

# Research Carried out to Improve the Efficiency of Dust Capture Equipment in Cotton Cleaning Enterprises

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**Annotation:** pollution of atmospheric air with various industrial waste and other substances ultimately threatens the life of living beings in land and water bodies in the biosphere. Such mixtures in the air gradually sit on the surface of the Earth, showing a great obstacle to the growth and development of plants.

**Keywords:** Micromanometer, dust capture equipment, aggregates, allowable quantity.

The main focus of reducing industrial waste disposal in the air pool is the improvement of production process technologies and basic technological equipment. When choosing technological aggregates, it is necessary to pay attention to more powerful aggregates.

Two different methods are used to determine the amount of dust in the air:

1. Weight method.
2. Counting method.

The weight method was applied because it was convenient.

The following formulas are used when it is determined by pulling the contents of the dust in the air on the scales:

$$C = \frac{q_1 - q_2}{V_0} * 1000 \quad (1)$$

The weight of the dust is determined by dragging the filter.

Here:

Total C-powder mg / m<sup>3</sup>;

q<sub>1</sub> and q<sub>2</sub> are the Clean, pre – pollination, and post-pollination weights of the filter, in mg resolution;

V<sub>0</sub>-the volume, air temperature and barometric pressure of the air passing through the filter are taken into account.

This air volume is found by the following formula.

$$V_0 = \frac{273 * V_t * B}{(273 + t) * 760}, [m^3] \quad (2)$$

in this:

B-barometric pressure, Pa (1 mm.rt.st. 133.322 Pa)

the temperature of the air at the place where the T-dust sample is being taken, 0s.

VT-measured using a tool, the volume of air passed through the filter, (liters) this can be found by calculating:

$$V_t = t * v, [l] \quad (3)$$

here:

V-the speed of the volume of air absorbed through the filter, l/min.

t-experience Time, minute.

**Cotton cleaning plant owned by Samarkand Kamalak invest tekstil LLC analytical method determination of indicators of dust mixture thrown into the atmosphere in aspiration networks using a micromonometer**

The calculation work was carried out on the source No. 6 in the cleaning-drying Tsex. The capacity of the dust flow cleaning ventilation network is Q = 7200 m<sup>3</sup> / h, the fan is T-25, the source height is N = 11.2 m, the diameter is D = 0.52 m.

Air pressure R = 735 mm, temperature T = 10 OS, correction factor q = 0.90. Micromanometer pointers dr = 78, 77, 69 until the cleaning process.

Using micromanometer-derived pointers, the rate of dust flow was determined:  $V_1 = \sqrt{78} * 1,70 = 15,09$  м/с

$$V_1 = \sqrt{77} * 1,70 = 14,95 \text{ м/с} \quad V_{\text{ypr}} = 14,46 \text{ м/с}$$

$$V_1 = \sqrt{69} * 1,70 = 14,06 \text{ м/с}$$

The cross-sectional surface of the source is equal to:

$$F = \pi * D^2 / 4 = 3,14 * 0,52^2 / 4 = 0,212 \text{ м}^2$$

The volume of the flow of dust passing through the pipe was equal to:

$$Q = V_{\text{cp}} * F * 0,90 = 14,46 * 0,212 * 0,90 = 2,76 \text{ м}^3/\text{с}$$

Aspirator adjuvant chang fractionsining concentration, time of birliga ichidagi and yillic quantities of larin precision:

$$V_{\text{ч}} = 0,98 \text{ л/мин} * 5 \text{ мин} = 4,9 \text{ л} = 0,0049 \text{ м}^3$$

$$V_0 = 0,0045 * 0,90 = 0,0044 \text{ м}^3$$

$$C = \Delta Q / V_0, \text{ мг/м}^3, \quad C_1 = 2,83 / 0,0044 = 643,6 \text{ мг/м}^3$$

