

## RESEARCH ON DIFFERENT TECHNOLOGICAL PARAMETERS OF COLUMNS AFFECTING THE LINTERING PROCESS

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### ABSTRACT

The article presents the results of research on various technological parameters of the columns that affect the lintering process. As a result of the research, taking into account the efficient operation of the linter, increased productivity of seed and down compared to other profile columns, improved quality of seeds and down produced, the bottom of the new profile column is 60 degrees relative to the horizontal axis. The optimum size was taken to be the distance between the surface of the column with 25 mm.

**KEYWORDS:** Seed, linter, grate, working chamber, profile.

### INTRODUCTION:

Schemes of columns of different profiles for 5LP linter equipment were developed on the basis of selected theoretical parameters in order to reduce the time of lintering seeds in the working chamber during the seed lintering process, to eliminate the process of stagnation of seeds leaving the working chamber in the seed comb zone (Figure 1). Based on the developed schemes, sketches of the column were prepared and experimental copies were produced (Fig. 2). The produced columns were installed on 30-saw 5LP linter equipment in the technological laboratory of JSC "Scientific Center of Cotton Industry" and test work was carried out (Figure 3). During the test, the effect of the angle of inclination of the lower part of the column in the zone of the linter seed comb, the distance between the surface of the column with the seed comb and the height of penetration of saws into the working chamber of the saw cylinder was studied [1]. In this case, the angle of inclination of the seed comb was constant and the saw was set in the center of the cylinder. The range of mixing blades with the saw cylinder on the linter was selected and adjusted by selecting the desired size of the set distance of 9-12 mm. The saw cylinder on the 30-pin linter was driven at 3 kW, 730 rpm, and the mixer at 1.5 kW at 500 rpm. In this case, the lint separated from the lintering of the seeds was sucked into the condenser KV-03 and separated from the air and collected in a collection bunker. The spacing of the saws in the saw cylinder remained unchanged at 8.75 mm.

Given that the angle of inclination of the lower part of the existing columns in the columnar grid of the 5LP linter relative to the horizontal axis is 45 degrees, and in this case the lack of seed accumulation in the seed comb zone and obstruct the seed path from the working chamber, Conducted on improved columns at 70 degrees.

At the same time, the height of penetration of the saws into the working chamber at the angle of inclination of each column is changed from 35 mm to 45 mm, the distance between the column with the seed comb from 20 mm to 30 mm, depending on the working condition of the linter. The effect was studied. The tests were performed on saws with an outer diameter of 320 mm on the linter shaft [2].

1- working chamber, 2- mixer, 3- seed comb, 4- EN profile linter column, 5- improved design linter column, 6- saw cylinder, 7- saw spacer

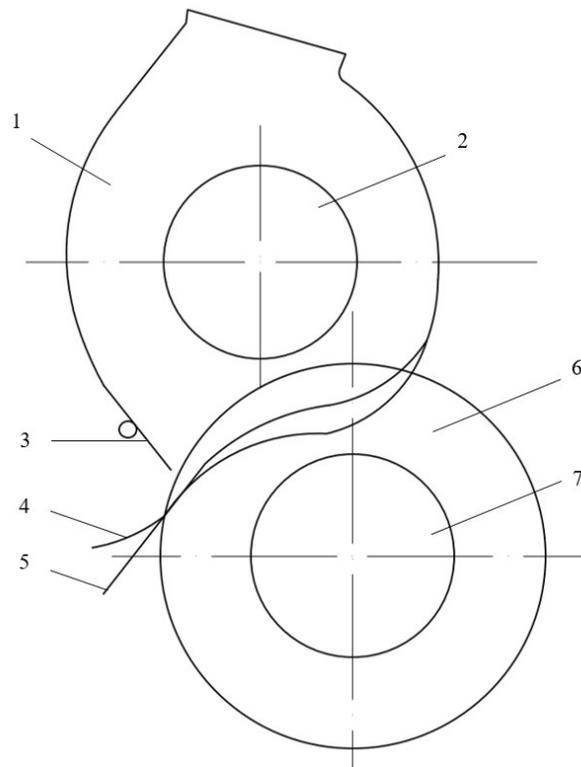


Figure 1. Schematic of a 5LP linter working chamber with EN profile and improved construction

