

# EXHAUST EXTRACTION SYSTEMS

• product catalog •

# SovPlym Company

## Our expertise

For 35 years, SovPlym JSC has been offering advanced solutions for creating healthy and safe working conditions, ensuring norms on MAC (maximum allowed concentrations) in the working area and reducing emissions of harmful substances into the atmosphere.

Our company is a recognized leader in production and supply of industrial ventilation, aspiration equipment, vacuum dust removal and exhaust gas removal systems. SovPlym also implements modern methods of combating the dangerous effects of industrial noise, welding radiation, dust and smoke in workshops.

The range of services provided includes the development and design of systems, production, installation, commissioning, warranty and regular service, and post-warranty maintenance.

## "SovPlym" in figures

SovPlym Holding was founded in 1989 in St. Petersburg. During this period, our qualified specialists have implemented tens of thousands of projects and accumulated priceless experience, professional knowledge, and high competence. We are proud of our successes and feedback from partners and continue to steadily develop our production, technology, and customer service.



**1989**

**THE YEAR OF  
INCORPORATION**



**2**

**PRODUCTION SITES**



**> 60 000**

**HAPPY CUSTOMERS**



**25**

**REPRESENTATIVE  
OFFICES AND  
BRANCHES**



**30,000 m<sup>2</sup>**

**PRODUCTION FLOOR  
AREA**



**> 600**

**TOTAL NUMBER OF  
OFFICE AND PRODUCTION  
EMPLOYEES**



**11**

**PRODUCT LINES**



**300**

**PRODUCT ITEMS**



**16 500**

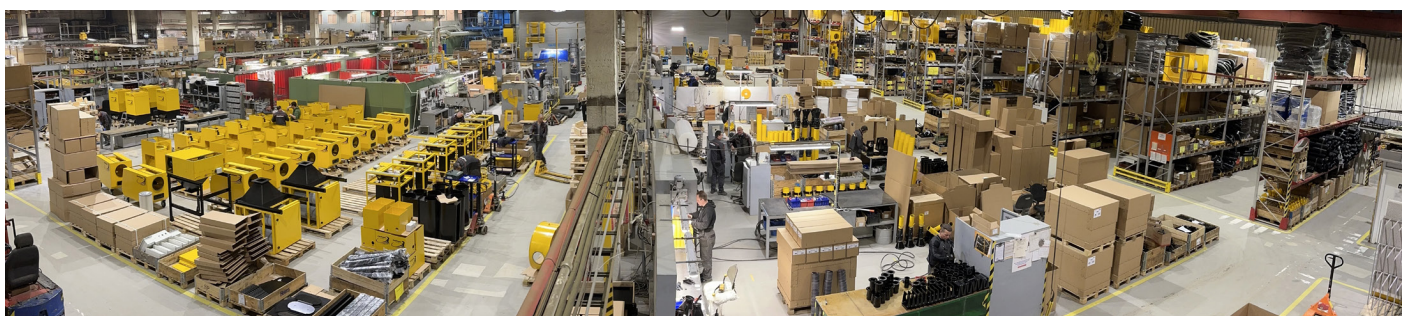
**PRODUCTION UNITS  
PER YEAR**

## Production inputs and standards

The main production facility of SovPlym JSC is located in St. Petersburg. Some products are manufactured in Ekaterinburg. The total area of production and storage facilities is 30,000m<sup>2</sup>. Every year the enterprise develops new product range, carries out constructive and technological modernization of manufactured items.

The technological fleet is regularly updated to perform the most advanced and efficient operations. Our production facilities are equipped with machines of brands including AMADA, FINN-POWER, HACO. In total, we operate about 150 pieces of equipment. SovPlym carries out cutting, bending, stamping, turning and milling, welding, soldering, stripping, rolling, drilling, chiseling, grinding, painting, balancing, crimping, gluing, radio mounting, assembly, marking, and packaging.

The company has an integrated quality management system that meets the ISO 9001:2015 requirements. A lean production system, including the "5C" system of workplace organization and rationalization, has been implemented and is successfully operating at the production facility. All manufactured equipment is made of high-quality components and undergoes stage-by-stage control by Quality control department. We also strictly control all purchased parts and consumables used in production.



## Sustainability factors on the market

60,000 companies have chosen SovPlym JSC as a professional partner for reliable and high-quality equipment, fast feedback, timely delivery and consumer services. Our loyal customers' feedback is the best argument in favor of cooperating with us.

- **Focus on customer** In our work we prioritize the prompt solution of customers' tasks.
- **Expertise** Employees of SovPlym JSC are experts in their field. High professional qualification, preserving the best traditions of domestic engineering, allows the production and supply of equipment on the single cycle principle - from development of design documentation to turnkey commissioning of the facility.
- **Quality** We control every step in accordance with ISO 9001:2015, lean manufacturing principles and 5S.
- **Technological effectiveness** We apply only advanced technologies in the field of air filtration, aspiration, vacuum technology, noise and spark protection.
- **Extent of service coverage** We work in all regions and time zones of Russia and neighboring countries. A wide network of branches and dealers allows us to be closer to our customers, to promptly visit the sites for presentations, definition of tasks and design.
- **Customer confidence** Thousands of long-term clients, including the largest holdings and town-forming enterprises, military-industrial complex and state-owned companies, large and medium-sized private enterprises, small businesses.

## Branch offices and dealers

📍 – production site + office

🏢 – Sales Office

### Branches in Russia:

Saint Petersburg  
 Moscow  
 Novosibirsk  
 Ekaterinburg  
 Kazan  
 Surgut  
 Nizhny Novgorod  
 Samara  
 Rostov-on-Don

### Operating countries:

Kazakhstan  
 Uzbekistan  
 India  
 Israel  
 Republic of South Africa  
 Australia



## Partnership with global brands of dust and gas capturing devices

Developing and strengthening partnerships with leading European manufacturers of industrial air filtration systems is one of the most important tasks SovPlym has set for itself. Rich implementation experience and advanced technologies of our partners help to effectively solve the tasks set by our customers.

**PLYMVENT®**

**FILTERMIST**

**Vanad®**  
 CNC Thermal Cutting Machines

**PURAFIL**

**RGS**  
 VACUUM SYSTEMS

**CEPRO®**  
 защитные ограждения

**РУССКИЕ ШЛАНГИ**

**INTENSIV  
 FILTER**

**C(MBR)A**

**F**

# Engineering, installation and maintenance

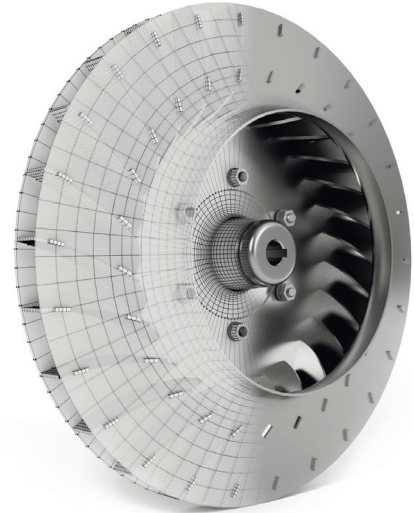
## Design and Technology Department

The chief designer's department and the chief technologist's office work in the computer-aided design program using aerodynamic flows calculation module. These departments are located directly in the production building, which allows our specialists to participate in the testing of new and modified products on a daily basis.

### Stages of creating products:

1. 3D modeling
2. Strength and aerodynamics calculations;
3. Issuance of working design documentation;
4. Formalization of operational documentation;
5. Laboratory tests.

By utilizing the world's latest technologies from its in-house R&D department and state-of-the-art full-cycle production, SovPlym provides customers with a wide range of the highest quality equipment and successfully implements worldwide optimal solutions for indoor air filtration, improving working conditions and increasing productivity.



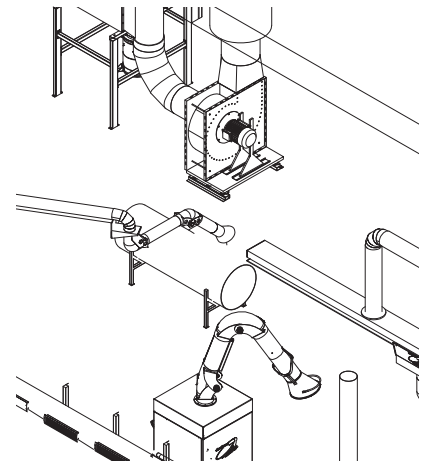
## Unified Engineering Center

SovPlym JSC has a Unified Engineering Center with branches in St. Petersburg, Novosibirsk and Ekaterinburg. This Center thoroughly develops project documentation, which allows us to successfully solve a wide range of tasks on industrial ventilation and protection of personnel from harmful effects.

United Engineering Center has a lot of experience in the Building Information Modelling technology, 3D parts scanning, point clouds. With these tools, our technicians effectively plan, design and show possible commissioning options for air filtration equipment and infrastructure.

### Projects are carried out on a turnkey basis:

1. Pre-project audit:
  - pre-plan site study
  - Collection of initial data
  - Drawing up technical design specifications
2. Design:
  - Developing project documentation defining the main technical solutions
  - Developing working documentation with the main set of drawings, certification of equipment, products, and materials required for the construction and installation works.
3. Obtaining mandatory approvals for expert assessment stage
4. Designer supervision at all stages of construction works



## Installation and servicing

SovPlym JSC is a member of several self-regulatory organizations for design, construction, and survey. We provide a full range of installation and service work:

1. Designer supervision
2. Site Supervision;
3. Installation work
4. Commissioning work;
5. Warranty and after-sales service