$$C_2 = 2,8 / 0,0044 = 636,4 \text{ мг/м}^3 \quad C_3 = 2,87 / 0,0044 = 652,6 \text{ мг/м}^3$$

$$C_{\text{cp.}} = 644,2 \text{ мг/м}^3$$

$$M_{\text{ypr}} = 644,2 * 2,76 * 0,001 = 1,78 \text{ г/с}$$

$$M_{\text{йил}} = 1,78 * 6960 * 3600 / 1000000 = 44,6 \text{ т/year.}$$

Micromanometer pointers up to cleaning process: dr = 30, 20, 10

Using micromanometer-derived pointers, the rate of dust flow was determined by the following expression:

$$V_1 = \sqrt{69,7} * 1,70 = 14,2 \text{ м/с}$$

$$V_1 = \sqrt{63,1} * 1,70 = 13,5 \text{ м/с} \quad V_{\text{cp.}} = 13,8 \text{ м/с}$$

$$V_1 = \sqrt{65,4} * 1,70 = 13,7 \text{ м/с}$$

The cross-sectional surface of the source is equal to:

$$F = \pi * D^2 = 3,14 * 0,50^2 / 4 = 0,196 \text{ м}^2$$

The cross-sectional surface of the source is equal to:

$$Q = V_{\text{cp}} * F * 0,90 = 13,8 * 0,196 * 0,90 = 2,43 \text{ м}^3/\text{с}$$

Aspirator adjuvant chang fractionsining concentration, time of birliga ichidagi and yillic quantities of larin precision:

$$V_{\text{ч}} = 15 \text{ л/мин} * 5 \text{ мин} = 75 \text{ литр} = 0,075 \text{ м}^3$$

$$V_0 = 0,075 * 0,90 = 0,0625 \text{ м}^3$$

$$C = \Delta Q / V_0, \text{ мг/м}^3, \quad C_1 = 3,83 / 0,0625 = 64,2 \text{ мг/м}^3$$

$$C_2 = 3,8 / 0,0625 = 61,8 \text{ мг/м}^3 \quad C_3 = 3,87 / 0,0625 = 60,6 \text{ мг/м}^3$$

$$C_{\text{cp.}} = 62,2 \text{ мг/м}^3$$

$$M_{\text{ypr}} = 62,2 * 2,43 * 0,001 = 0,156 \text{ г/с}$$

$$M_{\text{йил}} = 0,156 * 6960 * 3600 / 1000000 = 3,92 \text{ т/йил.}$$

$$\eta = 44,6 - 3,92 / 44,6 = 91,2 \%$$

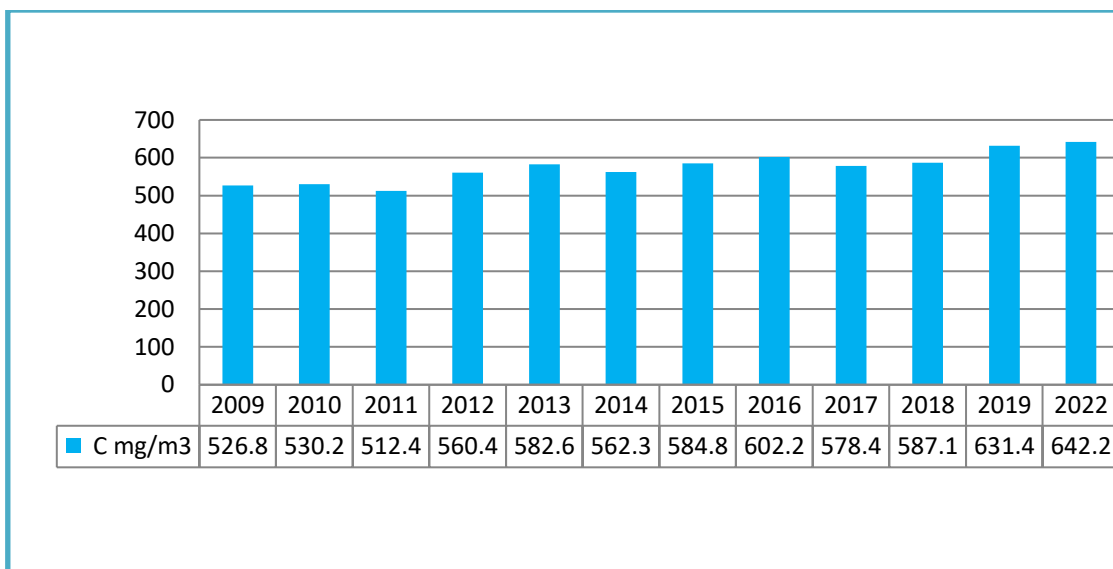
The concentration of dust flow in the air before and after cleaning is given in the tables and graphs below.

