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INFLUENCE OF TECHNOLOGICAL PARAMETERS OF THE DRAFTING SYSTEMS OF THE RING SPINNING MACHINE ON YARN QUALITY

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ABSTRACT

In this article, its friction resistance is tested in determining the quality index of the tissues. The properties of friction resistance, length, linear stiffness, torsion and strength, deformation properties of the fibre in its composition were studied. In this paper, the friction resistance of tissue is tested in determining its quality index. The properties of friction resistance, length, linear stiffness, torsion and strength, deformation properties of the fibre in its composition were studied. It has also been studied that fibres are formed based on a spinning system and that their deformation properties increase or decrease when the fabric is resistant to abrasion. Also in the research work was prepared yarn (Compact melange yarn (RoCos)) with high deformation properties. The study found that rubber tissue has a 10% higher abrasion resistance than tissue *made from ordinary melange yarn. Experiments have shown that the tensile strength of compact (RoCos) melange yarn made of ordinary melange yarn is 19.2N higher than the length of the fabric made of ordinary melange yarn.*

KEYWORDS: *Yarn, Spinning Machine, Deformation, Quality, Compact Yarn, Spun, Unevenness, Elongation, Melange.*

INTRODUCTION

The yarns produced at the enterprises must meet certain requirements, depending on what purpose they are used for, that is, they must be in a certain consistency, to a certain extent, clean and smooth [1,2].

The threads with the highest quality are produced in the spinning machines with rings. The ring spinning style has been improving for more than two hundred years [3]. The advantage of the ring-spinning machine is that the yarn obtained from it satisfies the requirements of the world market in terms of quality. The ring spinning machines installed in the enterprises of Uzbekistan are mainly operational, high-performance equipment of leading foreign firms. The most common among them is the ring-spinning machine of the firms “Rieter” and “Zinser”. The frequency of rotation of the female of these machines is now reached up to 25000 thousand^{-1} With the introduction of advanced technologies in the textile industry, product quality management, based on the study of factors affecting the structure and properties of yarn obtained in serum spinning machines, is important in improving spinning efficiency [4,5]. Leading companies are conducting several important studies to improve the efficiency of spinning machines and machine design. Examples of such innovations include increasing the number of loops in machines, the introduction of compact spinning machines, continuous spinning and waste-free spinning [6]. Updates of this type are still in use on spinning machines. At the same time, the properties and traditional loop spinning yarns have become very popular in spinning technology under the name of the compact yarn, increasing the quality indicators based on completely new technologies. The geometry of the compact yarn has changed compared to traditional loop yarns. In the process of forming compact yarns, the baking triangle is almost non-existent [7].

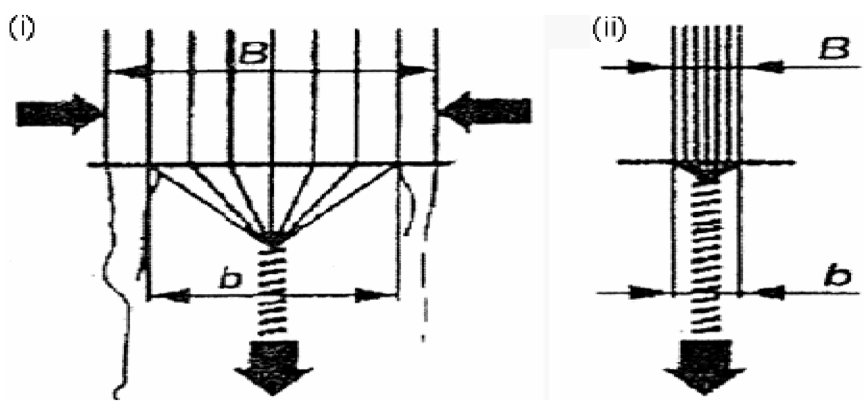

Figure 1. The basic principle of compact and simple yarns. (I) yarn spun in a simple ring method. (II) yarn spun in a compact manner

In the zone of yarn formation, the fibres become tense at the edges of ordinary yarns. ROTORCRAFT scientists explain that the fibres in the middle part are less involved in the twist. In ordinary yarns, the tension of the cross-sectional fibres is greater, and the tension of the fibres decreases towards the centre. Because the fibres have different stresses, the structure of the yarn is uneven and has low resistance to tensile forces [8, 9]. In compact yarns, we can see that the fibres are evenly distributed in the cross-section of the yarn. This arrangement of the fibres also affects the next stage of the process. In ordinary yarns, the tension of the cross-sectional fibres is greater, and the tension of the fibres decreases towards the centre. Due to the fact that the fibres have different stresses, the structure of the yarn is uneven and has low resistance to tensile forces. In compact yarns, we can see that the fibres are evenly distributed in the cross-section of the yarn. This arrangement of the fibers also affects the next stage of the process [10].

