

# INDUSTRIAL TESTS OF FILTER BAGS "3DESA FILTRPATRON" WITH INCREASED FILTERING AREA

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## 1. Introduction

One of the ways of modernization existing of the dust filtration equipment is to use in the bag filter houses the filter bags with increased by surface of filtration. The other way is concluded in use in bag filter houses the filter bags with increased by surface of filtration at development and construction new compact dust filtration equipments.

## 2. Review filter bags with increased by surface of filtration

A few types of the filter element with increased by surface of filtration is known in the world. The most spreading has got cartridges or pleated filter bags. They provide frequentative increase filtering area in contrast with smooth's cylindrical bags. Their using is limited small dust load, low air permissions, acerbity of the source material and high cost. DESA Co.Ltd. brings on the market of dust filtration the new technology 3DESA (3D Economic System of Aspiration) [ 1 ] using the filter bags "3DESA filtrpatron" in the filter houses (Fig. 1). These filter elements are made from nonwoven filtering materials and are produced according the technical conditions [ 2 ]



Fig 1. 3DESA filtrpatron

Is known several producers making filter element with increased by surface of filtration from nonwoven filtering material. This is, so named, "Star bag" and "Ad-flow". Their produce one Australian, one Chinese and one Canadian company.

The design consists of star-type metallic cages and put in troughs asterisk nonwoven of the filter media. Such elements give increase filtering surfaces in 2,3 times. The main defect beside them is a design of the cages, overlaying flow of the air inwardly bag (Fig. 2). As a result sharply increases the resistance a flow, which "eats" all improvements to account of the increase filtering surfaces.

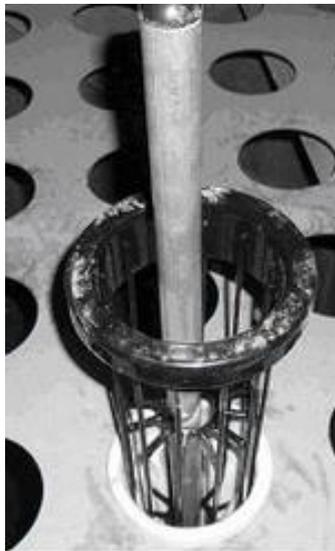


Fig. 2. Filter bag “Ad-flow” with the cage

### 3. Test of separately elements

To define the possibility of the using filter bags "3DESA filtrpatron" in acting filter, we offer the industrial enterprise as first step to test separately samples. On result of such test are conducted modifications of technologies 3DESA and is taken the decision on the further action. In case of success will be completed separate section of the filter house or separate filter filter house of the dust filtration system, consisting of several filter houses. On result of the test decision is taken in such volume about bulk purchase filter bags "3DESA filtrpatron".

#### 3.1. Ferro-siliceous production

Test was organized on ferro-siliceous production [ 3 ] For the reason check of capacity to work filter bags 3DESA-filtrpatron are made three samples new filter bags with new cages (the Rice. 3). These samples was mounted in acting device. Test was conducted on small sizes dust on bag filter house CYCLO JET FILTER for 18 months. During this period was not find the motion of dust through the filter bags. The checkup new filter bags has shown the absence of some destructions of the bags. The Conclusion: use new type filter bags "3DESA-filtrpatron" allows to conduct the modernization of the bag filter house with thick location filter bags by change filter bags and cages.



Fig. 3. 3DESA-filtrpatron with cage

They are conducted test the kit of filter bags on the one of the filter house at present.

#### 3.2. Electro mechanical plant

The electro mechanical plant has buy the filter MF-3D (Fig.4) in 2014. They happened to to search for change the filter of Italian production, installed on clearing the air from dust, crush jet

installation M1000. The filter MF-3D much was aptly inserted in system peelings air. Has served before 2018года, was replaced on such.

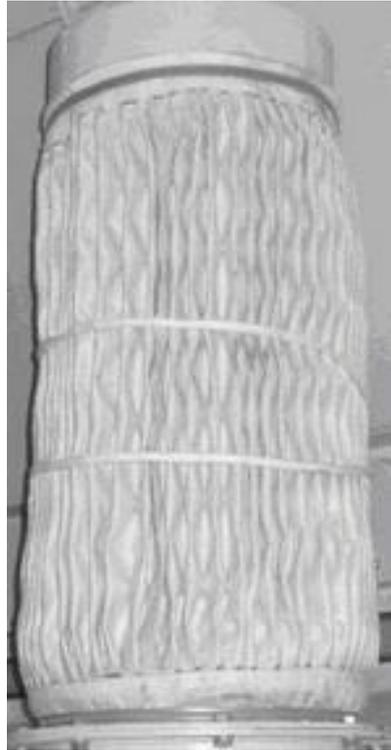


Fig. 4. Filter for crush jet install

### 3.3. Zinc plant

Test 4-h filter bags "3DESA filtrpatron" length 3 m was organized (Fig. 5) on zinc plant



Fig. 5. 3DESA filtrpatron for zinc dust

Test were conducted during of 7 months on the filter house of zinc preparation equipment. Is not find end-to-end hole and other mechanical damages in filter bags.