### Pre-and post-cleaning indications of cotton dust concentrate in cleaning-drying tsexi

Table 1

years	2009	2010	2011	2012	2013	2014	2015	2016	2018	2019	2021	2022
Pre-cleaning indicators of cotton dust in the cleaning-drying Tsex												
C мг/м <sup>3</sup>	526,8	530,2	512,4	560,4	582,6	562,3	584,8	602,2	578,4	587,1	631,4	642,2
Cleaning-post-cleaning indications of cotton dust in drying tsexi												
C мг/м <sup>3</sup>	72,4	74,2	68,3	76,8	80,4	74,3	82,1	88,2	81,6	89,2	91,3	93,3

1. the table shows that the concentration of cotton dust thrown into the atmosphere in the cleaning-drying Tsex was 526.8 mg/m<sup>3</sup> until the purification process in 2009, 72.4 mg/m<sup>3</sup> after the dust capture equipment, the efficiency of the dust capture equipment was 86.2%. 512.4 mg/m<sup>3</sup> until the purification process in 2011, 68.3 mg/m<sup>3</sup> after the dust capture equipment, the efficiency of the dust capture equipment was 86.6%. 584.8 mg/m<sup>3</sup> until the purification process in 2015, 82.1 mg/m<sup>3</sup> after the dust capture equipment, the efficiency of the dust capture equipment was 85.9%. 631.4 mg/m<sup>3</sup> until the purification process in 2021, 91.3 mg/m<sup>3</sup> after the dust capture equipment, the efficiency of the dust capture equipment was 91.2%. 1. and 2. pictures.



1. - Fig. Cleaning-pre-cleaning indicators of cotton dust in the drying Tsex.