Ordinary yarns have low tensile strength and high hair strength. These problems have been eliminated in compact yarns. The larger the baking triangle, the worse the texture of the yarn. This means that the loss of the baking triangle in compact yarns has led to an increase in yarn properties. The compact and simple yarns look longitudinal as follows.

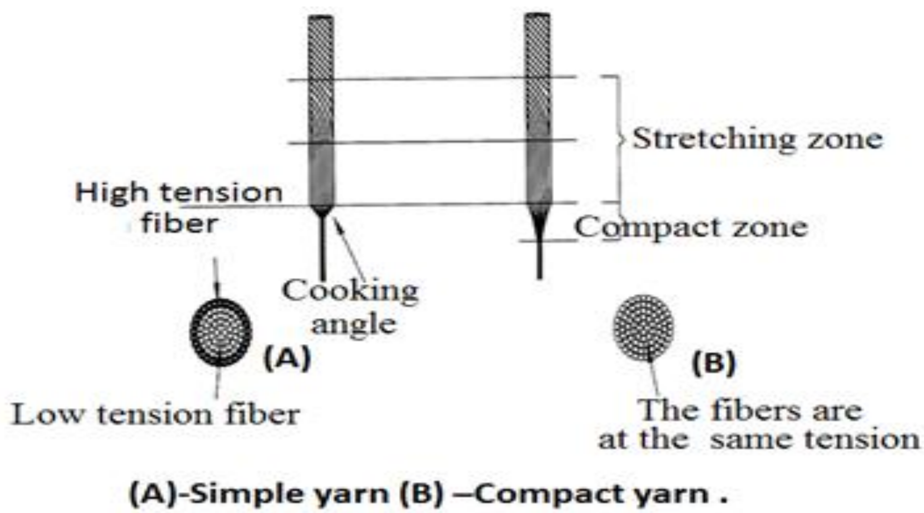

Figure 2 Placement of fibers in simple compact yarns

THE MAIN ISSUE

Several companies have also proposed their own inventions for compact yarns. Suessen (Elite spinning) Zinzer Air-Com-Tex 700 invention, Marzoli's Mas 3000 compact spinning machine, Rieter (Comforspin) engineers' compact spinning device, RoCoS device in the production of compact spinning devices by Rotorkraft have managed to improve the quality of yarn. Among the recommended devices, Rotorkraft's RoCoS compact yarn is simple and does not require additional energy. From the words Rotorkraft, Compact, Spinning - the term RoCoS, which is a device for mechanical compaction of fibres involved in the formation of yarn. Specifically, in the manufacture of compact yarns, the fibres passing between the elongated rollers of the ring-spinning machine are compacted using a device before the winding process [11, 12].

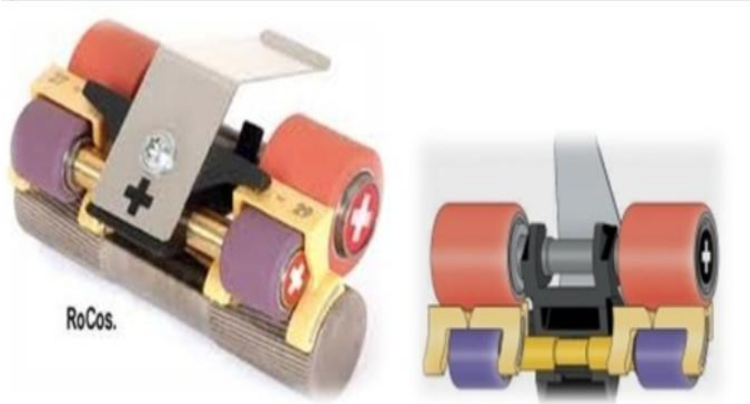

Figure 3. Rotorkraft's RoCoS compact yarn production method.

