

OTOMATIC



BEFORE YOU BUY GUIDE

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1. Introduction

The demand for DPF filter cleaning service is growing dynamically in the world. Companies running this type of business do not complain about the lack of clients.

The availability of the service that restores the efficiency of the DPF filter to almost 100% of its efficiency, including up to half the cost of repairing the filter compared to the cost of its removing, legality of driving on public roads, makes the service of cleaning DPF filters more and more popular.

Today, almost everyone has heard about the hydrodynamic method of cleaning particulate filters. The method uses the force of turbulent hydrodynamic water flow and the force of the compressed air pulse from the compressor. The movement of the working fluid is forced by external pressure, which must overcome the flow resistance in the filter channels.

The emergence of a new method is accompanied by the appearance of new business opportunities. New companies providing DPF filter cleaning services are emerging. Car workshops and individuals are their clients. More often transport companies and municipal communication facilities are asking about the service.

You need a specialized machine to start a business, but which one should you choose?

Our guidebook provides some basic tips on what you should pay attention to.

2. Cleaning programs

First of all, pay attention to whether the machine you are going to buy gives you the option of individually setting the cleaning program adapted to the filter capacity.

The hydrodynamic method of cleaning DPF filters consists in filling the empty exhaust channels of the DPF monolith with working fluid, then releasing the compressed air pulse from the compressor in the same direction. In this way, we use the phenomenon of turbulent water flow hydrodynamics between filter channels.

The DPF monolith is built of inlet and outlet channels parallel to each other. The engine inlet channels are a particulate filtration system, thus they are dirty. Then in many cases completely clogged.

Only the exhaust gases filtered through the walls separating the channels escape outside.

In order to effectively release sediments from clogged intake channels from the engine side, we install the DPF filter from the outlet side, then run the cleaning program.

The cleaning program consists of two stages:

- time to fill the outlet channels with working fluid
- compressed air impulse time, squeezing through the bulkhead walls all the liquid from the outlet channels into the inlet channels.

Each clogged intake channel from the engine side is adjacent to a clean exhaust channel. To effectively clean all dirty inlet channels, we must ensure that all outlet channels are filled with working fluid.

DPF filters differ from each other in the size of the filter-monolith insert, as well as its metal housing.

Most competing machines only offer one predefined cleaning program.

In some cases, the time to fill the filter with fluid may be excessive, and in others it may be insufficient. In the case of insufficient water in the outlet channels, we encounter the effect of uneven cleaning of the inlet channels and the generation of excessive foam, which can easily damage the water pump.

All models of our machines offer free setting of cleaning programs adapting them to the type and size of the DPF filter to be cleaned.

Sufficient filling time and compressed air pulse time guarantee penetration and release of deposits evenly from all filter inlet channels.

3. Methods of installing DPF filters in the machine

Installing filters in the machine's cabin is an indispensable element of the cleaning process.

In most machines, the installing consists in choosing the right connection adapter.

Unfortunately, this solution is very time consuming.

It often requires a dozen or so different connecting adapters, which, when properly selected and then attached with belts, takes more time than the cleaning process itself. These types of adapters wear out quickly, and their purchase price significantly affects the overall operating cost of cleaning the filter.

In our company, we have developed a quick way to install filters from passenger cars and vans.

Thanks to it we were able to shorten the filter installing time from a few minutes to a few seconds.

The technology is based on the use of a pneumatic cylinder.

The pneumatic cylinder is equipped with a rubber sleeve, which under the pressure of the pneumatic cylinder expands inside the metal housing of the DPF filter.

This reduces filter vibrations and impacts on the cabin casing during a compressed air pulse. A phenomenon that occurs in machines where the filter is cleaned in a lying position, constrained by straps. In the event of an impact to the ceramic insert, brittle filter element may crack or crumble.

The installing of DPF filters from trucks in our machines involves the use of a special platform made of two plates connected vertically with screw connectors.

In our machines, the platform is an additional, mobile element of the machine, therefore it is not permanently attached inside the machine's cabin. This solution allows free, unrestricted use of the entire volume of the cabin while cleaning DPF filters from cars and vans.

The attachment of SCR catalysts in the One-Box system from trucks was solved by using one cone-shaped rubber connection adapter.

The cone shape allows free adjustment and adjustment of the adapter to the diameter of the SCR catalyst inlet.

4. Position of the DPF filter during cleaning

Another aspect that increases the efficiency of cleaning DPF filters that should be noted is the position of the DPF filter during cleaning.

The position of the DPF monolith channels vertically towards the working fluid supply nozzle significantly increases the likelihood of liquid filling of all outlet channels evenly during filling.

The horizontal (horizontal) position of the filter causes that part of the lower channels of the filter monolith in this position is filled with working fluid much more than its upper channels.

The upper channels that are insufficiently filled with liquid are not cleaned in the same way as the lower channels. When cleaning the upper channels, excessive foam often comes out.

