbook "Spinning technology". Toshkyent.

5. J. Mirzaboyev. (2017). Influence of technological processes on the amount of fiber, yarn and waste in spinning mills. Master's dissertation. Namangan.
6. Рахматов, К. Р. (2021). Radiofrequency ablation of facet nerves in the treatment of pain syndromes in degenerative diseases of the spine. *Узбекский Медицинский Журнал*, *2*(5).
7. Zokirzhonovich, O. O. (2021). Use of Low-Carbon Technologies on Vehicle Transport. *International Journal of Innovative Analyses and Emerging Technology*, *1*(5), 15-17.
8. K.I. Badalov, V.V. Dzhokhov, H.A. Osmin. (1988). Spinning of cotton and other textile fibers. M.: *Legprombytizdat*.
9. Korabayev, S. A., Matismailov, S. L., & Salohiddinov, J. Z. (2018). Investigation of the impact of the rotation frequency of the discretizing drum on the physical and mechanical properties of. *Central Asian Problems of Modern Science and Education*, *3*(4), 65-69. https://uzjournals.edu.uz/capmse/vol3/iss4/9
10. Korabayev, S. A., Mardonovich, M. B., Lolashbayevich, M. S., & Xaydarovich, M. U. (2019). Determination of the Law of Motion of the Yarn in the Spin Intensifier. *Engineering*, *11*(5), 300-306. https://www.scirp.org/journal/paperinformation.aspx?paperid=92784
11. Ahmadjanovich, K. S., Lolashbayevich, M. S., & Tursunbayevich, Y. A. (2020). Study Of Fiber Movement Outside The Crater Of Pnevmomechanical Spinning Machine. *Solid State Technology*, *63*(6), 3460-3466.
12. Erkinov, Z., Abduvaliyev, D., Izatillya, M., & Qorabayev, S. (2020). Theoretical studies on the definition of the law of motion and the equilibrium provision of the ball regulating the uniform distribution of the torque along the yarn. *ACADEMICIA: An International Multidisciplinary Research Journal*, *10*(11), 2338-2347.
13. Ahmadjonovich, K. S., Lolashbayevich, M. S., Gayratjonovich, M. A., & Erkinzon, S. D. (2021). Characteristics of yarn spinned on different spinning machines. *Збірник наукових праць ΛΟΓΟΣ*.