The RoCoS device is tested at a melange spinning mill. The experiments used a Zinser-350 ring spinning machine. Instead of a machine output roller, a RoCoS device was installed and compact mélange yarn samples (spinning frequency 17,000 and ripening at 750 b/m, 20-text sample yarn) were compared and compared with ordinary factory yarn.

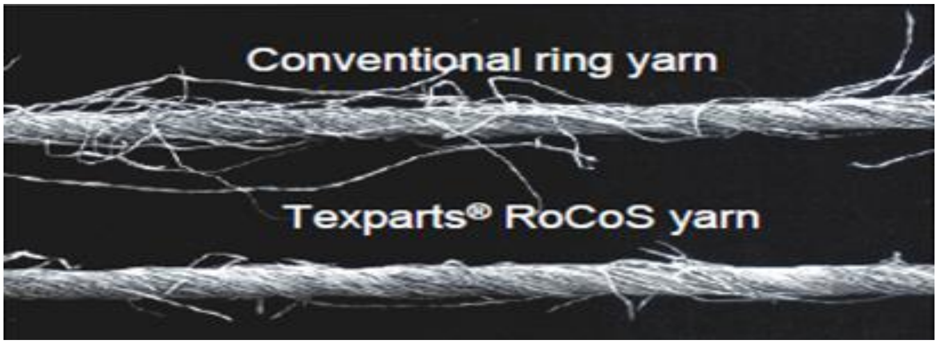

Figure 4 Comparison of RoCoS compact spinning system with the simple spinning system.

TABLE 1 CHARACTERISTICS OF SIMPLE AND COMPACT YARNS

№	Name of the parameters and unit measure	Simple yarn	Compact yarn
1.	Frequency of spindle rotation x103, min-1	17	17
2.	Relative breaking strength (Rkm) R, sN/teks	12,59	15,71
3.	Number of feathers 50 m long, more than 3 mm long, pcs	187	65
4.	Practical ripening, Ka, b / m	671	703
5.	Coun or line unevenness, C2 {T} %	16,34	15,54
6.	Force of the breaking, unevenness C2 {R} %	11,04	8,57

It was found that the quality of compact melange yarn obtained using a compact device has improved in all respects compared to ordinary melange yarn. Experiments have also shown that compact yarns have higher deformation properties than ordinary yarns.

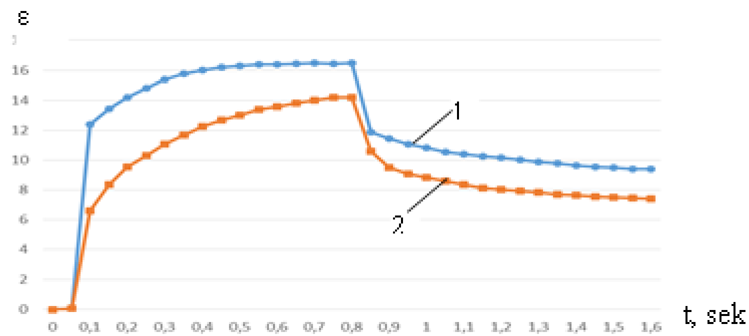

Figure 5. Deformation of normal and compact melange yarns by loading and unloading for 2 seconds. 1-simple melange yarn, 2-compact melange yarn

An optical instrument was used to measure the deformation properties of the threads. It is known that the threads are subjected to a force for a very short period of time [13,14]. With this in mind, their deformation resistance was determined over a short period of time, and the results were plotted and analyzed [15,17].

The single-cycle deformation properties of the sample yarns were studied over a period of 2 s (Figure 5). It was found that when compact (1) and ordinary melange yarns (2) are under load, the compact yarn has a 13% greater resistance to ordinary yarn. During the unloading process, it was found that the compact melange yarn returned to its original state by 21%.

The deformation properties of the yarns can also affect the quality of the fabric in the next stage. To determine this, a simple and compact melange yarn sample was obtained from a rubber knit fabric. The quality of the fabric was studied in the laboratory, in accordance with the requirements of standard norms. The results obtained are summarized in the table 2.

