STUDY OF THE EFFECT OF TEMPERATURE ON THE DRYING PROCESS OF COTTON RAW MATERIALS.

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ABSTRACT: In the process of drying high-quality cotton, an analysis of such factors as the preservation of the natural properties of raw cotton, its mutual growth, a decrease in whiteness, high performance of the drying drum, and research of high-quality raw cotton is carried out. - select the main parameters of the drying drum for drying.

KEYWORDS: Dryer drum, heat carrier, air chamber, casing, raw cotton, seed cotton, raw material.

INTRODUCTION: To determine the heating efficiency of the drying drum shell, an experimental study was carried out at the Paytug cotton refinery.

On the current, in The following changes were made to the 2SB-10 drying plant at the Paitug cotton ginning plant. The surface of the drying drum is covered with a special heat-insulating casing, the mesh part of the drum is sheathed with sheet steel, the front part of 1 meter of the drum is made of mesh. [1-15].

MATERIALS AND METHODS: General view of the drying plant operating on Paytug cotton mill, is shown in Fig. 1, and the flow diagram of the coolant is shown in Fig. 2.

The dryer works as follows:

From the heat generator through pipelines 1 and 2, a heat carrier with a volume of up to 1000 m is supplied^3/ h, respectively into the dryer and the air chamber. The heat carrier entering the air chamber washes and heats the drum shells, and then enters the inside of the drum through the mesh surface 8. The heat carrier entering through the pipeline 1 prevents the accumulation of raw cotton in the front part of the drum.

When the drum rotates between the raw cotton and the heat carrier and the drum shell, heat and mass exchange occurs, the cotton is dried, the spent heat carrierb through pipeline 6 escapes into the atmosphere.

The test was carried out according totechnological regulations for processing raw cotton (PDI-30-2012). The operating mode of the dryer was selected in accordance with the regulations, depending on the initial moisture content, the test was carried out at a heating temperature of the drum shell t = 25-40-55-700C. Before the experiment, the time required for heating the drum shell was determined. The tests were carried out on raw cotton of the selection variety An-Bayavut Z, III industrial sart with an initial moisture content of 10.5 to 22.35%.[1-15].

