

## TECHNOLOGICAL POSSIBILITIES OF UTILIZATION OF FIBRE WASTES.

<https://doi.org/10.5281/zenodo.11242782>

*Phd Norbayeva Dilfuza Voxobovna*

[norbayevadilfuza41@xmail.ru](mailto:norbayevadilfuza41@xmail.ru)

**Abdulfattohov Ibrohimjon Abdurahob o'g'li**

*29,30-31-TMJ-21 group student*

[ibrohimabdufattohov04@gmail.com](mailto:ibrohimabdufattohov04@gmail.com)

*"Technological Machines and Equipment"*

*Uzbekistan, Namangan.*

### **Annotation**

*In the article reviewed different designs of cleaning machines in cotton factories, separating of cotton from small pollutants. In this case, more effective ways of cleaning cotton from small pollutants are suggested.*

### **Keywords**

*cleaning, cotton, productivity, efficiency, small pollutants, pin drum, mesh, seeds, gin.*

The average size of the cotton grown in our country is 3,5-3,9 million tons. Organization all matters related to acceptance, storage and processing of this amount of cotton, coordination, implementation of a unified scientific-technical policy, production that meet the requirements of the global market standards and supply customers with cotton are the main objective of the JSC Uzbekistan cotton processing and sell cotton products association. There are 98 cotton refineries, more than 500 manufacturing facilities in our republic's cotton processing industry and each of them is equipped with modern equipment manufacturing base. Cotton production and processing industry is also very important in the economic development issues. Raw cotton processing starts with drying, quality of raw cotton by-products and technical performance of the equipment depend on the degree of moisture of raw cotton. Drying is a complicated process of the exchange of heat and humidity which is the most important technological step of the drying of raw cotton. Selection of drying mode is difficult, and it depends on heat-physical properties of the drying material and the forms of contact with moisture. There are more than 10000 kinds of materials dried in the world. And among them raw

cotton is the most complicated drying object. Because cotton is a material with multiple components (fiber, cotton seed cover, kernel) and it has different heat-physical properties. Therefore, it requires to acquaintance a knowledge in order to conduct drying process of raw cotton without prejudice to its quality, drying equipment mode selection relate to properties of raw cotton as a drying the object and drying equipment working processes.

Due to not fully implementation of these processes raw cotton with multiple components (fiber, seed cover, kernel) doesn't transmit moisture evenly, therefore wetting process is being carried out high-level cotton fiber up to 7%, low-grade cotton fiber up to 8.5%. This, in turn, it also requires to acquaintance a knowledge of raw cotton properties (fiber, seed cover, kernel) as wetting object and wetting equipment working processes. As the raw cotton is delivered in large batches to cotton refineries it's impossible to process them all at the same time, and most of them need to keep a long time. The appearance of the raw cotton with a high moisture and fiber strength reduce when stored, cotton seeds loses its physical and mechanical properties due to overheating. While cotton processing normal mode of machinery operation will break, reduce effectiveness of raw cotton refining and raw cotton clog in the hole of the machines. It should be reduced the moisture content of up to 7-8% immediately in order to get a high quality fiber and ensure the best performance of machines.

**Table 1**

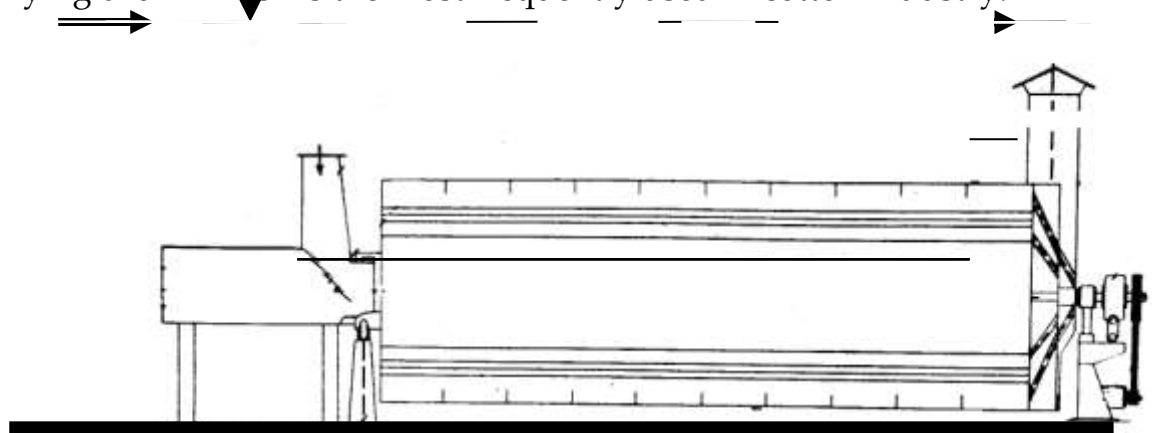
**Weight fraction of contaminants and the principles of limited weight ratio of moisture per cotton class, percent**