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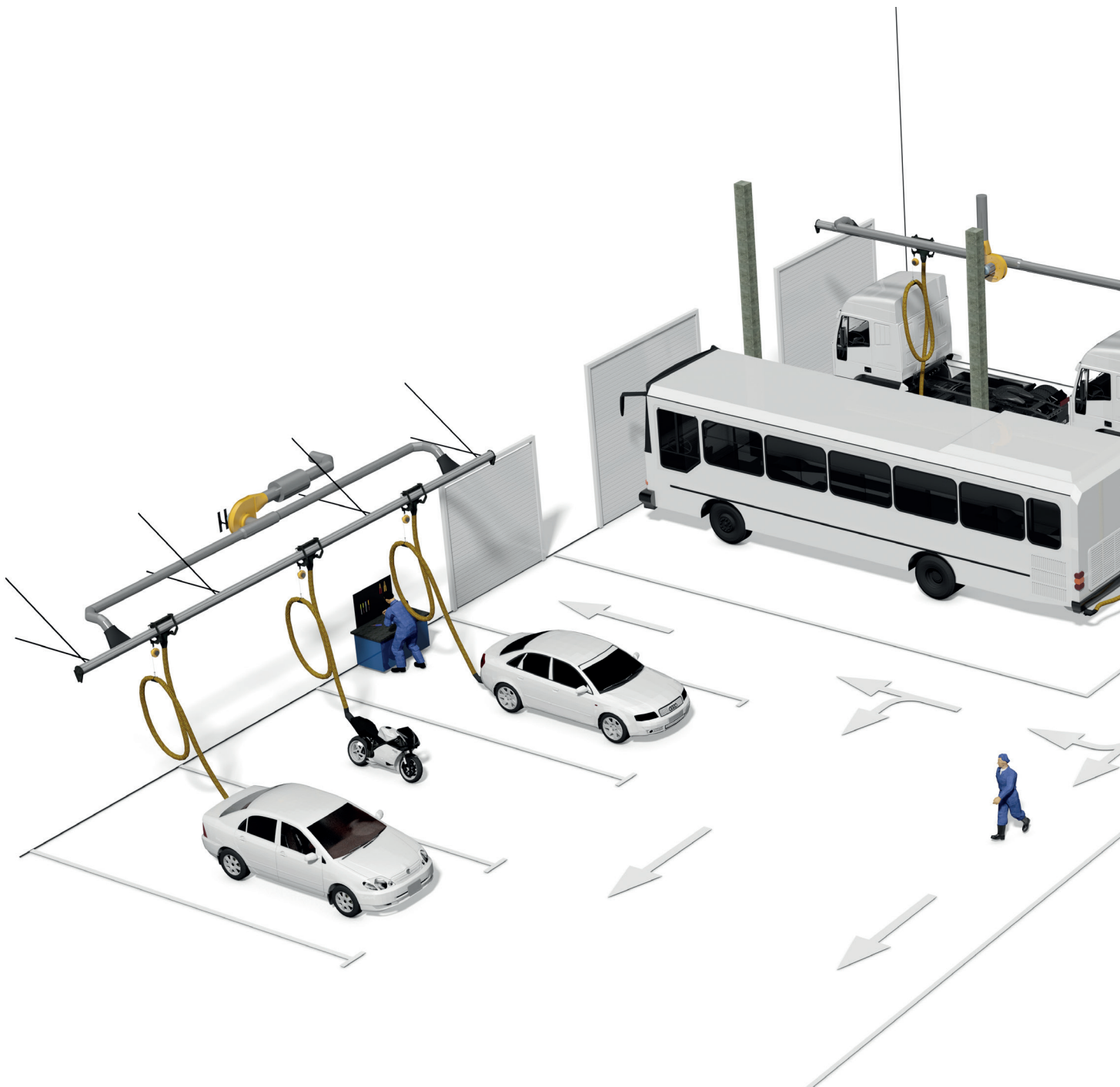
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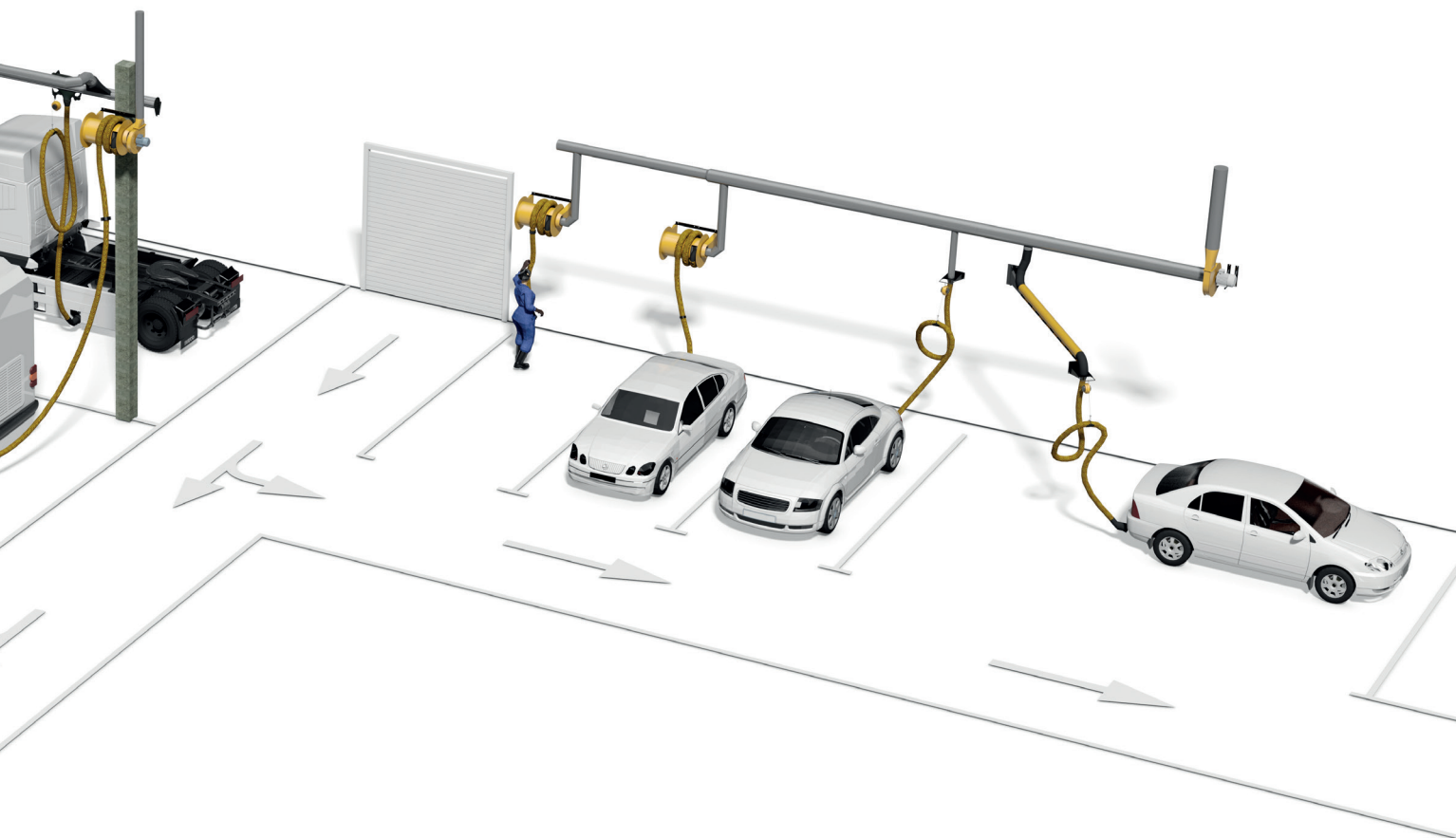
# EXHAUST EXTRACTION SYSTEMS

SovPlym produces a full range of exhaust extraction systems. These are exhaust devices, exhaust coils, and rail systems. Along with the main equipment, we select extraction hoses, gas intake nozzles, and hose splitters of the required diameters and heat resistance, as well as fans of the required capacity for the specific needs of customers.

Our model range allows working with almost any type of transport, such as motorcycles, cars and trucks, special equipment, military equipment, and diesel locomotives.



A conventional ventilation system cannot ensure MPC of harmful substances contained in exhaust gases in the human breathing zone, which means that personnel are constantly exposed to harmful chemical elements such as: CO, NO, NO<sub>2</sub>, SO<sub>2</sub>, as well as lead, cadmium, etc. Exposure to these hazards causes disorders of the nervous and cardiovascular systems, dizziness, vomiting, shortness of breath, bone tissue destruction and visual impairment that occur over time, and diseases such as atherosclerosis, chronic gastritis, bronchitis, laryngitis, and lung cancer. To protect the environment from harmful emissions you can use our equipment, which ensures 100% removal of gases directly from the exhaust pipe of the car, which significantly reduces the load on the supply and exhaust ventilation and saves heat and electricity. Complies with all labor protection rules and regulations.



# 1 HOSE REELS

## SPRING-DRIVEN RETRACTABLE HOSE REELS

ARS/ ARS-M



### Description

The ARS mechanical exhaust extraction coil and the lighter version ARS-M are the optimal and efficient solution for exhaust extraction at stationary repair and maintenance stations for vehicles and other types of machinery. The coil can be operated as a separate exhaust device with an individual fan model VMA. Multiple reels can be combined into a single exhaust extraction system connected to a central fan.

### Structure

The exhaust coil consists of a frame and a reel on which an exhaust hose with a limiter (a locking ring fixed to the hose) and a gas intake nozzle is wound.

The reel is fixed on the mounting frame posts using polymer rolling bearings that ensure smooth rotation of the reel when winding the hose.

One of the frame racks has a mounted block with band-type springs (1 or 2, depending on the coil model) which ensure the reel rotation when the extraction hose is wound.

A locking (ratchet) mechanism is fixed on the opposite frame post, fixing the reel in a position that corresponds to the length of the hose on which it must be wound from the coil reel. The design of the ratchet mechanism allows locking the reel only in certain positions, while the discreteness of the extraction hose unwinding is 0.5 m.

### Notes

The gas intake nozzle and extraction hose are to be ordered optionally, depending on the required amount of exhaust gases to be removed (the calculation is presented on page 57)

The air extractor must be started before starting work.

### Operation principle

If the automation system is applied, the fan will start automatically when the hose is unwound from the reel.

In the initial, non-operational state, the extraction hose is wound on the reel, with the locking ring resting on the reel frame. The free end of the hose with the gas intake nozzle does not touch the floor and does not interfere with the operation.

The hose is unwound to the required length and the reel is fixed with a ratchet mechanism before connecting to the exhaust pipe of the car.

After unwinding the extraction hose and fixing it at the required length, the gas intake nozzle is connected to the exhaust pipe of the car. After completing the work with the car, the nozzle is disconnected from the exhaust pipe, the reel is removed from the stopper of the ratchet mechanism (pull the hose a little to do it), and the hose is wound on the reel using the spring drive. The hose is wound until the locking ring fixed on the hose rests against the coil frame. The length of the hose overhang from the reel is adjusted by installing the locking ring at the required distance from the gas intake nozzle.

### Features and benefits

- Complete elimination of exhaust fumes from the premises.
- Heat and energy savings due to the elimination of exhaust gases directly from the exhaust pipe compared to general ventilation.
- Multiple coils can be connected to one air extractor. The extraction hose is wound on the coil reel and does not clutter the working space nor interfere with the passage of cars and maintenance personnel.
- Ability to service vehicles with different locations and configurations of exhaust pipes.
- The use of a reliable and durable band-type spring as a drive, combined with a specially developed by our designers fixing mechanism, allows smooth unwinding and winding of the extraction hose and fixing it to the desired point.

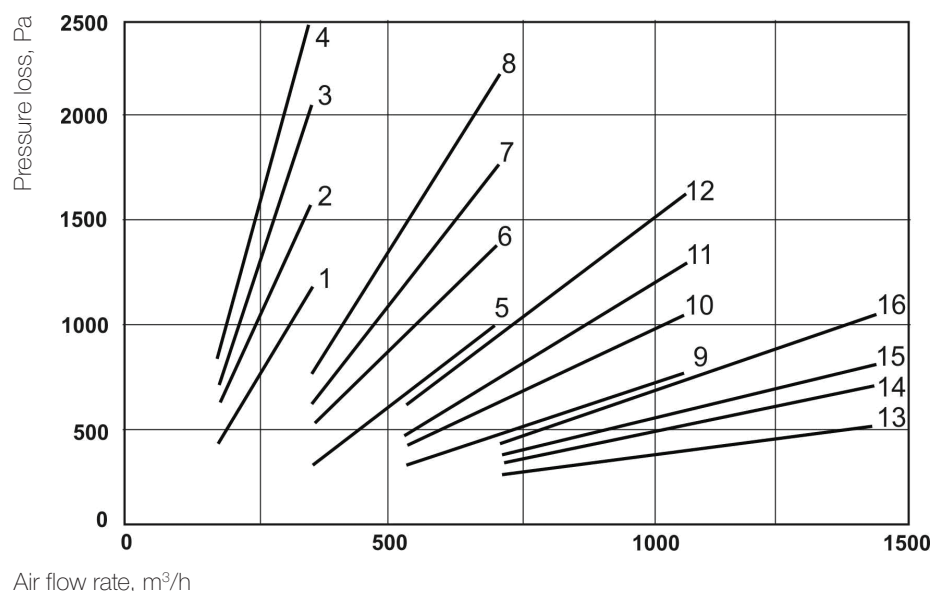


- The rigid frame of the reel enables it to be firmly fixed on any surface, that together with the use of a polymer plain bearing for reel rotation, reduces the dependence of operability on poor quality mounting, namely, with some misalignments in the installation and mounting of the coils.
- The use of a polymer plain bearing in the structure to rotate the reel, further increases the reliability and service life of the coil.
- Versions vary in size and weight while maintaining performance and manufacturing quality.
- The use of automation elements (MSR microswitches and PU F fan control panel) ensures automatic switching on/off of the fan when the coil reel rotates.
- The wear-resistant powder coating of the coil body preserves its appearance for many years and protects it against corrosive media.
- Modern design and the possibility of painting in the required color, allows you to harmoniously fit the coil into the interior of any service station.