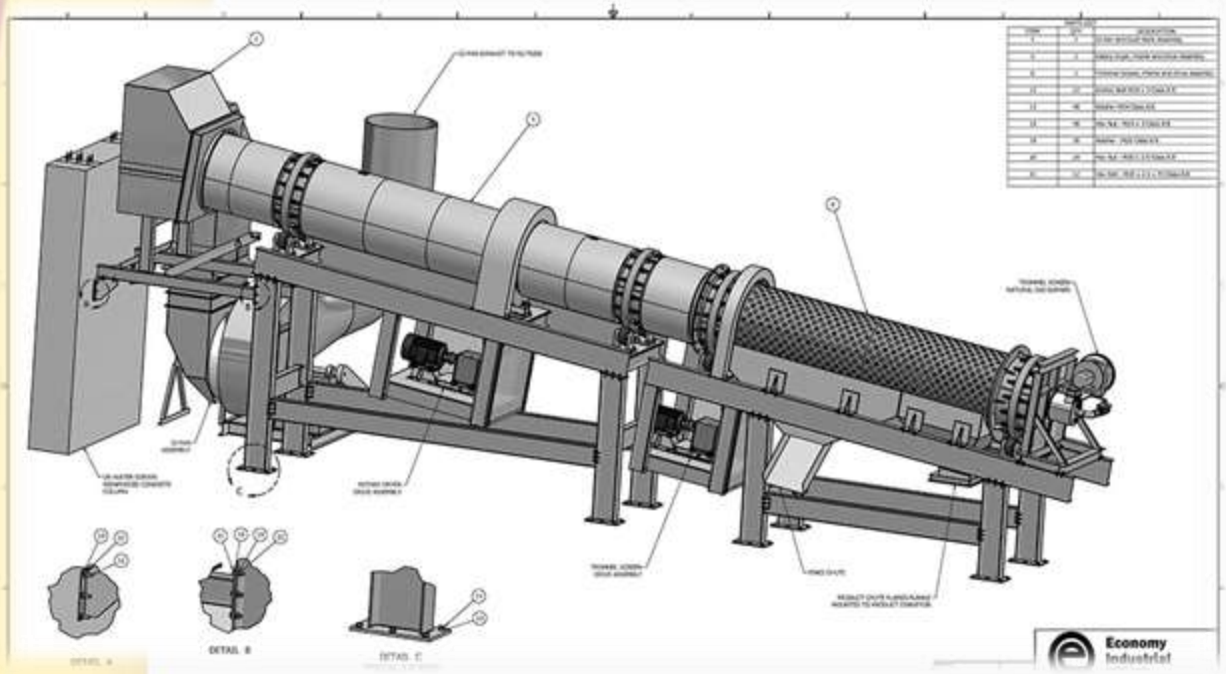

Figure 1. Drying plant

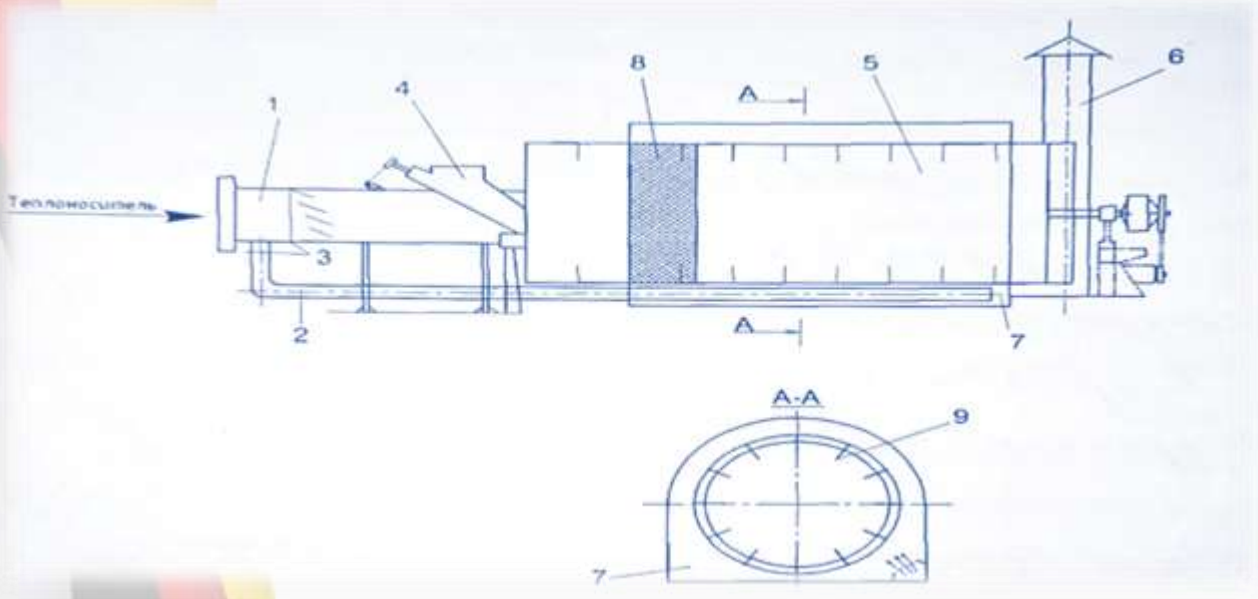

Figure 2. Scheme of the heating agent supply.
1-pipeline for supplying the main coolant, 2-pipeline for supplying coolant to the air chamber, 3-dampers, 4-tray for supplying raw cotton, 5-drying drum, 6-pipeline for exhaust air, 7-air chamber, 8-mesh part of the drum, 9-longitudinal blades.