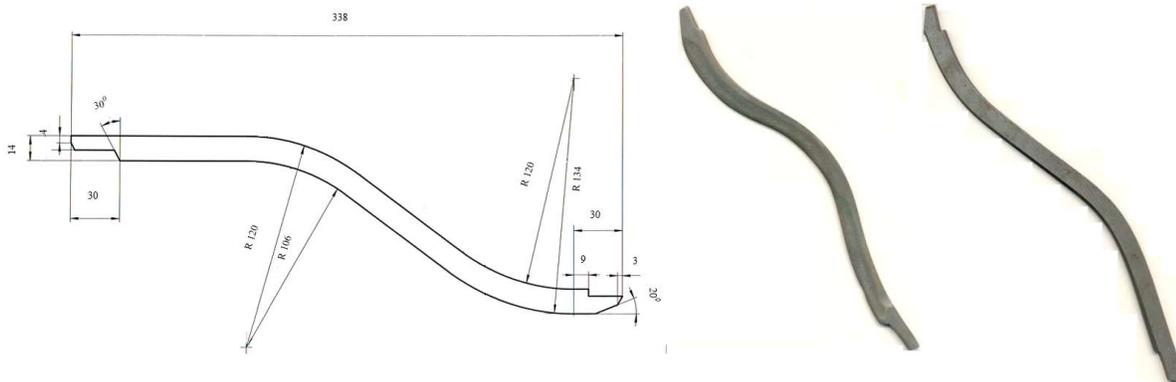


Figure 2. Drawing of 5LP linter column with improved design (a. Simple design, b. Improved design)

### EXPERIMENTAL SECTION

Experimental and research work was carried out on Namangan-77 selection I grade cotton seed of I grade. During the experimental work, samples were taken from the seeds fed to the linter, the seeds produced from the linter and the wool and analyzed in the laboratory [3, 4]. The quality indicators of the primary seed are given in Table 1.

Experimental research was carried out on the basis of the developed methodology. The results of the tests are presented in Table 2 and Figures 4-6.

From the analysis of Table 2 in the application of columns with a variation of 50 to 70 degrees relative to the horizontal axis of the lower part of the linter, the height of saws entering the working chamber from 35 mm

to 45 mm and the distance from the seed chamber the fluff rate can be seen to increase from 6.34% to 8.65%.

Table 1  
The result of laboratory analysis of the quality of the primary seed

Cotton seed		Seed quality indicators,%			
selection sort	industrial sort	fluff	injury	pollution	humidity
Namangan-77	I	10,46	3,14	2,1	9,68

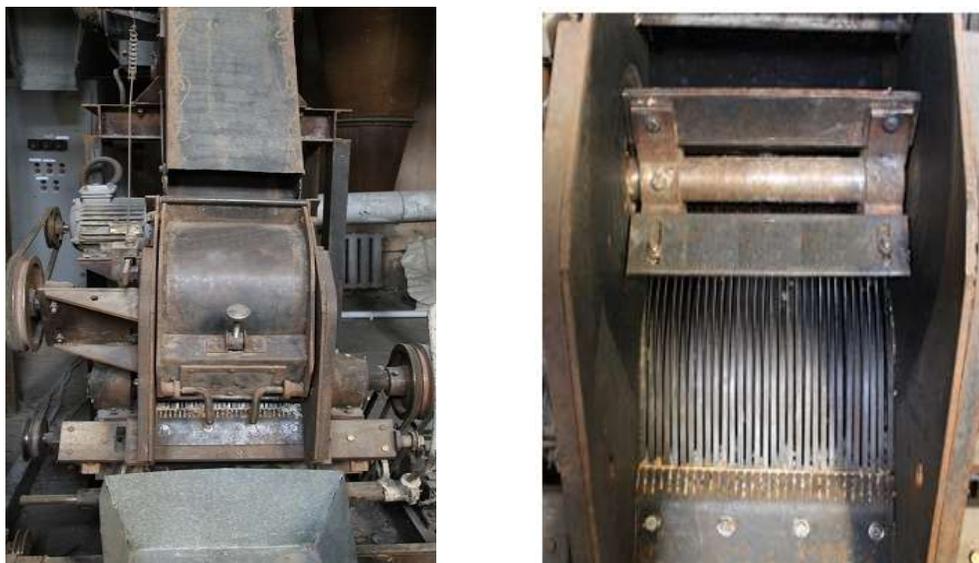


Figure 3. Stand view of a 30-saw 5LP linter.  
a). In general. b). Internal view of the working camera