TABLE 2. INFLUENCE OF PHYSICAL AND MECHANICAL PROPERTIES OF FABRICS ON YARN QUALITY

№	Names	Friction resistance and number of rotations in friction	Breaking force N		Elongation, %		Shrinkge, U %		Air permeability	Surface density M, gr/m^3
			Length	Eni bo'yicha	Lenght	Width	Lenght	Width		
1	Made from	28,8	816	331,9	66,7	231	10	-5	106,7	474,1

	the Simple melanj yarn Lastik tissue									
2	**Made from the Compact (RoCos) melanj yarn tissue**	**32**	**835,2**	**348,5**	**67,05**	**263,7**	**8,50**	**-3**	**108,5**	**505,9**
3	**Simple melanj yarn and made from the Spantex Lastik tissue**	**30,5**	**841,2**	**363,7**	**120,9**	**351,7**	**7**	**-2**	**40,9**	**635,8**
4	**Compact (RoCos) melanj yarn and made from the Spantex Lastik tissue**	**34,1**	**868,3**	**408,8**	**112,3**	**310,9**	**7**	**-1**	**35,4**	**626**

RESULTS ANALYSIS

In determining the quality of a fabric, its abrasion resistance is tested. The properties of abrasion resistance depend on the length of the fiber, its linear density, torsion and strength, deformation properties. This is formed on the basis of the fiber spinning system. In analyzing these, we did this through several experiments below. Their deformation properties also play a role in increasing or decreasing the abrasion resistance of tissues. Rubber fabric made of yarn with high deformation properties (Compact (RoCos) melange yarn) has a 10% higher abrasion resistance than ordinary melange yarn.

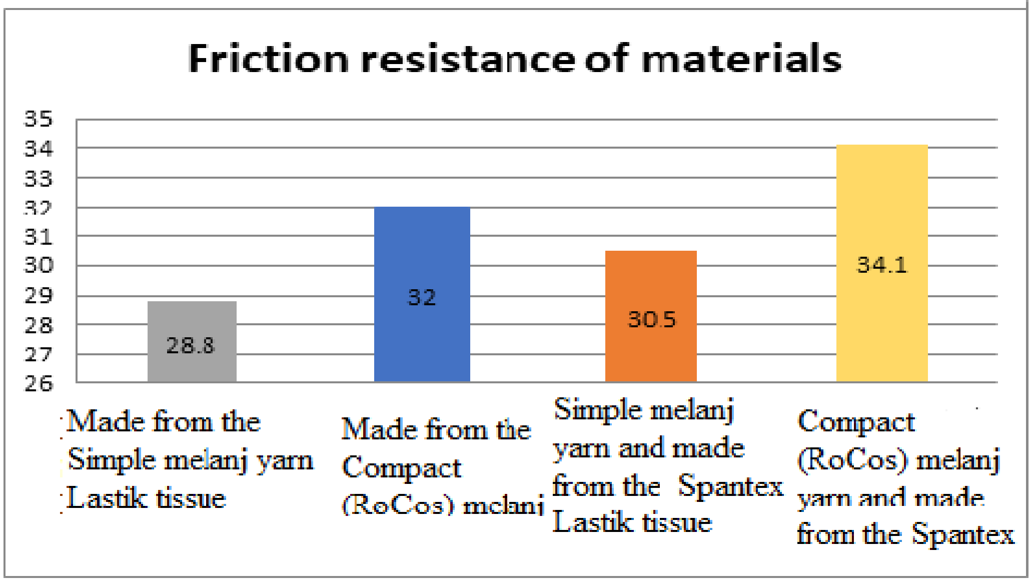

Figure 6. Friction resistance of materials

A certain amount of Lycra yarn is used to preserve the shape of knitted fabrics. The study also examined the abrasion resistance of Lycra mixed rubber tires.

Based on the results of the research, the quality of rubber fabric made from a mixture of ordinary melange yarn and Lycra yarn, as well as the quality of rubber fabric made from a mixture of Kompact (RoCos) melange yarn and lycra yarn were analyzed. According to the analysis, we can see that the rubber fabric woven from Compact (RoCos) melange yarn has an abrasion resistance of 11% higher than the rubber fabric woven from melange yarn. as well as a mixture of ordinary melange yarn and Lycra yarn, Rubber Tissue Friction Resistance It was found that woven rubber fabric obtained from a mixture of compact (RoCos) melange yarn and lycra was 11.8% higher than the friction strength.

