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Analysis of the Separation of Spinning Fiber from Fibrous Waste Generated in Spinning Mills

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Abstract: The results of the study of the spinning capacity of spinning mills, including the characteristics of the fiber waste of the spinning mill and the correct selection of the composition of the mixture for spinning from fibrous waste.

Keywords: cotton, fiber, spinning system, production, fiber waste, standard, quality, supirindi, grinding, beating, mixing, ring, pneumomechanics, spinning, shaving, raw material, type, lot, filter, length, staple length, toughness, short fiber, yarn elongation, resources, rewinding, bass drum, industry, enterprise.

To ensure the implementation of the decision of the Cabinet of Ministers of the Republic of Uzbekistan dated February 12, 2019, local cotton fiber processing enterprises used a total of 761,000 tons of cotton fiber. 608,000 tons of high-quality, competitive yarn were produced.

This year, in 2020, the capacity of the cotton fiber processing enterprises will exceed 1.1 million tons, and 945,000 tons of cotton fiber will be developed and 740,000 tons of yarn will be produced. [1]

Methods. In particular, in the process of processing raw cotton by many spinning enterprises, high-quality yarns are spun and delivered to weaving and knitting enterprises in the form of semi-finished products. Simultaneously, spinning mills emit fibrous waste at every stage of their technological processes. The efficient use of this fiber waste will increase the cost-effectiveness of recycling fiber waste and create opportunities for spinning yarns of different linear densities.

Fiber wastes from spinning mills are identified and named on a standard basis. Here are some types of fiber waste:

ST-1 - Filter waste, ST-3 - Fiber waste from the saw unit (cleaned by a special device and then added to the rate), ST-7–

In the ring and pneumomechanical spinning system, the fiber waste from the hatch of the combing unit between the hats, ST-11 - the fiber waste from the main drum of the combing unit in the ring and pneumomechanical spinning system, ST-17 - Supirindi and pemsos fiber, ST-19 - Pilik ring, 30-Fiber waste from the spinning machine, ST-33 - fiber waste from the pneumomechanical spinning machine, ST-36 - Fiber waste from the rewinding unit and other types of waste.

Selection of raw materials for spinning yarn for industrial recycling, as well as types of cotton fiber and

industrial varieties should be developed on the basis of the recommended standard sorting (mixture). [2]

Not all types of this fibrous waste can be used for spinning in industry. The length of the fiber in the fiber waste should be at least 25-28 mm. Physico-mechanical properties of fibrous waste should be determined for spinning from 100% fibrous waste, which is considered acceptable for the formation of the mixture.

Conditions for determining and evaluating the properties of fibers Researchers have proposed many new ideas. AFIS and In comparative comparison of fiber quality determination in HVI equipment It has been shown that each of them gives a specific result [3].

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Results. Our practical research was conducted at MEGA TEXTILE LLC. This company uses the following machines in the technological process to prepare the fiber for spinning.

Sweeping unit: Blendomat BOA-019 machine made by the German company TRUTZSCHLER; Shaving unit: TS15 (258) machine made by TRUSHCHLER, Germany; 1st, 2nd stage in the spinning unit: 1st stage "TRUTZSCHLER" TD9T, 2nd stage TD10 machines; Peeling unit: Zinser Speed 5M machine; Spinning unit: on SAURER Zinser Ring 72XL machine; In the packaging unit: SAURER Schlafhorst Autoconer is made on 6 brand machines.

In the experiments, the fibrous waste generated at the plant is recycled. The mixed composition of the yarns planned to be spun from fibrous waste was obtained from 2 lots used at MEGA TEXTILE M.Ch.J. The main purpose of obtaining the results is to check whether our split fiber waste to be spun is suitable for spinning and then the composition of the mixture is formed.

In obtaining the results of the study, the properties of fibers in the fiber waste were determined on the laboratory equipment NVI of the Namangan branch of SUE "Service Center in the agro-industrial complex" of Namangan region.

Table 1 shows the important technological properties of the fibers in the waste.

Table 2 shows the conditional designation of the results of the examination of the fibrous waste in the NVI laboratory equipment and its nomenclature according to the Liverpool standard.