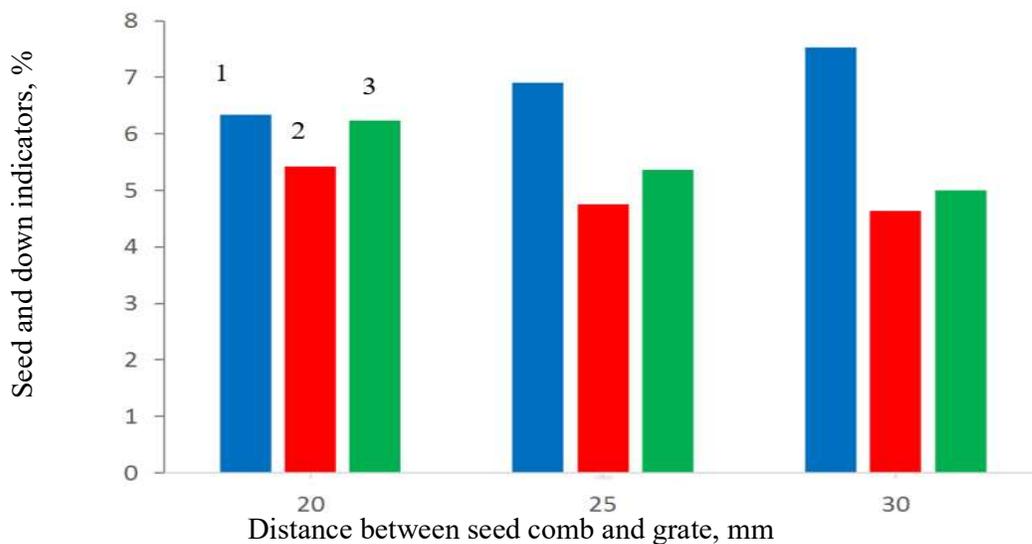
At the same time, the degree of seed damage decreased from 5.42% to 4.21%, the mass fraction of impurities in the wool and whole seeds decreased from 6.24% to 4.53%. Linter's seed productivity increased from 98 kg/h to 174 kg/h, while wool productivity decreased from 6.24 kg/h to 4.27 kg/h (Table 2). When the lower part of the columns is set at 70 degrees to the horizontal axis, the height of penetration of the saws into the working chamber is 35 mm to 45 mm, the distance between the surface of the columns with the seed comb is 20 mm to 30 mm. seeds ", according to the " Specifications ", the grade I was 0.16% to 1.65% higher than the requirement for Class 1 [5], and the liner productivity was reduced from 5.78% to 4.27%. In this case, the rotation speed of the seed roller was not uniform along the length of the chamber because the seed roller in the linter working chamber did not receive the required density.

During the test, the linearity of the liner seeds leaving the working chamber was 6.9%, the damage was 4.42% at a distance of 25 mm from the working chamber at a distance of 25 mm from the working surface of the new profile column with a bottom 60 degrees relative to the horizontal axis. , the mass fraction of impurities in the fluff and whole grains averaged 5.49%, and an improvement in the quality of the seed and fluff produced was observed [6].

Table 2

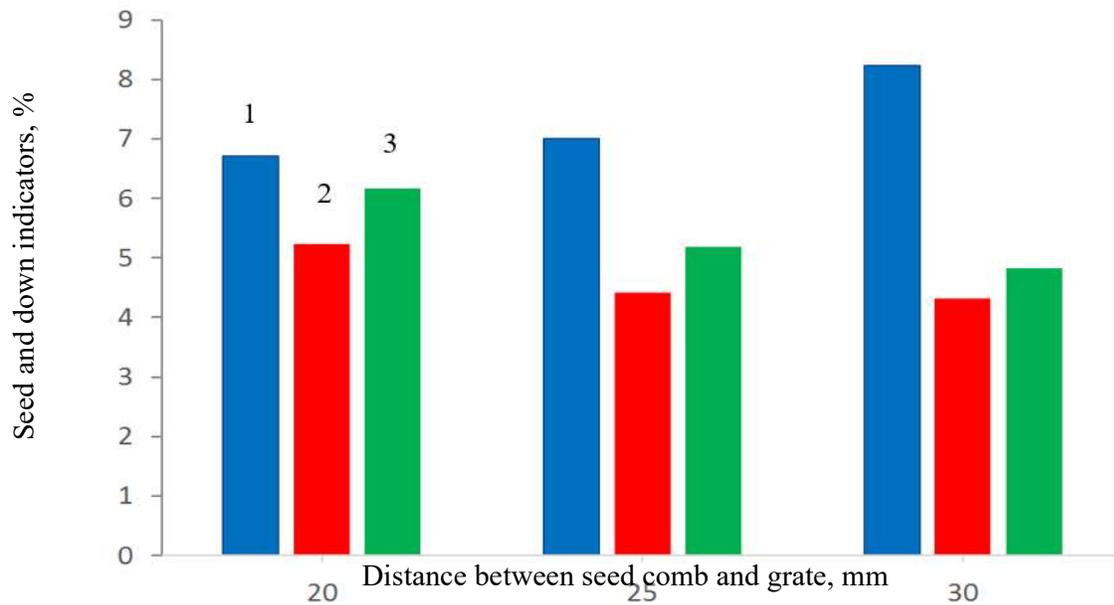
The effect of changes in the profile of the column during the linting of seeds on the productivity of the linter, the quality of seeds and down