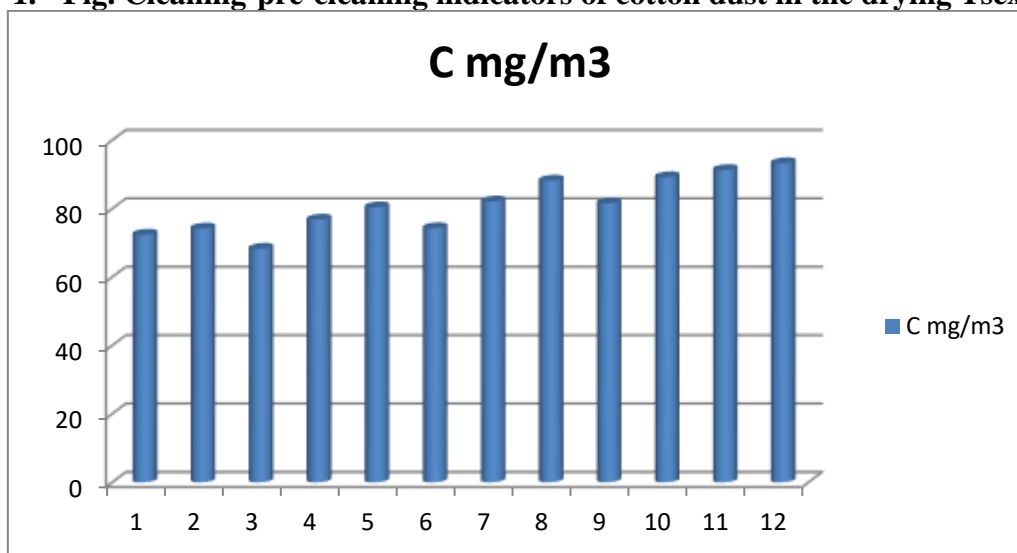
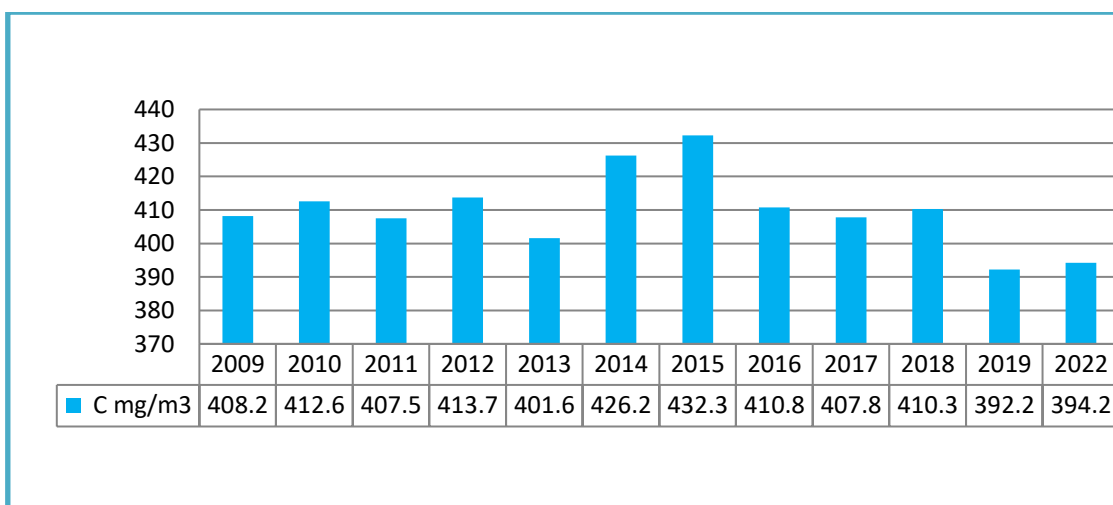


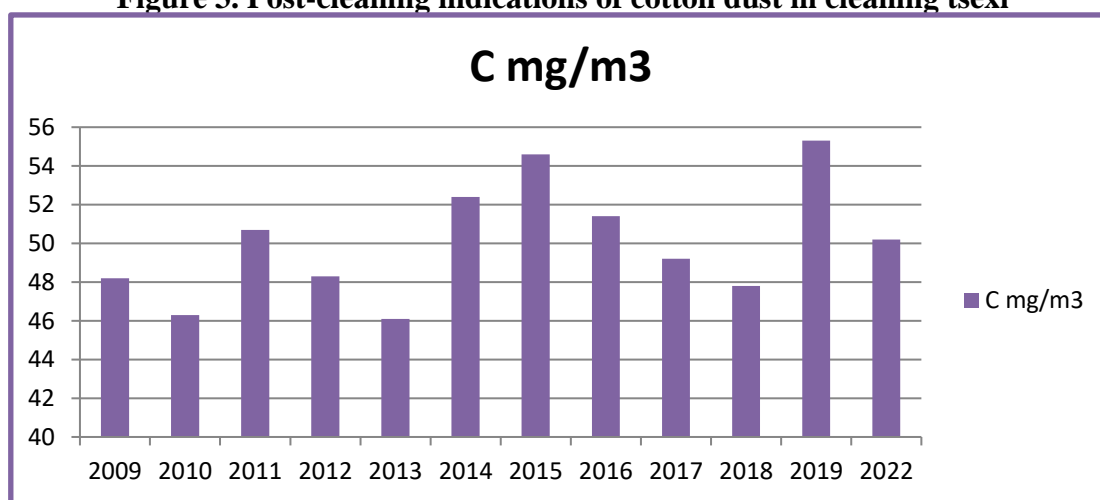
Figure 2. Cleaning-post-cleaning indications of cotton dust in drying tsex