Cotton type	1 class		2 class		3 class	
	Weight fraction of contaminant	Weight ratio of moisture	Weight fraction of contaminant	Weight ratio of moisture	Weight fraction of contaminant	Weight ratio of moisture
I	3,0	9,0	10,0	12,0	16,0	14,0
II	5,0	10,0	10,0	13,0	16,0	16,0
III	8,0	11,0	12,0	15,0	18,0	18,0
IV	12,0	13,0	16,0	17,0	20,0	20,0
V	-	-	-	-	22,0	22,0

Drying, passing moisture from cotton is carried out in special equipment - dryers (artificial method) or in the open air (natural method). Natural drying requires many place, many of the labor force and good weather conditions which is

carried slowly. So it is not applied for the cotton industry. The growth of raw cotton production, reduction of gathering period through introduction of machine picking of crops as a result of reduce the heavy manual labor in cotton drying and quality of raw cotton natural quality indicators and ensuring the safety of serving personnel made to create high-productivity driers. And constantly moving, highly efficient mechanical driers are created. As a result, manual labor expenditure is reduced significantly in drying and cotton processes.

Nowadays, drum-type with a high efficiency 2SB-10 and SBO dryers are being used in raw cotton drying processes. Picture 1 shows technological scheme of the SBO drying drum which is the most frequently used in cotton industry.



**Picture 1.** Technological scheme of SBO drying drum.

1- heated air transfer pipe; 2- pneumatic maintainer; 3-device delivers wet cotton into drum; 4-drying drum; 5-spades installed in drum; 6-used air transmitting pipe;

7-редуктор; 8-electro engines.

Seeded cotton is delivered together with heat (drying agent) (2) into drying drum (4) through a maintainer (1).

Due to drum rotation seeded cotton collapse as a crumbled as a result of lifted to a certain height, then dried mixed with a drying agent, and then dried seeded cotton is sent to the next machine through a transfer spade (10) of the drying drum. Used drying agent goes out through a transmitter (9).

### Technical indicators of 2SB-10 drying drum:

1. Cotton work productivity, kg/hour .....	10000
2. Drying agent temperature, °C.....	up to 280
3. Moisture separation, %.....	up to 10
4. Heat consumption for 1 kg moisture separation, kJ/kg .....	8500
5. Drying agent consumption, m <sup>3</sup> /h.....	18000 ÷ 20000
6. Drum rotation, rpm.....	11
7. Power of engines, kW.....	13.0
8. Dimensions, mm:	
a) the length of the drum .....	10000
b) the diameter of the drum .....	3200

In the US, seeded cotton drying is carried out in a variety drying devices using a gas-air mixture. Typically, this process is carried out in two stages: the same speed (surface moisture is lost) and reducing speed (internal moisture is lost).

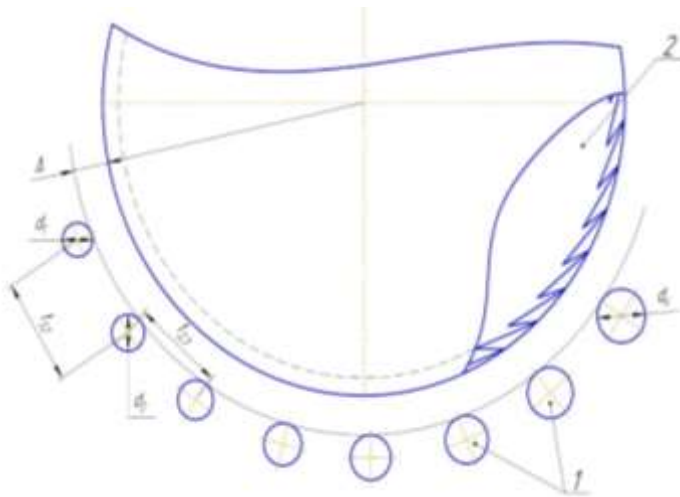
These stages are not relevant to drying agent temperature (60-170 °C) when the seeded cotton is in a high moisture. If the moisture of seeded cotton is not exceeding 10%, it is dried at low temperature (60-120 °C) to carry out the process in two stages. When applied low-temperature drying of seeded cotton creates better condition for the transfer of moisture from seed inner layer and material surface moisture drying. Thus drying "soft" mode is used. Seeded cotton drying process indicators are to be installed due to its initial moisture and type (technical or seed). In the United States in a variety of shelf tower dryers are used. The delivered heat amount will be set up with the amount of the drying agent.