In our machines, the vast majority of DPF filters are in a vertical position during cleaning. The machines are equipped with a steel stand with a pneumatic cylinder for filter attachment.

5. Safety devices.

Protection against too high pressure in the filter during cleaning.

Each DPF filter has its own individual background. From time to time a car collision, after a turbine failure, after an injector failure, etc.

Appropriate diagnosis of such a filter before cleaning can help avoid unnecessary worries and embarrassment with the customer.

Unfortunately, there are situations where such a diagnosis will be difficult. The DPF filter may have blocked channels in the interior of the monolith, e.g. due to the melting of its structure as a result of combustion of diesel fuel from emergency injectors.

By diagnosing the filter with an inspection camera, we can only see its external surfaces from the inlet and outlet. In most cases, this is enough to see damage, but not always.

In the process of hydrodynamic cleaning of such a damaged DPF filter, further damage may be expected in the form of a monolith shift inside the filter housing, or even damage to the ends of the filter sensors.

Our machines have a safety device that prevents such an emergency.

All models of our machines are equipped with a pressure monitoring sensor, an inverter for the water pump, and a solenoid valve.

From the position of the operator panel we can freely set the level of the maximum allowable working pressure and the number of attempts to lower it.

In critical situations, the machine is turned off by the controller, giving a message on the screen about excessive pressure.

Unfortunately, our competitors have forgotten about this type of security.

Protection against lack of air flow in the filter during drying.

Another important aspect is to avoid overheating the air blower during drying time.

Side channel blowers are used for the drying process.

Side channel blowers are devices that compress air to a slight overpressure.

The rotating impeller draws a specific volume of air between a pair of blades and pushes it as a result of centrifugal force into the upper part of the inter-blade space. Pushed air is thrown away in so-called side channel - outlet.

In the process of cleaning DPF filters by hydrodynamic method, the entire interior of the filter is filled with water. Water enters the internal metal filter housing, filter monolith channels, as well as microscopic pores in the walls separating the filter channels.

After the filter cleaning process, some of the working fluid remains in the interior of its monolith. DPF filters differ in size, shape of the monolith metal housing, degree of filtration accuracy, material used for the production of monolith, and many others.

During drying, the direction of air flow through the DPF may be easier. As already mentioned above, side channel blowers are characterized by high efficiency of the air flow, even up to 350m³ / h, but compresses air only to a slight overpressure.

In some situations, such a blower may simply not have the power to push the water out of the filter housing, which can cause the blower to overheat.

An additional air flow sensor is used in our machines.

From the position of the operator panel, we can freely determine the minimum% air flow to be achieved in a given period of time. If the machine does not reach the selected parameters during drying, the machine stops with information to try to install the filter from the other side.

Unfortunately, our competitors have forgotten about this type of safety device too.

6. Filtration systems

The filtration system of working fluid plays a significant role in the process of cleaning DPF filters.

The DPF filter itself is and acts as a filter. Thus, the working fluid used to clean such a filter must be free of dirt particles that could clog it.

The degree of accuracy and efficiency of particulate filtration varies between DPFs. The parameters of DPF filters often depend on the EURO exhaust emission standard that they had to meet during their application.

In addition, DPFs depend on the operating system, wet or dry.

The emission limit values for the EURO 6 standard for passenger cars with a diesel engine are 0.005 g / km PM (solid particles).

Such tight standards require car manufacturers to use increasingly better and more accurate DPF filters.

The walls of the filter cartridge (monolith) have a distribution of fine pores that are carefully controlled in the production process. The total porosity of the material is usually from 45 to 50% or more, while the average pore sizes are usually from 10 to 20 μm .

The hydrodynamic method of cleaning DPF filters consists in squeezing the working fluid from the outlet channels to the inlet channels through the porous walls dividing the filter channels. That is why the quality of the working fluid is so important.

DPF filter cleaning machines work in a water closed circuit, which means that we use the same water all the time in the cleaning process. Dirty water flowing out of the filter during cleaning is filtered in filter tanks before refilling the filter again.

The quality of the filtration is determined by the type of filter cartridge used, its degree of accuracy specified in microns, as well as its efficiency specified in %.

OTOMATIC filter cartridges effectively retain the smallest impurities several dozen times smaller than the size of a grain of sand.

- filtering efficiency of 99.9% for particles only a few micrometers in size (1 micrometer = 1 thousandth of a millimeter).

For the production of filter seals, we use a unique polyurethane compound, which is distinguished by its elasticity and resistance to compression at high temperatures. Thanks to the unique quality of the seals, OTOMATIC filter cartridges maintain tightness in tanks even in very difficult operating conditions.

- OTOMATIC filter cartridge pleats are stabilized by means of special ribs that prevent adjacent pleats from sticking. Thanks to the even distribution of pleats, the filtration process takes place over the entire surface of the filter medium.