## Specifications

Code	Model	Extraction hose		Recommended air flow, m <sup>3</sup> /h	Weight, kg (without hose)	Dimensions, mm					
		Diameter, mm	Length, m			D	L	L1	L2		
5650	ARS-75-5	75	5	270	42	73	764	602	600		
5980	ARS-M-75-5				32		633	583	450		
5650	ARS-75-7.5	75	7.5		42		764	602	600		
5980	ARS-M-75-7.5				32		633	583	450		
5651	ARS-75-10	75	10		45		914	752	750		
5983	ARS-M-75-10				35.5		853	803	670		
5651	ARS-75-12,5	75	12.5		45		914	752	750		
5985	ARS-M-75-12,5				35.5		903	853	720		
5652	ARS-100-5	100	5		540		42	98	764	602	600
5986	ARS-M-100-5						32		633	583	450
5652	ARS-100-7.5	100	7.5	42		764	602		600		
5986	ARS-M-100-7.5			32		633	583		450		
5653	ARS-100-10	100	10	54		914	752		750		
5988	ARS-M-100-10			35.5		853	803		670		
5654	ARS-100-12,5	100	12.5	53.5		1064	902		900		
5655	ARS-125-5	125	5	810		48	123		764	602	600
5656	ARS-125-7,5					48			914	752	750
5657	ARS-125-10	125	10			54			1064	902	900
5658	ARS-125-12,5	125	12		55.5	1264		1102	1,100		
5659	ARS-150-5	150	5		1,080	48		148	914	752	750
5659	ARS-150-7,5					48			914	752	750
5660	ARS-150-10	150	10	54		1064	902		900		
5661	ARS-150-12,5	150	12.5	55.5		1264	1102		1,100		

## Pressure drop chart

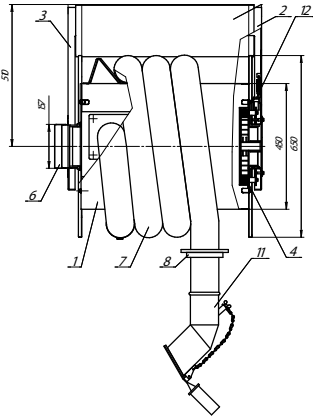


Models:

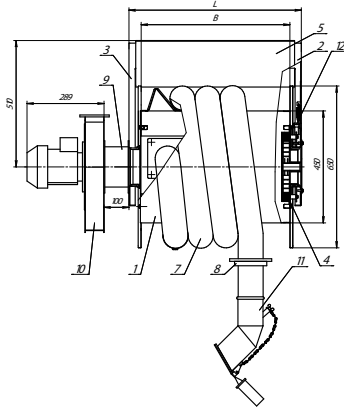
- ARS/ARS-M-75-5
- ARS/ARS-M-75-7,5
- ARS/ARS-M-75-10
- ARS/ARS-M-75-12,5
- ARS/ARS-M-100-5
- ARS/ARS-M-100-7,5
- ARS/ARS-M-100-10
- ARS-100-12,5
- ARS-125-5
- ARS-125-7,5
- ARS-125-10
- ARS-125-12,5
- ARS-150-5
- ARS-150-7,5
- ARS-150-10
- ARS-150-12,5

**Main components and dimensions**

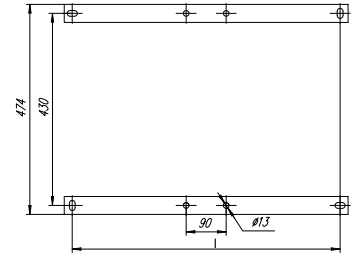
**ARS**



**ARS with fan VMA**



**Fastening**



- 1. Reel
- 2. Drive rack
- 3. Air duct rack
- 4. Spring drive
- 5. Beam

- 6. Flange, Ø160 mm
- 7. Extraction hose\*
- 8. Conical rubber hose stopper
- 9. Connection nipple
- 10. Fan

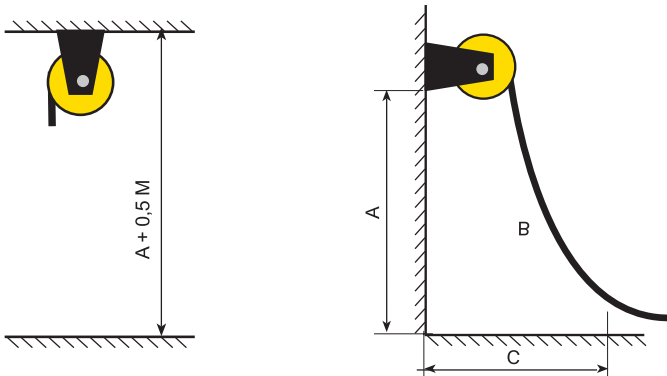
- 11. Extraction nozzle\*
- 12. Spring loaded reel stopper

\* Not included in the coil delivery kit.

**Mounting options**

**Maintenance area**

When mounted horizontally (to the wall), the coil must be installed in such a way that the extraction hose is lowered from the outside of the reel.

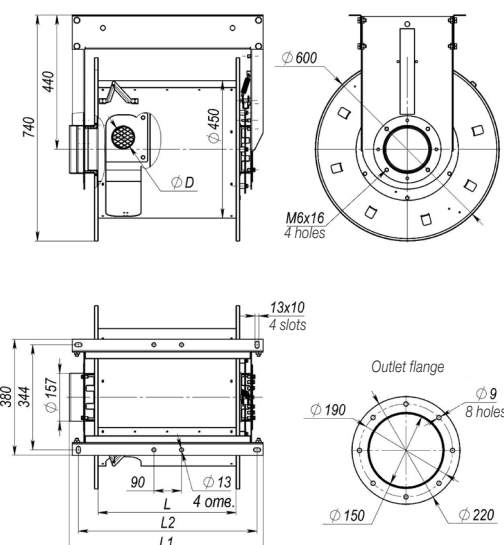
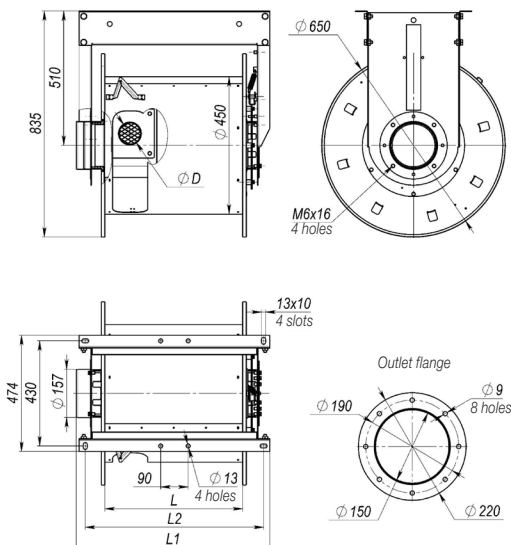


A, m	B, m	C, m	B, m	C, m	B, m	C, m
2.5	5.0	3.8				
3.0	5.0	3.5	7.5	6.2		
3.5	5.0	3.2	7.5	5.9	10.0	8.5
4.0	5.0	2.7	7.5	5.5	10.0	8.3
4.5	5.0	2.0	7.5	5.2	10.0	8.0
5.0			7.5	4.7	10.0	7.7
5.5					10.0	7.4
6.0					12.5	10.0
6.5					12.5	9.7
7.0					12.5	9.4

A – Installation Height B – Hose Length C – Maximum Distance

**Overall dimensions ARS**

**Overall dimensions ARS-M**



## MOTORIZED HOSE REELS

### ARM



### Description

The exhaust coil with electric drive (ARM model) is designed to eliminate exhaust gases from various types of vehicles during warming up, adjusting, and technical diagnostics of the engine.

Motorized hose reels are typically used to service large equipment, where large diameter and length extraction hoses are used, and in areas with high ceilings.

The coil can be operated as a separate exhaust device with an individual fan model FA.

Coils mounted in a workshop where several cars are serviced at once can be combined into a unified ventilation system and connected to a single air extractor of the required capacity. The calculation of the required capacity (amount of exhaust gas to be eliminated) is shown on page 57 of the catalog.

### Note

The heat-resistant extraction hose (not included in the coil delivery kit) is selected depending on the engine power of the serviced vehicle (heat resistance and diameter) and the zone served by the coil (hose length).

In addition, a gas intake nozzle is selected based on the size, configuration and design of the vehicle's exhaust pipe.

### Structure

The exhaust coil consists of a frame and a reel on which an extraction hose with a steel gas intake nozzle is wound.

The reel is fixed on the mounting frame posts using polymer rolling bearings that ensure smooth rotation of the reel when winding the hose.

An electric drive is mounted in one of the frame posts, which ensures the rotation of the coil reel when winding the extraction hose.

The electric drive is controlled from the wall control panel (key switch) which is included in the standard delivery kit.

The electric drive can also be controlled from a remote control (via a radio channel), which allows you to unwind and wind the hose onto the coil reel from anywhere in the room (there is no need to approach the wall control panel).

The coil is connected by a duct to the central ventilation line leading to the fan through the outlet pipe  $D=160$  mm, located on one of the frame posts.

### Operation principle

The air extractor must be started before starting work.

If the automation system is applied, the fan will start automatically when the hose is unwound from the reel.

In the initial, non-operational state, the extraction hose is wound on the reel.

The free end of the hose with the gas intake nozzle does not touch the floor and does not interfere with the operation.

Before connecting to the exhaust pipe of the vehicle, the hose is unwound to the required length using the electric drive control panel.

After unwinding the extraction hose to the required length, the gas intake nozzle is connected to the exhaust pipe of the vehicle.

After finishing work with the vehicle, the nozzle is disconnected from the exhaust pipe, and the hose is wound on the reel using the electric drive.