The concentration of cotton dust thrown into the atmosphere in the cleaning Tsex was 408.2 mg/m<sup>3</sup> until the purification process in 2009, 48.2 mg/m<sup>3</sup> after the dust capture equipment, the efficiency of the dust capture equipment was 88.2%. 407.5 mg/m<sup>3</sup> until the purification process in 2011, 50.7 mg/m<sup>3</sup> after the dust capture equipment, the efficiency of the dust capture equipment was 87.5%. 432.3 mg/m<sup>3</sup> until the purification process in 2015, 54.6 mg/m<sup>3</sup> after the dust capture equipment, the efficiency of the dust capture equipment was 87.4%. 494.2 mg/m<sup>3</sup> until the purification process in 2021, 55.3 mg/m<sup>3</sup> after the dust capture

equipment, the efficiency of the dust capture equipment was 85.9%. 4.1.3. and 4.1.4. pictures. Analysis shows that dust capture efficiency has been declining as dust capture equipment wears out from year to year.



**Figure 3. Post-cleaning indications of cotton dust in cleaning tsexi**



**Figure 4. Post-cleaning indications of cotton dust in cleaning tsexi**

The concentration of cotton dust thrown into the atmosphere in the wash body was 382.4 mg/m<sup>3</sup> until the purification process in 2009, 38.8 mg/m<sup>3</sup> after the dust capture equipment, with the efficiency of the dust capture equipment being 89.9%. 381.8 mg/m<sup>3</sup> until the purification process in 2011, 36.4 mg/m<sup>3</sup> after the dust capture equipment, the efficiency of the dust capture equipment was 90.5%. 364.2 mg/m<sup>3</sup> until the purification process in 2015, 43.2 mg/m<sup>3</sup> after the dust capture equipment, the efficiency of the dust capture equipment was 88.1%. 386.2 mg/m<sup>3</sup> until the purification process in 2021, 42.4 mg/m<sup>3</sup> after the dust capture equipment, the efficiency of the dust capture equipment was 89.0%, 4.1.5. and 4.1.6. pictures. Analysis shows that dust capture efficiency has been declining as dust capture equipment wears out from year to year.

As a result of the analysis carried out, the concentration of cotton dust in the air was 0.31 mg/m<sup>3</sup> in the working zone in the cleaning-drying Tsex, 0.17 mg/m<sup>3</sup> in the enterprise border outside the working zone, it was not observed that the permissible amount (REM-0.33 mg/m<sup>3</sup>) was exceeded.

Cleanup tsexi did not observe an increase in the permissible amount (REM-0.33 mg/m<sup>3</sup>), which was 0.29 mg/m<sup>3</sup> in the working zone, and 0.16 mg/m<sup>3</sup> at the enterprise border outside the working zone.

In the main building, there was no observed increase in the permissible amount (REM-0.33 mg/m<sup>3</sup>), which amounted to 0.26 mg/m<sup>3</sup> in the working zone, and 0.14 mg/m<sup>3</sup> in the border of the enterprise outside the working zone.

At the enterprise, the amount of pollutants being discarded from sources of atmospheric air pollution does not exceed the permissible amount. It does not adversely affect flora, fauna and other living organisms.

The results of the analysis show that the effectiveness of dust removal in industrial enterprises has decreased. It is possible to increase the efficiency of existing dry mechanical dust capture equipment, for this it will be necessary to install additional filters or modern electronic filters.

The main measures to reduce industrial waste and disposal are the improvement of technological equipment in production processes.

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