Indicators to be called	The angle of inclination of the lower part of the column relative to the horizontal axis, grad.			The angle of inclination of the lower part of the column relative to the horizontal axis, grad.			The angle of inclination of the lower part of the column relative to the horizontal axis, grad.		
	50			60			70		
	Height of saws entering the working chamber, mm			Height of saws entering the working chamber, mm			Height of saws entering the working chamber, mm		
	35	40	45	35	40	45	35	40	45
	Distance between seed comb and grate, mm			Distance between seed comb and grate, mm			Distance between seed comb and grate, mm		
	20	25	30	20	25	30	20	25	30
1	2	3	4	5	6	7	8	9	10
Seed fluff,%	6,34	6,82	7,63	6,71	6,9	8,24	7,16	7,36	8,65
Seed damage,%	5,42	4,76	4,63	5,24	4,42	4,32	5,07	4,3	4,21
Mass fraction of impurities and whole seeds in the fluff,%	6,33	5,62	5,1	6,16	5,49	4,83	6,0	5,21	4,53
Work productivity on seeds, kg / h	98	123	135	124	149	158	142	155	174
Work productivity on fluff, kg / h	6,24	6,11	5,2	6,0	5,95	4,83	5,78	5,71	4,27
Staple length and type of down, mm	6/7, Б	6/7, Б	6/7, Б	6/7, Б	6/7, Б	6/7, Б	6/7, Б	6/7, Б	6/7, Б

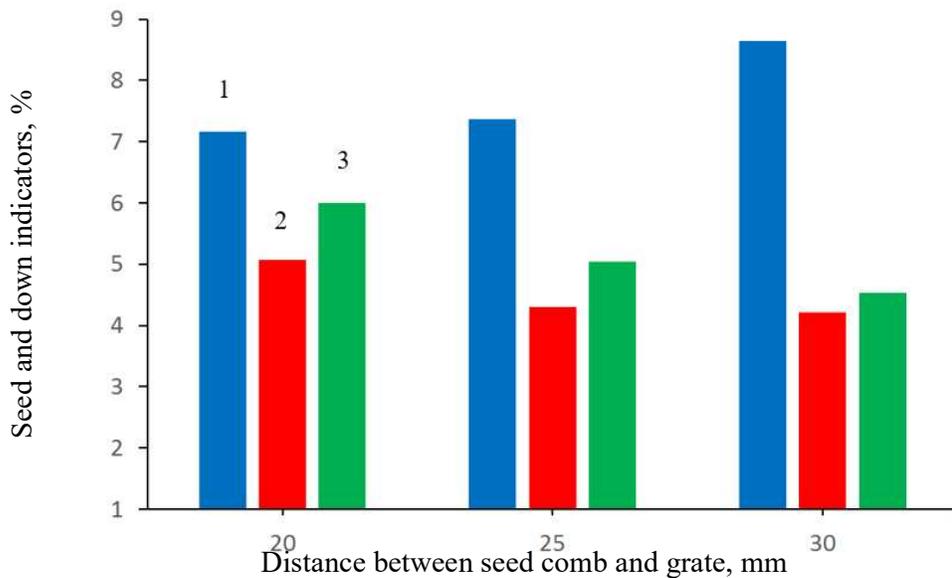


1- seed fluff,%, 2- seed damage,%, 3- impurities in the lint and the mass fraction of whole seeds,%.

Figure 4. Indicators of seeds and lint produced from the improved linter with an improved column (angle of inclination of the bottom of the column relative to the horizontal axis 50°)



1- seed fluff,%, 2- seed damage,%, 3- impurities in the lint and the mass fraction of whole seeds,%.  
Figure 5. Indicators of seeds and lint produced from the improved liner with an improved column (angle of inclination of the bottom of the column relative to the horizontal axis 60°)



1- seed fluff,%, 2- seed damage,%, 3- impurities in the lint and the mass fraction of whole seeds,%.  
Figure 6. Indicators of seeds and lint produced from the improved liner with an improved column (angle of inclination of the bottom of the column relative to the horizontal axis 70°)

At the same time, the liner productivity was high, averaging 149 kg/h for seeds and 5.95 kg/h for down. During the testing period, the improved 30-saw linter with a new profile colossus worked efficiently without clogging. The density of the seed roller in the liner working chamber was improved, the roller rotated at the same speed along the length of the linter, and the acceleration of the seed output from the working chamber was observed. There was no accumulation of seeds coming out of the chamber in the zone of the seed comb.

## CONCLUSION

Taking into account the efficient operation of the linter during the test, the increase in the productivity of seed and down compared to other profile columns, the quality of the produced seed and down, the bottom of the new profile column at 60 degrees relative to the horizontal axis, the working chamber saw height 40 mm. It was assumed that the distance between the surface of the column with a comb is 25 mm.

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