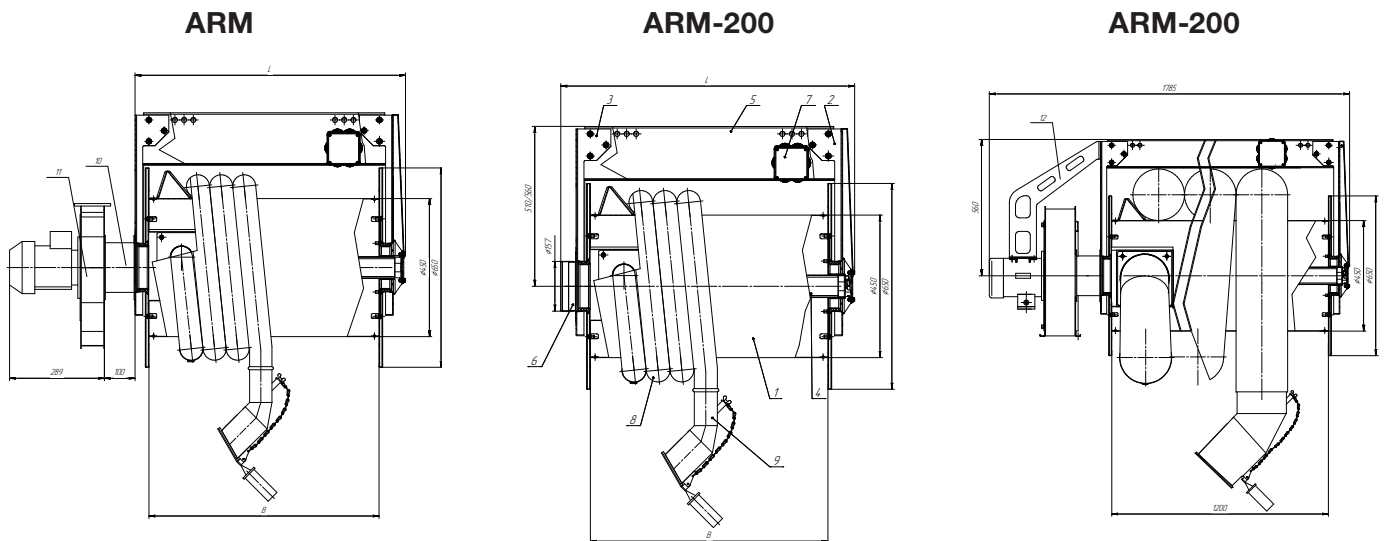
In case of complete unwinding or winding of the hose on the reel, the electric drive is automatically disconnected, and the rotation of the coil reel stops.

This is achieved by pre-adjusting the rotation of the actuator to the required number of revolutions. Pre-adjustment of the actuator is carried out at the manufacturing company. It is allowed to make additional adjustments to the rotation of the actuator to achieve the required length of the hose overhang from the reel.

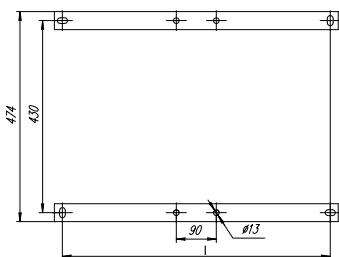
## Advantages

- Motorized ARM reels are ideal for repair areas of trucks, buses, and other heavy vehicles. Coils are also installed in garages with high ceilings.
- Complete elimination of exhaust gases from the premise saves heat and energy by removing exhaust gases directly from the exhaust pipe compared to general ventilation.
- The use of a high-quality and reliable electric drive with a large carrying capacity (up to 110 kg), allows the use of large diameter and length hoses.
- The rigid frame of the reel enables it to be firmly fixed on any surface, that together with the use of a polymer plain bearing for reel rotation, reduces the dependence of operability on poor quality mounting, namely, with some misalignments in the installation and mounting of the coils.
- The use of a polymer plain bearing in the structure to rotate the reel, further increases the reliability and service life of the coil.
- The coils are equipped with specialized exhaust hoses manufactured in-house, with required temperature resistance (from 150 to 600 degrees Celsius), diameter (100 - 200 mm) and length (up to 15 m), depending on the engine of the equipment being serviced, the height of the coil mounting and the required service area.
- The use of automation elements (MSR microswitches and PU F fan control panel) ensures automatic switching on/off of the fan when the coil reel rotates.
- The use of an automatic ventilation system with a variable speed air extractor can significantly reduce energy consumption, fan noise, and heat loss. Starting and stopping the fan, as well as changing its performance, is a completely automatic process.
- The wear-resistant powder coating of the coil body preserves its appearance for many years and protects it against corrosive media.
- Possibility of painting in the color required by the customer.

## Main components and dimensions



## Fastening

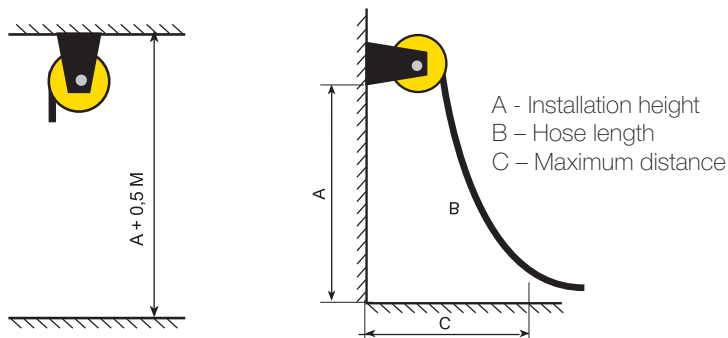


- |                        |   |
|------------------------|---|
| 1. Reel                | 8. Extraction hose                      |
| 2. Electric drive rack | 9. Gas intake nozzle                    |
| 3. Duct rack           | 10. Fan mounting connector              |
| 4. Electric drive      | 11. Fan                                 |
| 5. Beam                | 12. Fan mounting bracket for MERF-P-200 |
| 6. Duct flange         |   |
| 7. Terminal box        |   |

### Mounting options

### Maintenance area

When mounted horizontally (to the wall), the coil must be installed in such a way that the extraction hose is lowered from the outside of the reel.

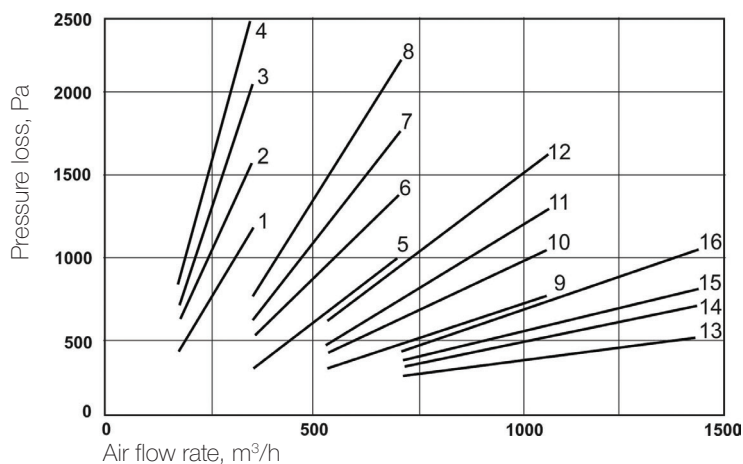


A, m	B, m	C, m	B, m	C, m	B, m	C, m
2.5	5.0	3.8				
3.0	5.0	3.5	7.5	6.2		
3.5	5.0	3.2	7.5	5.9	10.0	8.5
4.0	5.0	2.7	7.5	5.5	10.0	8.3
4.5	5.0	2.0	7.5	5.2	10.0	8.0
5.0			7.5	4.7	10.0	7.7
5.5					10.0	7.4
6.0					12.5	10.0
6.5					12.5	9.7
7.0					12.5	9.4

### Specifications

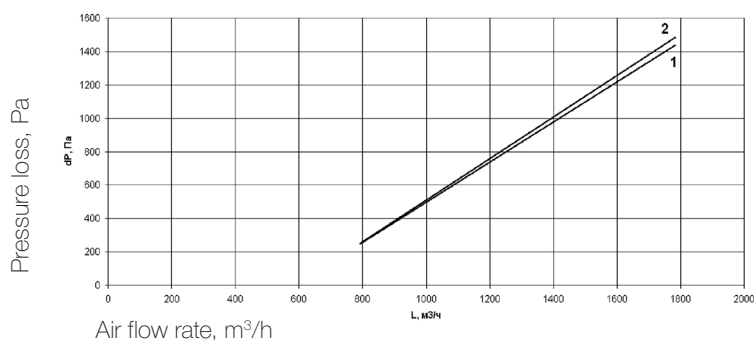
Code ARM	Model	Extraction hose		L, mm	l, mm	B, mm	Weight (without hose), kg		Recommended air flow, m³/h
		Diameter, mm	Length, m				MER	ARM	
6675/5674	ARM-75-5/12,5	75	5.0/7.5/10/12.5	930	752	750	43	58	270
6676/5676	ARM-100-5/10	100	5.0/10	930	752	750	43	58	370
6677/5678	ARM-100-12,5	100	12.5	1,080	902	900	46	61	370
6678/5679	ARM-125-5/7,5	125	5.0/7.5	930	752	750	43	58	600
6679/5681	ARM-125-10	125	10	1,080	902	900	45	60	600
6680/5682	ARM-125-12,5	125	12.5	1280	1102	1,100	49	64	600
6681/5683	ARM-150-5/7,5	150	5.0/7.5	930	752	750	43	58	800
6682/5684	ARM-150-10	150	10	1,080	902	900	45	60	800
6683/5685	ARM-150-12,5	150	12.5	1280	1102	1,100	49	64	800
6105/5155	ARM-200-10/12,5	200	10/12.5	1380	1202	1200	55	70	1200

### ARM Pressure Loss chart



1. ARM-75-5
2. ARM-75-7,5
3. ARM-75-10
4. ARM-75-12,5
5. ARM-100-5
6. ARM-100-7,5
7. ARM-100-10
8. ARM-100-12,5
9. ARM-125-5
10. ARM-125-7,5
11. ARM-125-10
12. ARM-125-12,5
13. ARM-150-5
14. ARM-150-7,5
15. ARM-150-12,5

### ARM-200 Pressure Loss chart



1. ARM-200-10
2. ARM-200-12,5

**PIVOT ARM**

SSA



**Description**

The pivot arm is designed to increase the coverage area of the exhaust coil. With this arm, you can install the coil near the workspace when other installation options are not possible.

**Design and Advantages**

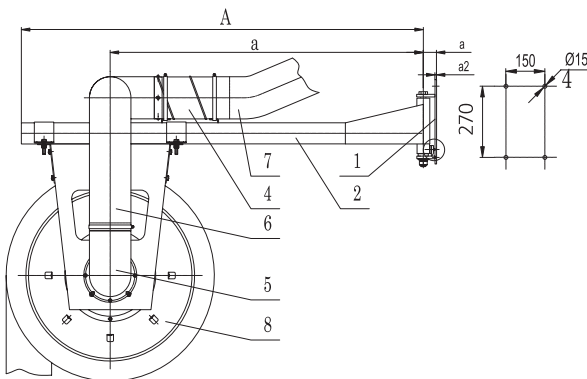
The pivot arm SSA consists of an arm with air ducts and a mounting panel. To maximize the working radius, the coil is installed at the end of the arm. The system makes it easy to move and fix the arm, which can rotate by 180°. The pivot arm can be attached to a wall or column.

**Specifications**

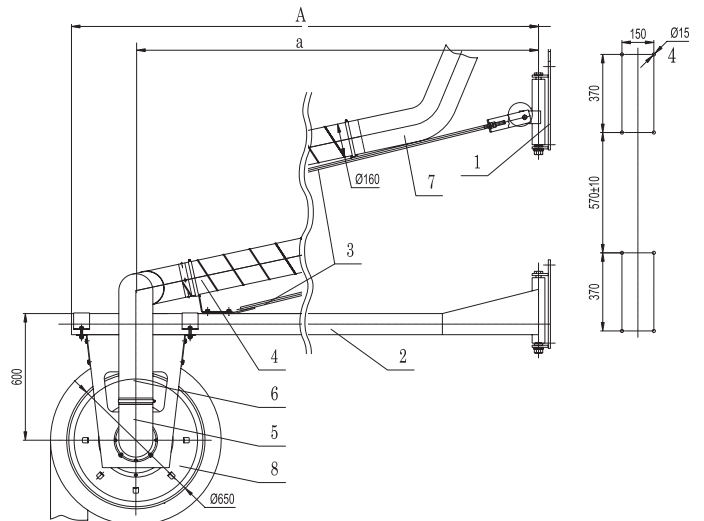
Code	Model	Diameter of ducts, mm	A, mm	a, mm	Maximum pressure loss, Pa	Weight, kg
5607	SSa-1.5	160	1,550	1208	50	20
5608	SSa-2.5	160	2550	2208	50	40
5609	SSa-3.5	160	3532	3190	50	50
5610	SSa-4.5	160	4530	4228	50	60

**Layout of mounting holes for the platform mounting**

**SSa-1,5; 2,5; 3,5**



**SSa-4,5**



- 1. Mounting pad.
- 2. Pivot arm beam.
- 3. Thrust (SSa-4,5 pivot arm only).
- 4. Rigid air duct.
- 5. Elbow.
- 6. Flexible steel duct.