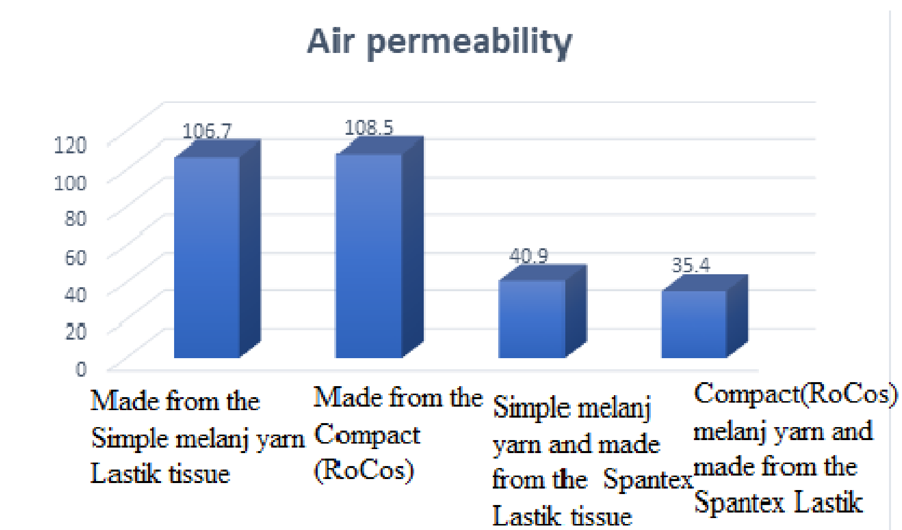

Figure 7. Air permeability

We know that the air permeability of the material depends on the type of yarn from which the fabric is made. We see on the basis of experiments that the prepared tire differs from the texture.

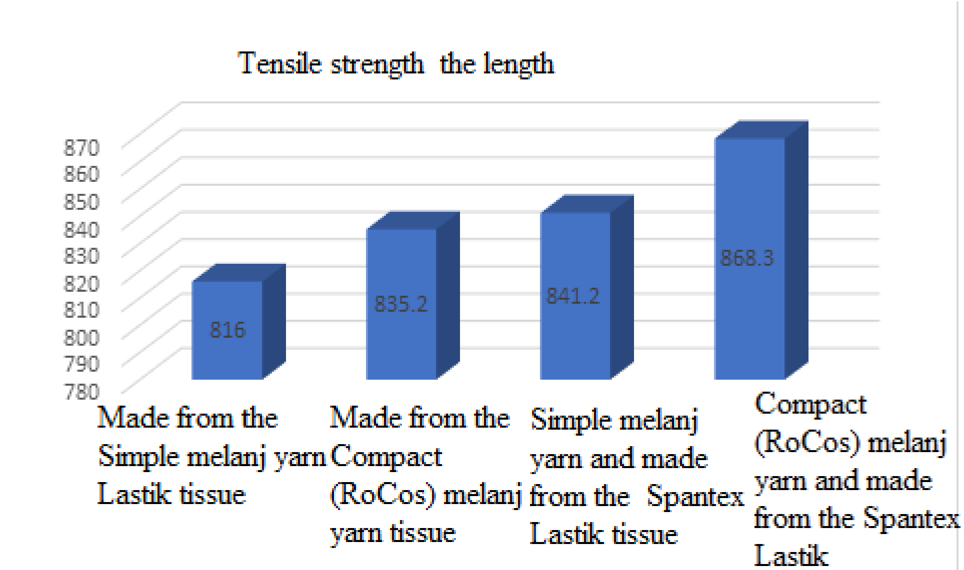

Figure 8. Tensile strength the length

Based on experiments, Normal Melange Yarn Compact Tire (RoCos) Melange Yarn Tissue Tensile Strength 19.2N, Normal Melange Yarn Tire Tissue Compact (RoCos) Melange Yarn and Lycra Tire to We can see that the tensile strength is less than 27.1 N

CONCLUSION

1. Studies have shown that compact melange yarns have higher physical and mechanical properties than ordinary yarns.

2. The melange yarn obtained in the RoCos compact spinning machine was found to have strength of 19.2N from factory ordinary melange yarn.