To measure the temperature of the internal devices of the dryer, a KSP-4 potentiometer with flat chrome money-saving thermocouples, type THK. The moisture content of raw cotton was determined in a drying oven Uz-8m.

For the study of changes in fiber quality depending on the intensity of drying in drum dryers, modern research methods are used with the use of effective methods and devices for processing the results obtained.

Fiber quality assessment after the technological process (drying, cleaning, ginning), according to all indicators were carried out in the laboratory
Paituga cotton ginnery and in the testing laboratory of the quality association.

Mass content the fractions of blemish and trash impurities of the fiber were determined by manual analysis by fractions according to the standard method.

For carrying out and processing the results experimental data showed that the most significant factors that have a noticeable effect on the quality and productivity of the dryer are: - the temperature of the coolant, the consumption of the coolant, the performance of the dryer for raw cotton, the initial moisture content of the raw cotton and the heating temperature of the drum shell. For further experimental research, the following factors were selected: the initial moisture content of the raw cotton, the productivity of the dryer for wet raw cotton and the heating temperature of the drum shell. [1-15].

The technological regulations recommend a coolant flow rate of 18-22 thousand m^3/ h depending on the initial moisture content of raw cotton. Based on this, in experimental studies, the coolant flow rate was taken constant, the average value of which is 20 thousand m3 / h.

The drying agent temperature was chosen depending on the initial moisture content of raw cotton in the range from 1300 to 1900 C.

Table 1. Shows the levels of factors included in the experimental design.

Humidity is taken as the output parameters of the experiment cottonseed after drying and the content of the mass fraction of flaws and trash impurities of the fiber. [1-15].

Table 1. Factors and levels of their variation

Designations	Factor name	Variation levels		
		-1	0	+1
X_1	Initial moisture content of raw cotton%	10.1	16.3	22.5
X_2	Dryer capacity, t / h	3.5	6.75	10.0
X_3	Drum shell heating temperature, 0C	35	52.5	70

Planning matrix with the randomized order of experiments is presented in table 2.

Table 2. Experiment planning matrix

No. p/p	Implementation order Experience			Factors		
				W ref%	F t / h	TB0S
1.	12	24	12	10.1	3.5	35
2.	4	19	14	22.5	3.5	35
3.	3	9	22	10.1	10	35
4.	23	5	1	22.5	10	35
5.	15	7	20	10.1	3.5	70
6.	8	21	17	22.5	3.5	70
7.	8	10	6	10.1	10	70
8.	16	2	11	22.5	10	70

The hypothesis on the homogeneity of the variance estimates was tested according to the criterion Cochran, and hypotheses about the significance of the regression coefficients using the Student's t test. Fisher's criteria were used to test the hypothesis of adequacy.

RESULTS AND DISCUSSIONS.

The experiments were carried out according to the accepted planning matrix (PFE 23).

Dryer drum was heated with a heat carrier supplied to the space between the drum and the casing. After reaching the required temperature, at the same time, a drying agent and raw cotton were fed into the drum and after 10 minutes samples were taken after the dryer. [1-15].

By processing the research results on a computer, the regression equations are obtained

$$y_1 = 12.8 + 4.75x_1 + 1.15x_2 + 0.85x3 - 0.37x_1 x_3$$
$$y_2 = 5.62 + 0.51x_1 + 0.31x_2 - 0.11x_3$$

The obtained regression equations were tested for adequacy according to Fisher's criterion.

Analysis of the equations shows that for the minimum values of x_1 and x_2 the moisture content of raw cotton after drying at a value of x_3 from -1 to +1 ranges from 7.38% to 6.42% i.e. with an increase in the temperature of the drum shell from 35 to 700 C, the moisture take-off will be 0.98% more, at the maximum

values of the factors X_1 and X_2, respectively, it will be 19.92 and 17.8, i.e., the moisture take-off will be 2.44% more, the content of defects and swath clogging will be 0.28% less.[1-15].

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