Competitive machines offer filter cartridges of 30 to 100 microns, or those with less than 50% efficiency, e.g. bag or even string filters. This level of filtration does not guarantee effective cleaning of DPF filters.

7. Cleaning efficiency tests

The degree of clogging of the filter prior to cleaning is measured by means of a pressure transducer. The transducer measures overpressure inside the DPF during airflow testing.

We perform air tests on a dry DPF filter, both before and after cleaning. In order to make a measurement after cleaning, the wet filter should be dried. Unfortunately, sometimes it turns out that the tests fail and the cleaning process should be repeated.

Our machines offer an additional measurement test using water as the medium. This type of water test serves as a pre-test before drying. Thanks to it, we can often save time spent on drying the same DPF filter twice.

8. Cabin and tank tightness

When testing the machine, make sure that the machine does not emit water outside the cab during air pulses. You should also look at the possibility of splashing water from the water tank inside the machine.

The cabin door is particularly exposed to possible leaks. In some cases, excess foam escapes from the cabin outside.

At the design stage, we have made every effort to ensure that our machines are tight during cleaning. The type and method of installing door seals, a gutter that drains water back into the tank, the full body of the tank forming one unit with the machine's cabin are just some of the elements of a competitive advantage.

9. Water tank

Take into account the costs associated with heating the cleaning fluid.

Due to the model and purpose, our machines are equipped with tanks of various volumes:

- DPF Premium 320l (double chamber)
- DPF Matic 110l

The DPF Premium machine is designed to clean DPF filters and catalysts from all vehicles, both passenger and heavy-duty. The machine is distinguished from our other models by the ability to clean all catalyst onebox.

For this purpose, a 320l tank was installed, guaranteeing a sufficient amount of working fluid during heavy-duty vehicle catalysts cleaning.

An additional advantage is the ability to divide the tank into two parts. When cleaning DPF filters from passenger cars or vans, there is no need to use the entire volume of the water tank (320l), all you need is one separate part 190 l.

Thanks to this solution, you save time and money.

The DPF Matic cleaning machine is equipped with a 110l tank, which is enough to clean DPF filters and catalysts from cars and vans.

Water tank insulation.

In all models of our machines, the water tank is insulated with an external insulation layer that protects against excessive heat loss.

10. Control system of water heating?

Water heating control means that in summer there is no overheating, and in winter the time to reach the set temperature is not too long.

Our machines have installed the option of adapting water heating process in the tank according to changing weather conditions.

The adaptation can be done several times a year.

11. Mobility of the machine.

Caster wheels - thanks to them we can easily move the machine from one place to another, without the need for a forklift.

No direct contact of the bottom of the machine with the ground extends its service life.

Caster wheels are the basic equipment of our machines.

Cleaning detergent laboratory tested

Recently, many DPF machine distributors have appeared on the market, offering detergents for cleaning DPF filters. Unfortunately, the vast majority of them damage the catalytic coating of the filter monolith.

Our company buys and tests such detergents on an ongoing basis. The results are catastrophic.

The cleaning efficiency of such detergents, due to their aggressive reaction (acid or alkaline) is very high, however they dissolve alumina, a coating element of the filter monolith. Often, these detergents have previously been sold as general motor cleaner. Their high efficiency leads some manufacturers to offer them now with a new label. The engine coating elements differ significantly from the delicate catalytic coating of the DPF filter monolith.

Our detergent was created only for cleaning DPF filters.

DPF Active Matic is a laboratory tested product.

During the tests no negative impact on the filter structure was found.

13. Training program.

Choosing the right machine is not everything.

What skills should you acquire during DPF cleaning training?

- Understanding the business aspect of providing DPF / FAP / CAT filter regeneration services
- Advanced theoretical knowledge in the construction and operation of the DPF / FAP / CAT filters
- Identification of typical and unusual causes of DPF / FAP / CAT filter defects with an emphasis on learning cause-effect analysis.
- Acquiring the ability to perform measurements and assessment of filter wear.
- Preparation of filters for cleaning.
- Cleaning in practice / hands-on machine learning
- Customer service.
- Document workflow.

During one-day training it is very difficult to master all the basic issues.

We have created a technical help desk for all our clients.

14. Manufacturer servicing

Check the origin of the machine.

Distributors importing machines from abroad often face the problem of fast delivery of parts from their manufacturers. Spare parts are usually much more expensive than domestic ones. Distributors often don't even have a service team. In return, they convince about the very low failure rate of their machines.

Check the manufacturer.

Most manufacturers do not use their machines on a daily basis.

Their machine production is based on theoretical and technological assumptions.

A large number of such manufacturers outsource a large part of their work to subcontractors.

Otomatic offers DPF cleaning service as well.

Working with our own machines, countless efficiency tests undoubtedly make us stand out from the competition.

We have our own machine park, construction and automation department, our own welders, CNC machine operators, machine assemblers.

We invite you to our headquarters

Meet your partner!