1.1, Period to usages have formed 7 months,

1.2. Takedown of the bags from filter and framework of the difficulties has not caused.

1.3. The filter bags has saved wholeness of the form and size.

1.4. Colour of the sleeve was changed with white on dark-gray,

1.5. Weight of the bag with dust has formed 10,55 kg. (amount of zinc dust, is valued approximately 8 kgs)

1.7. It is no mechanical damages in region of the bottom of filter bag.

1.8. Remaining air permeability in higher part of the filter bag is 15 - 17 dm<sup>3</sup>/dm<sup>2</sup>min and 18 - 20 dm<sup>3</sup>/dm<sup>2</sup>min in lower part of filter bag under 200 Pa.

The Findings:

Confirmed capacity to work filter bag "3DESA filtrpatron" for long time without mechanical damages and without change the form and sizes.

Based on this is possibility the reductions remaining the dust after the filter house less than 10 mg/Nm<sup>3</sup>).

The Recommendations: Elaborate the choice of the filter material. Optimize the modes to regenerations filter bags.

We are held talks about expansion of the volume of the test.

### 3.4. Coal power station

We make the tests of 3DESA filtrpatrons on the filter house in the coal power station (Fig. 6).



Fig. 6. Montage of filter bag 3DESA filtrpatron

3 corrugated filter bags production DESA Co.Ltd were installed 08.06.2017 in bag filter house for undertaking the test. The lifelength at period of the test has formed approximately 6500 hours. 11.05.2018 was made checkup corrugated filter bags and test one sleeve (Fig. 7).



Fig. 7. Checkup of the filter bag

It was tested the filter bag by length 8,5 m (Fig. 8).

On result of the checkup and test possible to do the following conclusion:

- the filter bag are found in run able condition, internal surface clean, damages no.



Fig. 8 Filter bag 3DESA filtrpatron for coal power station  
We are in procedure of discussion the next testing.

### 3.5. Production of the dry building mixtures

The plant of the dry building mixtures has equipped the row the dust clearing systems by the bag filter houses, equipped filter bags "3DESA filtrpatron". The perennial usage has shown efficiency of this decision (Fig. 9).

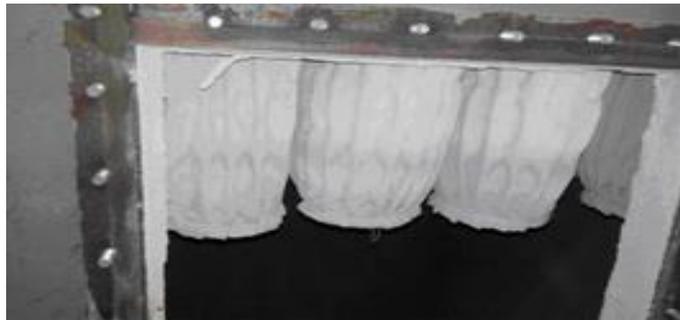


Fig. 9. Filer bag 3DESA patron in production of the dry mixtures

The right choice of the filtering material allows to raise efficiency a filter.



Fig. 10. Takedown of the filter bag 3DESA patron

### 4. Comparative test of the samples of filter bags AD-flow and "3DESA filtrpatron"

On the dust clearing system was installed beside filter bags "3DESA filtrpatron" and corrugated filter bag AD-flow company Advancetex (Fig. 11).

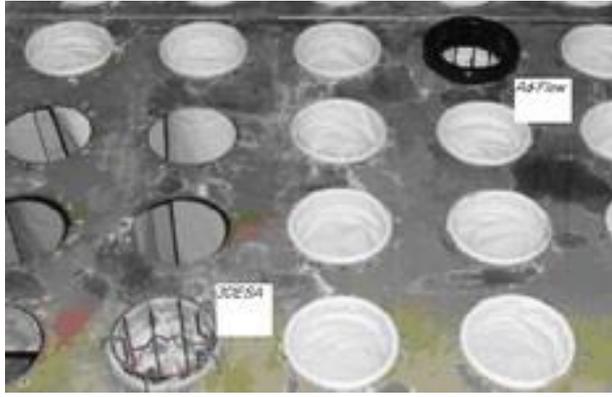


Fig. 11. Montage of two types of filter bags

Analysis of design these filter bags and calculation parameter flow through the bags was provided in the Table 1