- 7. 160 mm hose.
- 8. Exhaust coil.

## EXHAUST DEVICE

### IDROP



### Description

IDrop systems are a very simple but effective solution for eliminating exhaust gases in small car repair shops and garages. The IDrop can be installed with a separate fan or connected to a central ventilation system.

### Design and Advantages

The exhaust device consists of an extraction hose with a gas intake nozzle which is fixed to the mounting bracket nipple. An air extractor is installed directly on the mounting bracket (for DPF models), and a balancer with extraction hose support is suspended from it on a special bracket. In the non-operational state, the extraction hose is held by a balancer in the form of a smoothly bending loop, while the free end of the hose with the gas intake nozzle does not touch the floor and does not interfere with the work and passage of personnel. When connected to the exhaust pipe of the car, the hose is straightened. When disconnected, the hose returns to its original position with the help of the balancer.

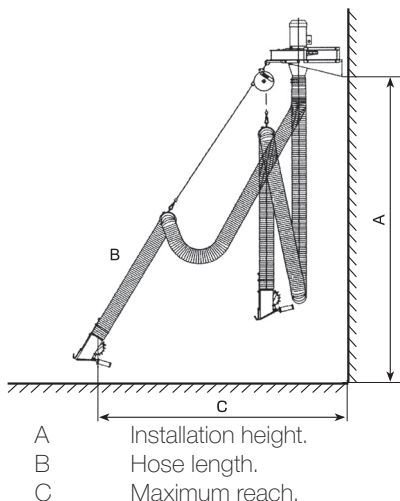
DP models with index "3" are equipped with a balancer with a 3 m long cable and a cable stopper, which allows fixing the hose at the required length. DP models with index "6" are equipped with a balancer with a 6m long cable without a cable stopper, while the device must be equipped with a gas intake nozzle with a clamp for fixation to the exhaust pipe.

### Note

The extraction hose and gas intake nozzle are selected depending on the required airflow rate, exhaust gas temperature, and exhaust pipe diameter of the vehicle.

Do not operate the engine of the vehicle with the extraction hose connected to it and the fan inoperative.

### Maintenance area

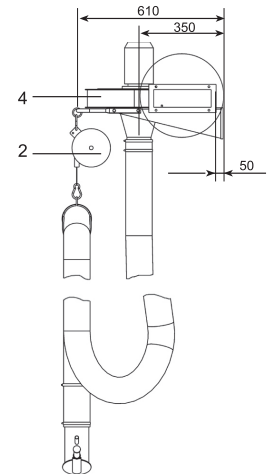
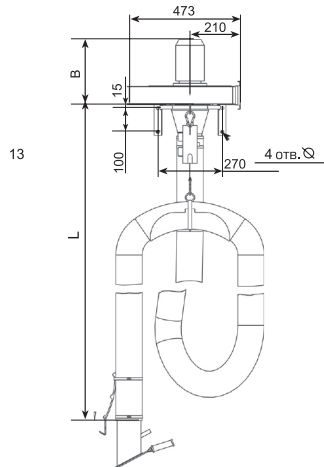
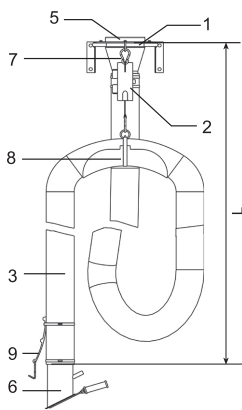


A, m	B, m	C, m	B, m	C, m
2.5	5	4.5		
3	5	4.2	7.5	7.0
3.5	5	3.7	7.5	6.7
4	5	3.1	7.5	6.5
4.5	5	2.3	7.5	6.1
5		7.5	5.7	
5.5		7.5	5.2	
6		7.5	4.6	

### Specifications

Code	Model	Extraction hose diameter, mm	Balancer rope length, m	Weight, kg	FR series fan		Recommended air flow , m³/h
					Power, kW	Speed rpm	
5009	DP-75-3	75	3	9.5	-	-	270
5010	DP-75-6	75	6	9.7	-	-	270
5011	DP-100-3	100	3	9.7	-	-	370
5012	DP-100-6	100	6	9.9	-	-	370
5013	DP-125-3	125	3	9.8	-	-	600
5014	DP-125-6	125	6	10.0	-	-	600
5015	DPF-75-3	75	3	23.6	0.55	2730	270
5016	DPF-75-6	75	6	23.8	0.55	2730	270
5017	DPF-100-3	100	3	23.8	0.55	2730	370
5018	DPF-100-6	100	6	24.0	0.55	2730	370
5019	DPF-125-3	125	3	23.9	0.55	2730	600
5020	DPF-125-6	125	6	24.1	0.55	2730	600
5021	DPF1-75-3	75	3	26.9	0.55	2840	270
5022	DPF1-75-6	75	6	27.1	0.55	2840	270
5023	DPF1-100-3	100	3	27.1	0.55	2840	370
5024	DPF1-100-6	100	6	27.3	0.55	2840	370
5025	DPF1-125-3	125	3	27.2	0.55	2840	600
5026	DPF1-125-6	125	6	27.4	0.55	2840	600

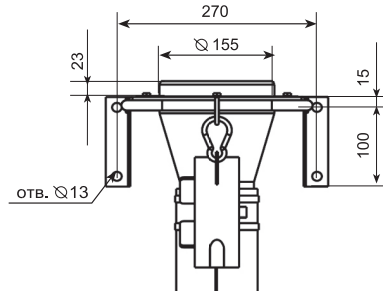
### Main components and dimensions



IDrop designation	B, mm
DPF	287
DPF1	313

Hose length, m	L, mm
5	2160
7.5	2960
10	3160

Hood Mounting Bracket



1. Mounting bracket.
2. Balancer.
3. Extraction hose.
4. Fan<sup>1</sup>.
5. Flange<sup>2</sup>.
6. Gas intake nozzle.
7. Hose nipple.
8. Conical rubber support.
9. Conical rubber belt with a hook.

1 for DPF/ DPF1 models  
2 for DP model

- The extraction hose with the required heat resistance and the gas receiving nozzle are to be ordered separately. The recommended extraction hose length is 5 to 7.5 m.

- The device can be attached to a wall, a ceiling, or a column.



## EXHAUST DEVICE

### VEGA



### Description

The VEGA exhaust gas extractor is ideal for small car repair shops and maintenance garages. This device has a small coverage area. As a rule, VEGA is connected to a separate fan, but in some cases, this device can be connected to a central ventilation system.

### Design and Advantages

The device consists of a pivot arm mechanism, a mounting pad, a hose with a balancer, and an exhaust nozzle. VEGA is easy to move and lock in position. The hose is held by a balancer in the raised position, thereby freeing up the working space. To attach the hose with exhaust nozzle to the exhaust pipe, simply pull the hose and secure it to the pipe. After operation, the hose is easy to return to its original position: simply disconnect the nozzle from the pipe and the balancer will lift the hose.

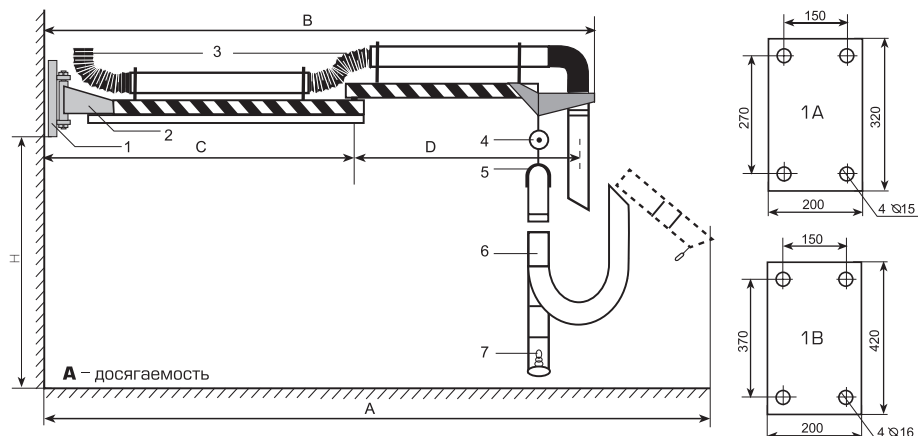
- The standard device is equipped with an SP-HOSE-150 hose with an operating temperature of 150°C and 160 mm air ducts.
- The exhaust device is fixed on a mounting bracket to a wall or columns.

### Specifications

Code	Model	Extraction hose		Maximum radius of the working area, m	Recommended air flow (m <sup>3</sup> /h)	Weight, kg
		Diameter, mm	Length, m			
5143	VEGA-025-75	75	5	4.5	270	42
5144	VEGA-025-100	100	5	4.5	370	42
5148	VEGA-1515-75	75	5	5.0	270	62.1
5149	VEGA-1515-100	100	5	5.0	370	66.5
5153	VEGA-2515-75	75	5	6.0	270	71.8
5154	VEGA-2515-100	100	5	6.0	370	66.3
5158	VEGA-3515-75	75	5	7.0	270	71.8
5159	VEGA-3515-100	100	5	7.0	370	76.3

## Main components and dimensions

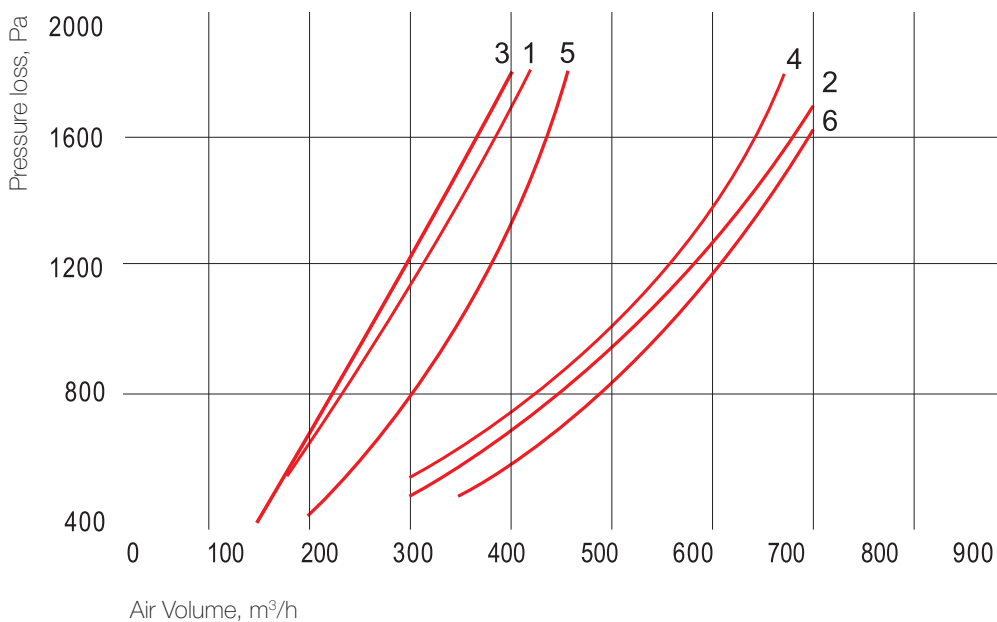
### Mounting pad



- |                         |                                    |
|-------------------------|------------------------------------|
| 1. Mounting bracket.    | 5. Conical rubber hose support.    |
| 2. Beam.                | 6. Heat-resistant extraction hose. |
| 3. Flexible hoses D160. | 7. Steel gas intake nozzle.        |
| 4. Balancer.            |                                    |

Model	A, mm	B, mm	C, mm	D, mm	H, mm
VEGA-025	4000	3000	2500	—	3200
VEGA-1515	5000	3000	1560	1410	3200
VEGA-2515	6000	4000	2560	1410	3200
VEGA-3515	7000	5000	3560	1410	3200

### Pressure drop chart



Models:

1. VEGA-025-75
2. VEGA-025-100
3. VEGA-1515-75
4. VEGA-1515-100
5. VEGA-3515-75
6. VEGA-3515-100

## EXHAUST DEVICE

### WHEELED EXHAUST DEVICE SUVP



#### Description and use

The wheeled exhaust device (WED) is designed to remove exhaust gases directly from the exhaust pipe of a car with a running engine. The intake funnel has a groove for entering the sampling probe of the gas analyzer for conducting exhaust gas tests. It is used in the premises of garages and vehicle maintenance shops that are not equipped with exhaust extraction system.