The advantages of this type of dryer:

1. The intensity of heat delivery to the cotton.
2. Working opportunities of dryers in the largest concentrations of cotton.
3. Opportunity of the process of drying agent to make full or partial re-circulation.

Tower driers are produced by "Continental / Moss Gordon", "Platt Lyummus" and "Xardvik Etter" firms, drum driers are only produced by "Murray". The interaction of drying agent and seeded cotton in the drying line is characterized that material moves with great speed for a while in contact with the continuous flow of gas. Hence, there is no need for the application of high-temperature drying agent. Tower racks are associated with the presence of the seeded cotton and drying agent changes direction several times and this rotates gas flow, this helps seeded cotton to be clumped and cleaned. Tower dryer is a hermetic four corner parallelepiped, consists of four sections rack: top section has five, and the rest has

six racks each. By one side of the camera there is a place planned for the installation one drum cleaners. Drying agent and wet cotton deliver pipe is installed at top the dryer, a transfer pipe is installed at the bottom part of the dryer.



**Picture 2. Tower dryer scheme.**

Seeded cotton is dried as following (Picture 2). Seeded cotton is delivered to ejection funnel through a maintainer, transported with the drying agent speeding 20-25 m/sec and gets into the first section at 10-12 m/s speed. In the dryer the drying agent speed, so the seeded cotton speed will be reduced up to 7-8 m/sec. The seeded cotton will be in the dryer for 10-12 seconds. The decrease of drying agent speed is a result of the flow expansion, because cross-section of between racks is 2,4 times bigger than the cross-section of transmission pipe. Seeded cotton with drying agent is transferred to the separator-cleaners through dryer racks and cleaner.

**Technical indicators of tower dryer**

Efficiency, kg/hour on dried seeded cotton on moisture (%) 1-dryer 2-dryer	Up to 8000  Up to 200 (2-3%) Up to 60 (0,8-1,5%)
Drying agent	Mixture of combustion gas like fuel
Temperature, °C drying agent	Up to 180

heat of seeded cotton 1-dryer 2-dryer	Up to 55 Up to 65
Heat consumption for 1 kg moisture evaporation, kcal/kg 1-dryer 2-dryer	Up to 5000 Up to 11000
Dimensions, m	1,32x1,65x5,84
Weight, kg	2400

This article illustrates both advantages and disadvantages of 2SB-10 drying drum using in cotton refineries in our republic and tower dryer using the United States, its schemes and working processes.

#### REFERENCES:

1. Directory on "Cotton processing" by Omonov F.B. edition. Tashkent, 2008. Page 413.
2. Parpiev A.P., Akhmatov M.A. Educational-methodical complex on Fibrous materials drying and wetting subject. Tashkent, 2011. Page 216.
3. Budin E.F. Study of grate-serrated working organs of cotton wool cleaners for machine collection of medium-fibrous varieties: Diss. ... Cand. those. sciences. Tashkent: TITLP, 1968. - 156 p.
4. Fazylov S. The grate knots of cotton wool cleaners from large weed impurities with adjustable parameters: Diss ... .kand. those. sciences. -Tashkent, 1985. - 142 pp.
5. Burnashev R.Z. Theoretical foundations of the technology of cotton raw cotton cleaning: Avtoref. diss. doc. those. sciences. - Kostroma .: KTI. 1984. - 41s.
6. Funk, A.Pual, Wanjura, D.John.Cotton seed unloading systems. Journal of Cotton Science Vol. 21, Issue 1, pp. 51-59, published 2017.