Table 1

**Calculation of parameters of the gas flow through filter bags**

Type of filter bag	Filterinf area, sq.m	Cross section sq.m	Air fpow through the filter bag m3/min	Dust loan per filter bag g/min
3DESA	5,06	0,017	6,697	100,455
Ad-Flow	4,48	0,002	0,698	1,047
Standard	1,96	0,013	1,984	29,76

It was organized the direct measurements of the speed of flow through filter bags by anemometer with diameter 100mm. Result is presented in Table 2.

Table 2.

**Results of the velocity measurements by anemometer**

Type of filter bag	3DESA	Ad-Flow	Standard	Standard
The velocity m/min	11,9	5,9	7,9	4,9
Remark		Length 2 m		

On photography (Fig. 12) is seen that through filter bag "3DESA filtrpatron" is greater flow of dust

became was

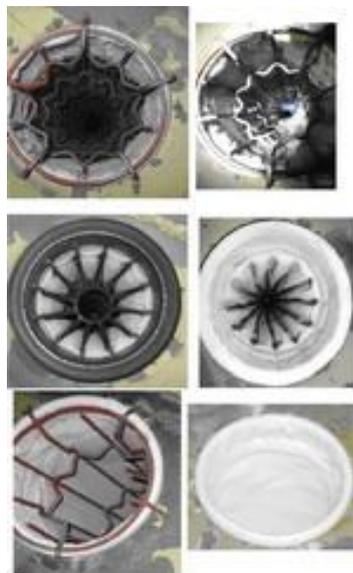


Fig. 12 The dust on the filter bags

## 5. Aluminum industry



Fig. 13. Montage of the filter bags "3DESA filtratron"

"3DESA filtratron" filter bags are being installed at the gas-purifying machines at the Krasnoyarsk Aluminum Plant. The size of the purification is 4 square meters, up 2-fold from the currently used filters. Over 2 thousand innovative filter bags have been installed in the gas-purification system.

We installed more than 4500 filter bags "3DESA filtratron" on RUSAL plants during last 3 years.

## 6. Use "3DESA filtratron" by producer of the bag filter houses

The different companies today use the filter bags "3DESA filtratron" in the bag filter houses. Such filter are FRI-3D (the Pic. 13), SFR and the ray of others.

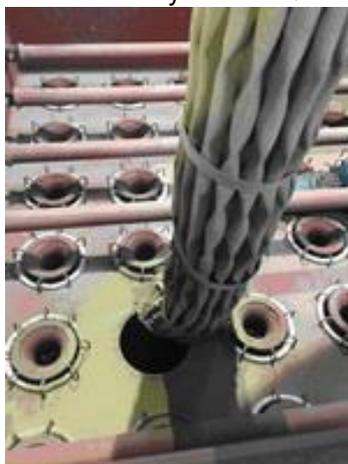


Fig. 14. Filter house FRI-3D in usages

For instance, filter FRI-3D on installation for drying of sand, as of measurements "NTC Industrial safety" under input the dust from 1 g/m<sup>3</sup> and has above provided the emission less 0,5 mg/m<sup>3</sup>.

Some manufacturers of bag filter houses use the filter bags "3DESA фильтрпатрон" with increased in 4,6 and more once area to filtering (the Rice. 14).

Our partner clear sees the advantage a filter bags "3DESA filtrpatron" and uses in their own filter. Herewith uses the filtet bags with repeatedly increased by surface (4 times and more). He recommends to use the filter bag "3DESA фильтрпатрон" in system dust filtration, under development for straiten conditions of the usages.



Fig. 15 Montages of the filter house with filter bags "3DESA filtrpatron" with increased in 4,6 surfaces filtration.

## 7. The findings.

The filter bags "3DESA filtrpatron" applicable in puls jet filter house for peelings of the air from different dust. They demonstrate high efficiency dust filtration. The filter bags "3DESA filtrpatron" length before 9 m and worker filtering area before 3 sq. m on l.m of lengths of the filter bag and more allow to solve the varied problems in many branch of industry. Increase to capacity dust clearing systems with conservation level surge or reduction surge under simultaneous increase of capacity is reached by change standard filter bags on filter bags "3DESA filtrpatron". Thereby, modernization existing dust clearing equipment to account of the use in th bag filter houses the filter bags with increased by surface фильтрования is provided domestic technology 3DESA.

## LITERATURE

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