#### Structure

The WED consists of a radial fan in a steel housing mounted on a two-wheeled trolley. The plastic gas intake funnel is connected to the fan by a heat-resistant hose 150 °C.

The intake funnel moves along the vertical rack and is fixed at the required height, and the angle of inclination of the funnel is adjustable. Exhaust gases from the fan (motor power 0.37 kW) are removed from the premises through a hose whose length should not exceed 10 m. The fan motor is powered from a single-phase AC mains with grounding (the scope of supply includes a cable L=5 m with a plug). As a discharge hose it is recommended to use a heat-resistant high-strength hose (with protection against overtravel) model SP-HOSE-150, d=125 mm, fixed on the fan outlet with a clamp. Hose and clamp are not included in the scope of delivery (available on request).

#### Features and benefits

- It can be used in any road transport enterprises and service stations that are not equipped with an exhaust extraction system.
- Cost-effective exhaust extraction solution.
- Due to its mobility, the UVP can be quickly moved from one vehicle service station to another, thus saving on the purchase of several stationary extraction units.
- The device uses a plastic non-contact gas intake funnel with a conical rubber damper, which prevents damage to the car paintwork.
- The gas intake funnel has a special window for the exhaust gas tester probe.
- A low-noise fan in a steel housing (220V network) is used.
- For convenience, the exhaust hose is spirally laid on the frame around the fan when the WED is moved and stored.

#### Specifications

Code	Model	Max capacity, m <sup>3</sup> /h	Diameter of the hose, mm	Funnel lifting height, mm	Funnel inlet hole size, mm	WED dimensions, mm	Weight, kg
5270	Wheeled exhaust device SUVP	900	125	200-600	220x200	650x1200x750	25

## A PIVOTED ARM EXHAUST EXTRACTION DEVICE TO REMOVE EXHAUST GASES FROM DIESEL LOCOMOTIVE

UKL



### Description

The device is a pivot arm beam with an exhaust device with a funnel fixed on its free end. Exhaust gases are eliminated by the air extractor through a flexible hose and duct.

The maximum temperature of the exhaust gases to be removed is 500 °C.

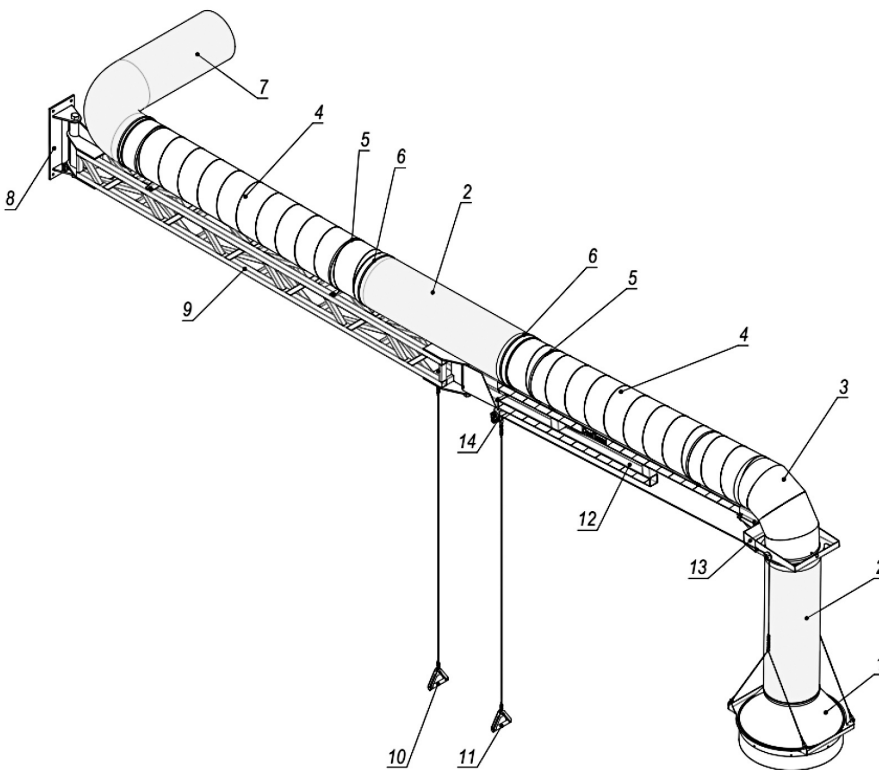
### Designation

The UKL series pivoted arm exhaust extraction device is designed for intake of exhaust gases generated in the process of locomotive engine operation and their further removal from the depot area to create favorable working conditions for the service personnel.

### UKL system advantages

- Preservation of personnel health, protection from harmful exhaust gases.
- Efficiency and high performance of the system.
- Flexibility and large coverage range of the system.
- Simplicity, reliability, and long service life of the system.
- Low power consumption by reducing the load on general ventilation.
- Easy installation and operation of the system.

### General view and components. Operation principle



1. Air intake funnel;
2. Flexible hose L= 1.2 m;
3. Angular elbow 90°;
4. Air duct;
5. Worm clamp;
6. Spiral clamp;
7. Flexible hose L = 1.5 m;
8. Installation site;
9. Internal beam;
10. Control rope;
11. Funnel lifting rope;
12. External beam;
13. Support bracket;
14. Funnel control cable fastening plate.

At the locomotive maintenance point (MMP), a movable console is installed at a certain place on the railroad track, which is fixed to a vertical surface (wall, column) by means of a mounting pad (8). The console consists of two beams (arms) (9, 12) which can be rotated relative to the platform by  $\pm 90^\circ$  and relative to each other by  $180^\circ$ .

Controlling the turning of the console beams is done by steel cables (10, 11).

The funnel raising/lowering is controlled by a cable (11). Adjustment of the turning force of the beams is carried out by pressing the brake pads on the mounting platform with screws, which prevents their involuntary "departure" from the place of work.

When the diesel locomotive is stopped in the system coverage area, a funnel of the required diameter (1) is brought to its exhaust pipe. In addition to magnetic nozzles, we offer other options based on the customer's conditions.

Inside the funnel, ring magnets (4 pcs.) are installed, which make it possible to reliably fix the funnel on the roof surface of the diesel locomotive, thereby practically eliminating the emissions of polluted air into the premises of the maintenance point.

A heat-resistant hose (2) connected to the air duct (4) extends from the funnel. The air duct runs along the console and is attached to it along the upper edge with clamps (5, 6).

A stand-alone fan connected to the UKL extractor removes the exhaust gases through a heat resistant hose and ducting outside the premises.

## Specifications

Code	Model	Max air flow, m <sup>3</sup> /h	Max radius of the working area, mm	Air duct diameter, mm	Funnel lifting height, mm	Lengths of beams internal/external, mm		Weight (NMT), kg
501150	UKL-4,5	5000	4500	315	500	2550	1750	110
501151	UKL-6	5000	6000	315	500	3550	2400	160
501152	UKL-8	5000	8000	315	500	4550	3400	190

Design modifications are possible (length of beams, diameter of ducts, diameter of exhaust funnel, temperature resistance of hoses) according to specific customer requirements.

## Required input data for selection (development) of the exhaust extraction systems for diesel locomotives (traction cars, diesel generators)

1. Layout of the premises with an indication of the diesel locomotive location during routine maintenance related to the need to remove exhaust gases.

Indicate the location of the exhaust pipe, its diameter (dimensions), and the height of the location from the floor (rails) level on the layout.

If the locomotive stops along a certain section of the track rather than in a specific place, please indicate the length of this section, which will be the length of the exhaust device (range).

Indicate the possible place of installation (mounting) of the exhaust extraction system on the layout taking into account the location of technological and other equipment and the ways of movement of personnel and equipment.

2. Characteristics of the diesel locomotive and engine:

- Overall dimensions of the diesel locomotive;
- type of diesel locomotive engine;
- engine cylinder capacity (l);
- engine speed during maintenance (rpm);
- the maximum temperature of the exhaust gases at the exhaust pipe section;
- the required volume of air to be removed (system performance).

## 3 GAS INTAKE NOZZLES

### CONICAL RUBBER GAS INTAKE NOZZLE

RON



#### Description

A conical rubber nozzle for exhaust gas removal with a metal branch pipe for connection to an extraction hose is used as part of exhaust devices and exhaust extraction systems of vehicles.

Convenient and easy to use and suitable for almost all types of exhaust pipes of appropriate diameters.

The nozzles are designed for servicing cars and trucks with exhaust pipes with a diameter of 50 to 115 mm.

The temperature resistance of conical rubber is 150°C, while the temperature of the exhaust gases removed through the nozzle can reach 200°C (provided that an additional inflow of ambient air through the nozzle bell is provided, 25% of the calculated amount of exhaust gases removed).

The conical rubber of the nozzle is dense enough to ensure rigidity and elasticity at the same time, which allows you to compress the nozzle and grab the oval exhaust pipe or adjust the shape of the nozzle under the cutout in the car bumper. When working with cars, the possibility of damage to the body paintwork and bumper is excluded.

Code	Model	Description
6434	RON-75/150	Hose diameter 75 mm, nozzle diameter 150 mm
6435	RON-100/150	Hose diameter 100 mm, nozzle diameter 150 mm
6436	RON-125/150	Hose diameter 125 mm, nozzle diameter 150 mm
10819	C-RON	Blanking cover

RON series nozzles are supplied with a conical rubber cover - a plug with a cross-shaped cut, which allows you to hold the nozzle on the exhaust pipe with the help of petals that bend inside the nozzle when putting the nozzle on the exhaust pipe of the car. The nozzle cover (C-RON) can be purchased separately in case of damage during operation or loss.

### CONICAL RUBBER GAS INTAKE NOZZLE

RON-G



#### Description

RON-G series nozzles are equipped with a mechanical clamp to firmly connect the nozzle to the exhaust pipe, e.g. when used as part of a rail exhaust system when accompanying a vehicle while driving.

The clamp has a part protruding relative to the nozzle edge, which makes it possible to attach the nozzle to the hidden (recessed into the bumper) exhaust pipes.