3. The compact yarn obtained in Rieter's K44 compact spinning machine has a strength of 27.1N compared to ordinary melange factory yarn. Normal Melange Yarn Tissue Compact (RoCos) is 1.8% different from Melange Yarn and Normal Melange Yarn Compact (RoCos) Melange Yarn is 5.5% air-tight compared to Lycra Tire. Permeability was determined experimentally

REFERENCES

1. 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.

2. 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.

3. SH.Komilov, A.Sarimsakov, R. Muradov (2020). Jin mashinasida kalta tolalar chiqishini kamaytirish va chigitnining shikastlanishini oldini olish yo’llari. // Trends in the development of light industry in the Republic of Uzbekistan: problems, analysis and solutions. - 2020. - No. 1. - S. 88-93. https: // doi: 10.47100 / conference_textile / S4_12

4. Ataxanov Avazbek Komiljanovich, Korabayev Sherzod Ahmadjonovich. (2020). Influence of the improved design of the twist intensifier on the mechanical properties of the yarn. *International Journal of Future Generation Communication and Networking*. Vol. 13 No. 4.

5. Bobojonov,H.T.; Yusupov,A.A.; Yuldashev,J.Q.; Sadikov, M.R.; (2020) Influence of deformation properties of yarn on the quality of knitted fabric. Test Engineering and Management. 83 (8). pp. 29502-29513.

6. Erkinov, Z., Zhumaniyazov, K., Parpiev, Kh., Fayzullaev, Sh., & Zhamalov, B. (2016). Influence of the number of folds of single threads, produced by different spinning systems, on the quality of the twisted thread. In Modeling in Engineering and Economics (pp. 201-203).

7. Jamshid, Y., Akbarjon, U., & Olimjon, S. (2020). Dynamics of Interaction of a Single Fiber with a Headset of a Sampling Drum. *Engineering*, *12*(6), 347-355.

8. Yuldashev, J. Q., & Bobojanov, H. T. (2020). Study Of The Influence Of The Parameters Of The Sampling Zone On The Condition Of The Capture Of Fibers By The Drum Teeth. *The American Journal of Engineering and Technology*, *2*(08), 75-78.

9. Sarimsakov, A. U., Kurbonov, D. M., & Khalikov, S. S. (2019). Study of the crucible of rotation of raw materials with a practical way. *Economy and society*, (12), 67.

10. Turdialiyevich, T. S., & Khabibulla, P. (2020). The Influence Of Top Flat Speed Of Carding Mashine On The Sliver And Yarn Quality. *European Journal of Molecular & Clinical Medicine*, *7*(7), 789-797.

11. Jamshid, Y., Akbarjon, U., & Olimjon, S. (2020). Dynamics of Interaction of a Single Fiber with a Headset of a Sampling Drum. *Engineering*, *12*(6), 347-355.

12. Bobojanov, H. T., Gofurov, Q. G., Jumaniyazov, Q. J., & Raxmatulinov, F. F. (2019). New ways to measure yarn deformation. *Textile Journal of Uzbekistan*, *2*(1), 63-68.

13. Bobojanov, H. T., Jumaniyazov, J. Q., Gofurov, Q. G., & Gofurov, J. Q. (2019). The relationship between the properties of yarn and knitted. *Textile Journal of Uzbekistan*, *1*(1), 7.

14. Kosimov, A. A., Bakhriddinova, S. F. K., & Abdulazizov, S. A. O. (2020). Classification Of Terry Products Made Of Natural Fiber. *The American Journal of Engineering and Technology*, *2*(11), 133-141.

15. 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.

16. Sarimsakov, A. U., & Ergashev, J. F. (2020). Modeling the motion of a mixture with weighty particles in a stationary flow of liquid. *SAARJ Journal on Banking & Insurance Research*, *9*(6), 20-24.

17. Ergashev, J., Kayumov, J., Ismatullaev, N., & Parpiev, U. (2020). Theoretical Basis for Calculating the Determination of the Optimal Angle of Rotation of the Slit and Air Velocity. International Journal of Advanced Science and Technology Vol. 29, No. 03, pp. 12776 – 12784.