The results show that the fibrous waste from the main drum of the ST-11-Ring and pneumomechanical spinning system from the 6th lot of fiber waste and the staple length of the fiber waste from the ST-30-Spinning machine is 14.8 mm in ST-11, ST At -30, 26.4 mm index results were obtained. [7]

Fiber waste from lot 7 is ST-3 - fiber waste from the sawing unit (cleaned by a special device and then added to the rate), ST-11 - fiber waste from the main drum of the combing unit in the ring and pneumomechanical spinning system, and ST-30– Staple length of fiber waste from the spinning machine ST-36 - Staple length of fiber waste from the rewinding unit is 25.9 mm in ST-3, 24.63 mm in ST-11, 25.65 mm in ST-30, ST-36 at 23.36 mm, we determined the indicator results. [8]

Table 1

Name of inspection results	Mic			Str			Len			Unf			SFI			Elg			T			Cnt			Area			CG			RD			+b		
	mean	S.D.	%CV	mean	S.D.	%CV	mean	S.D.	%CV	mean	S.D.	%CV	Mean	S.D.	%CV	mean	S.D.	%CV	mean	S.D.	%CV	mean	S.D.	%CV	mean	S.D.	%CV	mean	S.D.	%CV	mean	S.D.	%CV	mean	S.D.	%CV
6-лот																																				
CT-11	5.1	0.05	1.02	28.2	2.15	7.62	0.98	0.01	1.00	77.6	1.24	1.60	24.1	2.71	11.22	7.4	1.08	14.70	0	0	0	74	15.53	20.89	1.5	0.23	15.20	62-2			59.9	2.71	4.52	8.3	0.71	8.58
CT-30	3.9	0.05	1.35	34.8	1.70	4.97	1.04	0.02	1.77	82.3	1.28	1.55	12.8	3.24	25.32	6.2	0.25	3.99	4	0.41	9.86	2	1.22	81.65	0.4	0.04	9.80	22.2			75.8	1.49	1.55	10.6	0.41	3.92
7-лот																																				
CT-30	4.4	0.05	1.23	41.7	3.30	7.92	1.01	0.01	1.45	83.3	1.61	1.94	10.6	2.62	24.79	7.3	0.23	3.18	4	0.41	9.80	2	0.55	36.51	0.4	0.04	9.86	31-3			77.1	2.82	3.65	8.9	0.31	3.45
CT-36	4.6	0.04	0.89	36.3	1.62	4.46	0.92	0.02	2.05	76.6	1.06	1.36	28.9	3.49	12.07	8.2	0.58	7.06	4	0.82	16.84	2	0.55	36.51	0.4	0.08	18.84	31.4			73.4	1.20	1.64	9.1	0.33	3.65
CT-11	4.6	0.05	1.18	33.2	1.40	4.22	0.97	0.01	1.37	27.9	0.75	10.32	25.9	2.9	24.3	10.9	0.57	5.26	1	2.45	244.95	78	36.65	47.19	1.1	0.28	25.06	61.3			61.1	1.17	1.91	8.5	0.36	4.47
CT-3	4.5	0.04	0.91	31.0	1.90	6.14	1.02	0.02	1.93	79.0	0.77	0.98	20.2	2.68	13.24	8.9	2.07	23.38	3	4.65	154.92	67	17.1	25.7	1.2	0.38	30.6	62-2			57.9	3.92	6.78	8.2	0.50	6.13

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Table 2

Indicators conditional sign of	The indicator is the Liverpool standard to be named on
Mic	Micronair
Str	Specific breaking strength, gs / tex
Len	Upper average length, inches
Unf	Uniformity in length,%
SFI	Short fiber index
Els	Elongation at interruption,%
T	Area of Dirty Compounds, Trash, T = Area * 10
Cnt	The number of contaminants in the area of the measuring window
Area	The area of dirty compounds,% of the area of the measuring window
CG	Variety by color
RD	Light reflectance,% (used to determine the type by color)
+b	Fiber yellowing rate (used to determine the variety by color)
SCI	Fiber spinning ability index. Computational values based on the regression equation for all parameters measured in the HVI system
CS	The calculated stiffness of the rope

Conclusion. The results obtained and the data in the table show that the spinning of fibrous waste fibers from the company "MEGA TEXTILE" LLC is close to current requirements.

In particular, the average length of the fibers is within the spinning limit. However, due to the low staple length of the fibers contained in the fiber waste from the main drum of the sweeping unit (ST-11) and fiber waste from the rewinding unit (ST-36), these fiber wastes do not meet the standard. [4]

This in turn complicates the process of yarn formation on the spinning machine. Simultaneously, during the spinning process, it has a negative effect on the toughness, elongation, elongation at break.

Yarns derived from fibrous waste impact the quality of fabric and machine performance in the knitting and textile industry.

The above analysis was compared with the technical requirements of the state standard of the Republic of Uzbekistan "Secondary material resources for cotton fiber processing" and it is recommended to add a small percentage of fibrous waste (ST-11) and (ST-36) to the mixture at the fiber waste processing enterprises. , [10] As a result, in spinning mills, 100% fiber waste is obtained by increasing the toughness and deformation of yarn under the influence of force on the yarn. [14].

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