



# Research of the Process of Threshing Bread Mass and Cleaning the Grain of the Small Threshold and the Grain Cleaner

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**ABSTRACT:** The article explores the advantages of the process of threshing bread mass with a small-sized thresher and grain cleaner. In researches it is determined, throughput of a thresher makes 0.5 kg/s, at of grains milling 99.5 % and crushing of a grain-purifier cleanliness of a grain made limits of 98...99 % and losses of a grain of 0.3-1.0 %.

## I. INTRODUCTION

Currently, small farmers and farmer farms use elements of the technology of harvesting grain crops with the processing of the entire mass in the hospital. However, despite the positive results, there is no system of technical equipment necessary for the high-quality performance of all the operations envisaged. In particular, the question of increasing the efficiency of stationary threshing of grain mass and cleaning of grain after threshing remains unresolved, grain harvesters used on stationary threshing in small farms do not provide high-quality threshing of grain mass, although operating costs are high, and the resulting grain is practically not cleaned of debris before storage on the premises. With this in mind, we have developed a low-volume thresher and grain cleaner for threshing grain mass and primary grain cleaning, satisfying the interests of small farms, the novelty of technical solutions of which is protected by patents RUz No. 00120, No. 00126, No. 00317 [1,2,3]. To determine the quality indicators of the developed devices, we conducted studies to study the technological process of threshing and cleaning grain of the thresher and grain cleaner.

## II. RELATED WORKS

Investigations of the process of threshing grain mass and grain cleaning were carried out using the crumb wheat mortar with an average stem length of 89.2 cm, a diameter of 5.2 mm and a spike length of 7.5 cm. The ratio of grain to straw was 1: 1.45, humidity grain is 14.5% and straw moisture is 12.8%. Grain cleaning experiments were carried out on the obtained grain in a thresher after threshing the grain mass.

The values of the obtained data (table 1) at five times the experiments on threshing wheat mass of wheat with an experimental thresher show that the throughput of the thresher is 0.5 kg / s, i.e. with uninterrupted supply of bread mass, its productivity will be 1.5-1.8 t / h. With this load, the completeness of threshing grain averaged 99.5%, and grain crushing 0.8%. The breaking of straw after processing the bread mass was 81.7%, which facilitates its grinding before feeding the animals and reduces the cost of preparing the feed.

**Table 1**  
Quality performance of the thresher

The name of indicators	Thresher performance			
	max	med	min	by IT
Throughput, ct / s	0,6	0,5	0,4	0,5
The interruptibility of straw, %	86,1	81,7	73,4	--
Threshing completeness, %	99,8	99,5	99,1	98,0
Grain crushing, %	1,1	0,8	0,6	2,0
Grain loss, %	1,3	1,0	0,8	2,0
The purity of the threshed grain%	95,2	94,1	90,3	he<95

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The maximum purity of threshed grain in the thresher was 95.2%, which corresponds to the initial requirements (IT), and the average and minimum values of this indicator are slightly inferior to the requirements. In the most contaminated composition of the grain heap obtained in the thresher, pure grain is 90.3%, unmilled spikelets-4.7%, light impurities-2.3% and parts of the stems-1.2%.

In order to determine the operability of the developed grain cleaning machine under extreme conditions, the grain cleaning process was studied on this fractional composition of the grain heap and the influence of the frequency and amplitude of oscillations, as well as the angle of inclination of the sieves on the cleanliness and grain loss was studied.

### III. METHODS

From the results of the experiment (Table 2), it can be seen that with an increase in the sieve vibration frequency from 100 rpm to 150 rpm, the sieve vibration frequency from 150 rpm to 200 rpm, the grain purity had the same values and amounted to 98, respectively. 7 and 98.5%. With the improvement of grain purity, grain losses are simultaneously increased. If at the oscillation frequencies of the sieves of 100 and 125 min-1, grain losses were insignificant (0.1 and 0.3%), then with an increase in the oscillation frequency from 150 to 200 min-1, these indicators intensively increase and reach from 0.9% to 3.1% This is almost 10 times higher than the values at vibrational frequencies of 100 min-1 and 125 min-1. The results of the experiments show that when the vibration frequency is 100 ... 150 min-1, the grain purity is 98 ... 99%, and the grain loss is 0.1 ... 0.9%.

The relationship between the quality indicators and the amplitude of vibrations of the sieves (along the radius of the eccentricity) shows that with an increase in the amplitude of vibrations from 10 mm to 30 mm, the grain purity increases, from 97.4 to 98.5%, i.e. Improves by 1.1%. However, with further increases in the amplitude of oscillations from 30 mm to 50 mm, the purity did not change significantly and amounted to 98.7%.

### IV. RESULTS

Table 2.

The influence of the frequency of the oscillation amplitude, the angle of inclination of the sieves on the quality indicators of the work of the grain cleaner

The name of indicators	Sieve vibration frequency, min -1				
	100	125	150	175	200
Grain purity	97,6	98,1	98,6	98,7	98,5
Grain loss	0,1	0,3	0,9	1,3	3,1
	Amplitude of oscillations of sieves, mm				
	10	20	30	40	50
Grain purity	97,4	98,1	98,5	98,7,98,6	
Grain loss	0,4	0,2	0,1	0,5	1,1
	The angle of inclination of the sieves, deg.				
	5	8	11	14	17
Grain purity	95,4	97,0	98,6	99,2	99,5
Grain loss	0,1	0,1	0,4	1,0	2,1

The change in grain loss from the amplitude of the oscillations is of a different nature. If with an increase in the amplitude of oscillations from 10 to 30 mm, grain losses decrease from 0.4% to 0.1%, then with an increase in the amplitude of oscillations from 30 to 50 mm, grain losses increase and reach 0.1% -1.1%. An analysis of the results



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shows that within the range of oscillation amplitudes of 20 ... 30 mm, the best cleaning and the smallest grain loss are achieved.

## V. CONCLUSION

The angle of inclination of the sieves also affects the quality of the grain cleaner. From table 2 it is seen that if at an angle of inclination of 50 the grain purity was 95.4%, and grain loss of 0.1%, then an increase in the angle of inclination to 170. It led to an increase in purity and grain loss by 99.5 and 2, respectively. one%. From studies it was found that the intensity of changes in grain purity occurs within the angle of inclination of sieves 5-110, and the intensity of grain losses occurs at 11-inclination of sieves 5-110, and the intensity of grain losses occurs at 11-170 angle of sieve. The best indicators of cleanliness and grain loss are achieved within the angle of inclination of sieves 8 ... 110.

## REFERENCES

1. Astanakulov K.D., Baymetov R.I., Holierov E.B., Muminov S.M. The rotor of the threshing and separating device. Patent No. 00121. // Official newsletter. 2001 No. 5. P. 114-115.
2. Astanakulov K.D., Eshkaraev U.Ch., Ibragimshikov U.I. Threshing and separating device. RUz patent No. 00126 // Official newsletter. 2001.No. 6.C.73.
3. Astanakulov K.D., Karimov EZ. Grain cleaning machine. Patent No. 00317.// Official newsletter. 2007.№11.P.84.