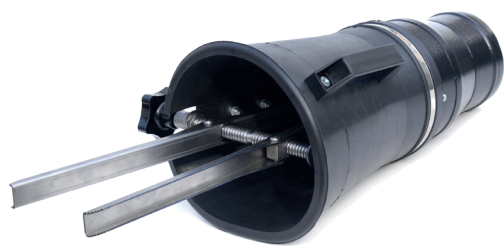
The protruding part of the clamp is closed with a rubber cuff to protect the car from scratches.

Code	Model	Description
6434	RON-75/150	Hose diameter 75 mm, nozzle diameter 150 mm
6435	RON-100/150	Hose diameter 100 mm, nozzle diameter 150 mm
6436	RON-125/150	Hose diameter 125 mm, nozzle diameter 150 mm

The structure of the clamp provides the possibility of changing the fastening force to the exhaust pipe and adjusting the clamp to the required thickness of the pipe wall.

## CONICAL RUBBER GAS INTAKE NOZZLE WITH INTERNAL CLAMP

RONIG



### Description

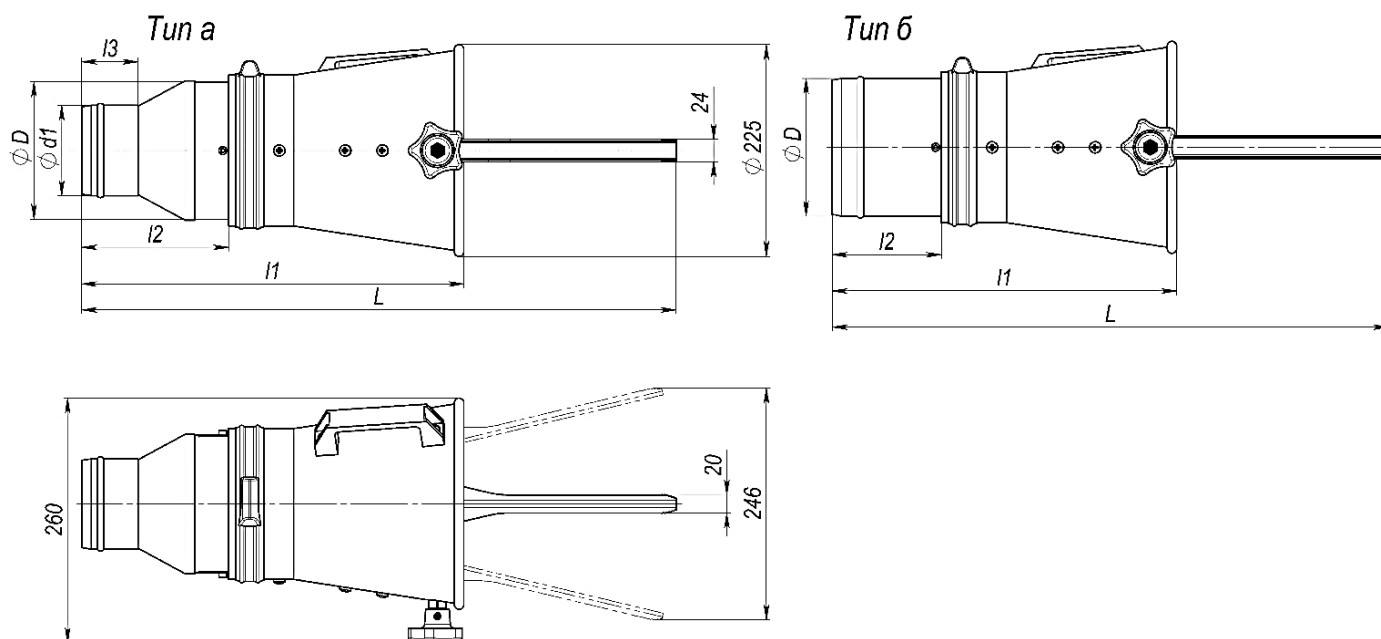
RONIG series gas intake nozzle is designed for capturing exhaust gases directly from exhaust pipes hidden in the bumper of the car, or exhaust pipes of vehicles (special equipment), to which it is difficult to connect via external diameter. The nozzle consists of a rubber housing, a steel connecting pipe, and a clamping (spacer) mechanism located inside the nozzle. A flexible hose of the exhaust device is connected to the nozzle socket. The spacers of the nozzle are inserted inside the exhaust pipe. When the handle is rotated, the spacers are spread to the sides and rest against the walls of the exhaust pipe, fixing the nozzle.

### Advantages

- RONIG is the only possible way to connect a car with exhaust pipes hidden in the bumper to the exhaust extraction system
- The nozzle is perfect for exhaust pipes of vehicles and special equipment with exhaust pipes of complex configurations (angled, beveled, etc.)
- There is a large gap between the exhaust pipe and the socket of the nozzle, providing a sufficient supply of ambient air and reducing the heat load on the nozzle and extraction hose

### Specifications

Code	Model	Type	D	d1	L	l1	l2	l3	Weight, kg	Diameter of the exhaust pipe	
										min	max
5912	RONIG-100	a	146	96	632	406	156	60	3.5	35	220
5913	RONIG-125	a	146	122	632	406	156	60	3.6	35	220
5914	RONIG-150	b	146	-	592	366	116	-	3.4	35	220



## STEEL GAS INTAKE NOZZLE

### IGRIP-ST



#### Description

Steel gas intake nozzle for removal of high-temperature, up to 500 °C, exhaust gases (provided that additional air is supplied through the nozzle socket, 25% of the calculated amount of exhaust gases to be removed). The nozzle is made of 0.7 mm thick powder coated steel.

The nozzle bell covers a spring-loaded conical rubber valve that closes the nozzle when not in use, preventing unnecessary airflow in the exhaust system. A 20 mm diameter gas analyzer tube is provided in the nozzle for CO testing of exhaust gases.

### Characteristics table for IGrip-ST/iGrip-STg nozzle models

IGrip-ST/iGrip-STg code	Model	Description
6112	iGrip-ST-75-75	Hose diameter 75 mm, nozzle diameter 75 mm
6113/6542	IGrip-ST/iGrip-STg-75-100	Hose diameter 75 mm, nozzle diameter 100 mm
6114/6543	IGrip-ST/iGrip-STg-75-125	Hose diameter 75 mm, nozzle diameter 125 mm
6115/6544	IGrip-ST/iGrip-STg-100-100	Hose diameter 100 mm, nozzle diameter 100 mm
6116/6545	IGrip-ST/iGrip-STg-100-125	Hose diameter 100 mm, nozzle diameter 125 mm
6117/6546	IGrip-ST/iGrip-STg-100-150	Hose diameter 100 mm, nozzle diameter 150 mm
6118/6656	IGrip-ST/iGrip-STg-125-125	Hose diameter 125 mm, nozzle diameter 125 mm
6119/6657	IGrip-ST/iGrip-STg-125-150	Hose diameter 125 mm, nozzle diameter 150 mm
6120/6659	IGrip-ST/iGrip-STg-150-150	Hose diameter 150 mm, nozzle diameter 150 mm
6111/6777	IGrip-ST/iGrip-STg-150-200	Hose diameter 150 mm, nozzle diameter 200 mm
6110/6778	IGrip-ST/iGrip-STg-200-200	Hose diameter 200 mm, nozzle diameter 200 mm
6779	iGrip-STg-200-250	Hose diameter 200 mm, nozzle diameter 250 mm

## STEEL GAS INTAKE NOZZLE WITH MECHANICAL CLAMP

### IGRIP-STG



#### Description

Steel gas intake nozzle for removal of high-temperature, up to 500 °C, exhaust gases (provided that additional air is supplied through the nozzle socket, 25% of the calculated amount of exhaust gases to be removed). The nozzle is specifically designed for use in exhaust extraction systems that can serve both stationary and moving vehicles.

Equipped with a mechanical clamp to securely connect the nozzle to the exhaust pipe.

The design of the clamp enables to change the fastening force to the exhaust pipe and to adjust the clamp to the required thickness of the exhaust pipe wall. The clamp has a part protruding relative to the nozzle edge, which makes it possible to attach the nozzle to the hidden (recessed into the bumper) exhaust pipes.

The protruding part of the clamp is closed with a conical rubber cuff to protect the car from scratches.



## STEEL GAS INTAKE NOZZLES FOR VERTICAL EXHAUST PIPES

### IGRIP-SK



### Description

The steel gas intake nozzle is designed to capture exhaust gases directly from a vertical, high-mounted vehicle exhaust pipe and is used in exhaust extraction systems.

The nozzle is made of galvanized steel.

A telescopic tube receiver with an angle-adjustable mechanism (depending on the exhaust pipe modification) is located on the nozzle body.

The nozzle is put directly on the exhaust pipe of the car. There is a vertical pin inside the nozzle socket for fixing on the exhaust pipe.

The nozzle is recommended for use with the telescopic holder TH-90, which is necessary for lifting to the height of the exhaust pipe. The telescopic sliding holder TH-90 has a length of 1.5 to 3 m. The TH-90 holder is to be ordered separately.

Code	Model	Description
6696	IGrip-SK-125-200	Hose diameter 125 mm, nozzle diameter 200 mm
6697	IGrip-SK-150-200	Hose diameter 150 mm, nozzle diameter 200 mm
6698	IGrip-SK-150-250	Hose diameter 150 mm, nozzle diameter 250 mm
6699	TH-90	Telescopic tube holder L=2-3 m

## STEEL FLOOR STANDING STEEL GAS INTAKE NOZZLE ON A RACK

### SAU



### Description

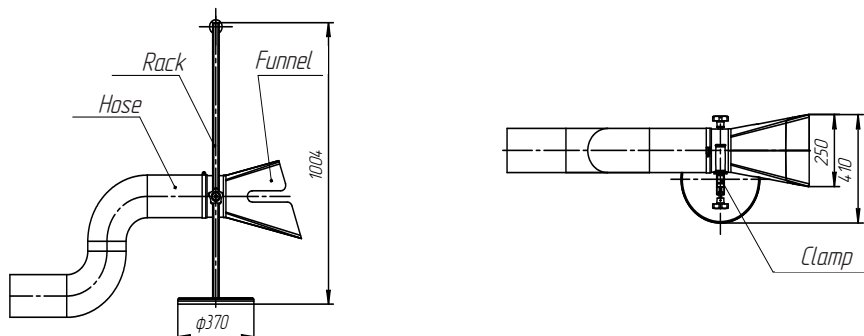
The SAU device is designed to remove exhaust gases from vehicles in repair shops and garages at non-stationary workplaces.

The device is ideal for trucks with a low position of the exhaust pipe or a pipe located under the bottom.

The AU device is a funnel with a rubber damper on a rack to which a hose with a diameter of 150 or 125 mm is connected. The funnel is mounted on the rack with a clamp and can be adjusted in height and angle. It is made of 0.7 mm thick steel with powder coating.

The unit is connected to a fan or exhaust ventilation system. The extraction hose of the required length is to be ordered separately.

Code	Model	Description
5101	sAU-125	Hose diameter 125 mm, nozzle size 277x250 mm
5102	sAU-150	Hose diameter 150 mm, nozzle size 277x250 mm



## CONICAL RUBBER GAS INTAKE NOZZLE

REN/REC/REG



### Description

Oval conical rubber gas intake nozzles for servicing cars and trucks with large diameter exhaust pipes (up to 160 mm), oval and twin pipes.

It is used as part of exhaust devices and exhaust extraction systems.

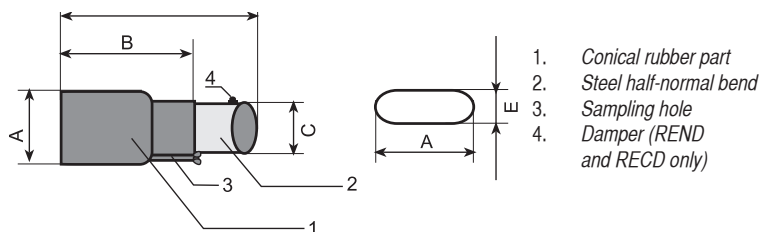
When working with cars, the possibility of damage to the body paintwork and bumper is excluded.

The temperature resistance of conical rubber is 150°C, while the temperature of the exhaust gases removed through the nozzle can reach 200°C (provided that an additional inflow of ambient air through the nozzle bell is ensured, 25% of the calculated amount of exhaust gases removed).

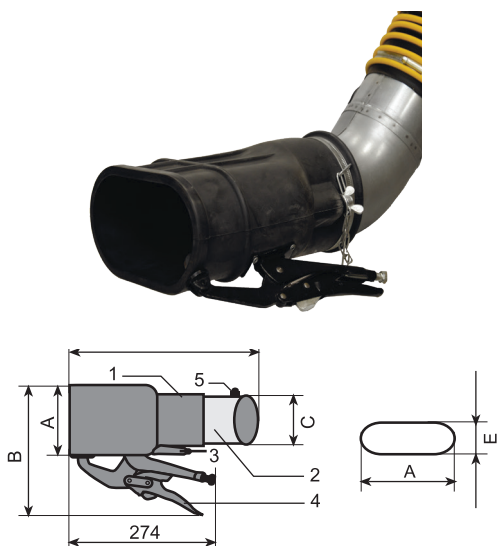
The nozzle has a 20 mm diameter opening for a gas analyzer to perform a CO exhaust gas test.

The nozzle with the D index has a damper built into the nozzle that closes the nozzle when it is not in use, which prevents unnecessary air flow in the exhaust system.

The REC series nozzle is equipped with a clip type clamp for fixing to the flat wall of the exhaust pipe.



Code	Model	Extraction hose diameter, mm	A, mm	B, mm	C, mm	D, mm	E, mm	Weight, kg
7827/7832	REN/D-75-115	75	155	275	75	435	91	1.0
7828/7833	REN/D-100-115	100	155	275	100	435	91	1.1
7829/7834	REN/D-100-160	100	210	290	100	490	117	1.5
7830/7835	REN/D-125-160	125	210	290	125	490	117	1.7
7831/7836	REN/D-150-160	150	210	290	150	490	117	1.8
7807/7812	REC/D-75-115	75	155	275	75	435	91	1.0
7808/7813	REC/D-100-115	100	155	275	100	435	91	1.2
7809/7814	REC/D-100-160	100	210	290	100	490	117	1.6
7810/7815	REC/D-125-160	125	210	290	125	490	117	1.8
7811/7816	REC/D-150-160	150	210	290	150	490	117	1.9



The REG nozzle is equipped with a mechanical clamp for a secure connection to the exhaust pipe.

The nozzle is specifically designed for use in exhaust extraction systems that can serve both stationary and moving vehicles.

The clamp design enables to change the force of attachment to the exhaust pipe and to adjust the clamp to the required thickness of the exhaust pipe wall.

Code	Model	Extraction hose diameter, mm	A, mm	B, mm	C, mm	D, mm	E, mm	Weight, kg
7817/7822	REG(D)-75-115	75	155	240	75	435	91	1.2
7818/7823	REG(D)-100-115	100	155	240	100	435	91	1.3
7819/7824	REG(D)-100-160	100	210	295	100	490	117	1.7
7820/7825	REG(D)-125-160	125	210	295	125	490	117	1.9
7821/7826	REG(D)-150-160	150	210	295	150	490	117	2.0

- 1. Conical rubber part
- 2. Steel half-normal bend
- 3. Sampling hole
- 4. Clip
- 5. Damper (REGD only)

## FLEXIBLE HOSE

### SP-HOSE-150

heat resistance– 150 °C

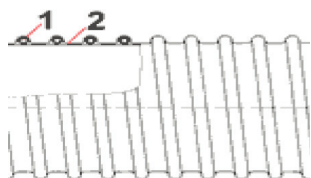


### Use:

- Exhaust hose that is resistant to being run over repeatedly by an automobile;
- for medium pressure, to remove exhaust gases from internal combustion engines and diesel engines;
- in all exhaust (suction) systems, such as:
  - hose reels,
  - rail systems,
  - stationary exhaust systems.

### Structure, material

1. Plastic hollow helix profile.
2. Hose wall: polyester fabric with double-sided Santoprene coating, welded construction.



## SP-HOSE-150

### Properties

- recovers from squeezing
- excellent resistance to deformation
- high resistance to mechanical stress
- very flexible
- axial compressibility
- lightweight
- small bending radius
- durable
- good tensile and tear strength
- good flow characteristics (low aerodynamic resistance)

### Main Specifications

Code	Model	Inner diameter, mm	Pressure limit recommendations, mm WG	Bending radius, mm	Outer diameter, mm	Weight, kg/m	Standard length, m
90021	SP-HOSE-150-75	75	2400	75	95	0.48	5/7,5/10/12,5
90020	SP-HOSE-150-100	100	1800	100	120	0.64	
90022	SP-HOSE-150-125	125	1200	125	145	0.78	
90023	SP-HOSE-150-150	150	500	150	170	0.93	
90032	SP-HOSE-150-200	200	200	200	220	1.22	

### Versions:

- Standard lengths are 5, 7.5, 10, and 12.5 m (special lengths up to 20 m on request).
- Color: hose wall – black, coil color – yellow (special coil-profile colors on request).
- Diameters: 75,200 mm (special diameters on request).

### Temperature range

Exhaust gases with a temperature of 150 °C (up to +200 °C for a short time provided that the gas intake nozzles are selected correctly and sufficient air supply is ensured passing through them (approximately 25% of the required rated amount of air to be removed).

## FLEXIBLE HEAT-RESISTANT HOSE

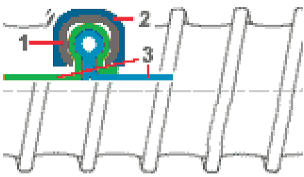
### SP-HOSE-200

heat resistance – 200 °C



#### Use:

- Medium load hose to remove exhaust gases from gasoline and diesel engines;
- in all exhaust (suction) systems, such as:
  - hose reels,
  - rail systems,
  - stationary exhaust systems.



#### Structure, material

1. Galvanized steel clamping spiral.
2. Additional external wear-resistant shock-absorbing plastic profile.
3. Hose wall: polyester fabric with double-sided Neoprene coating, clamping structure.

#### Properties

- very good heat resistance
- resistant to vibration
- good flow performance
- very flexible
- compressible 1:5 along the axis
- lightweight
- small bending radius
- durable
- a special method of clamping the steel profile provides a high tensile strength of the material of the hose and the outer spiral
- outer protective profile is made of elastic wear-resistant material

#### Main Specifications

Code	Model	Inner diameter, mm	Pressure limit recommendations, mm WG	Bending radius, mm	Outer diameter, mm	Weight, kg/m	Standard length, m
90024	SP-HOSE-200-75	75	1780	46	89	0.60	5/7,5/10/12,5
90025	SP-HOSE-200-100	100	1000	60	117	0.79	
90026	SP-HOSE-200-125	125	640	75	142	0.95	
90027	SP-HOSE-200-150	150	440	90	167	1.47	
91533	SP-HOSE-200-200	200	250	120	217	1.76	

#### Versions:

- Diameters: 75 – 200 mm.
- Color: hose – black, protective profile – yellow (special colors of the protective profile on request).
- The standard lengths are 5, 7.5, 10, and 12.5 m (up to 15 m on request).

#### Temperature range

Exhaust gases with a temperature of up to +200 °C (provided that the gas intake nozzles are selected correctly and sufficient air supply is provided through them (approximately 25% of the required design amount of air to be removed).

## FLEXIBLE SUPER HEAT-RESISTANT HOSE

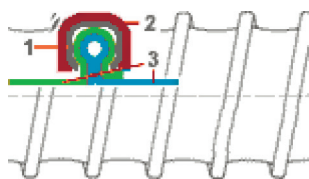
SP-HOSE-300

heat resistance – 300 °C



### Use:

- High-load hose for exhaust extraction from gasoline and diesel engines, especially suitable for trucks and construction machinery;
- in all exhaust (suction) systems, such as:
  - hose reels,
  - rail systems,
  - stationary exhaust systems.



### Structure, material

1. Galvanized steel clamping spiral
2. Additional external wear-resistant shock-absorbing plastic profile
3. Hose wall: special high-temperature fabric with one-sided silicone impregnation, clamping structure

### Properties

- high heat resistance
- resistant to vibration
- high resistance to mechanical stress
- flame retardant
- very flexible
- compressible 1:5 along the axis
- small bending radius
- durable
- a special method of clamping provides a high tensile strength of the hose material and of the outer spiral
- outer protective profile is made of elastic wear-resistant material

### Main Specifications

Code	Model	Inner diameter, mm	Pressure limit recommendations, mm WG	Bending radius, mm	Outer diameter, mm	Weight, kg/m	Standard length, m
90028	SP-HOSE-300-75	75	1400	46	89	0.49	5/7,5/10/12,5
90029	SP-HOSE-300-100	100	800	60	117	0.64	
90030	SP-HOSE-300-125	125	500	75	142	0.79	
90031	SP-HOSE-300-150	150	360	90	167	1.23	
91524	SP-HOSE-300-200	200	200	120	217	1.67	

### Versions:

- Diameters: 75 – 200 mm.
- Color: hose – green-grey, protective profile – yellow (other profile colors on request)
- The standard lengths are 5, 7.5, 10, and 12.5 m (up to 15 m on request).

### Temperature range

Exhaust gases with a temperature of up to +300 °C (provided that the gas intake nozzles are selected correctly and sufficient air supply is provided through them (approximately 25% of the required design amount of air to be removed)).



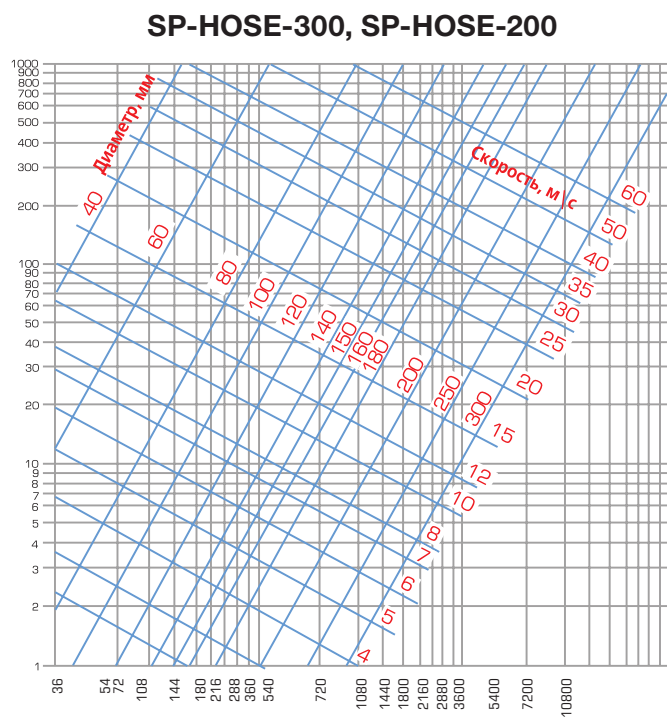
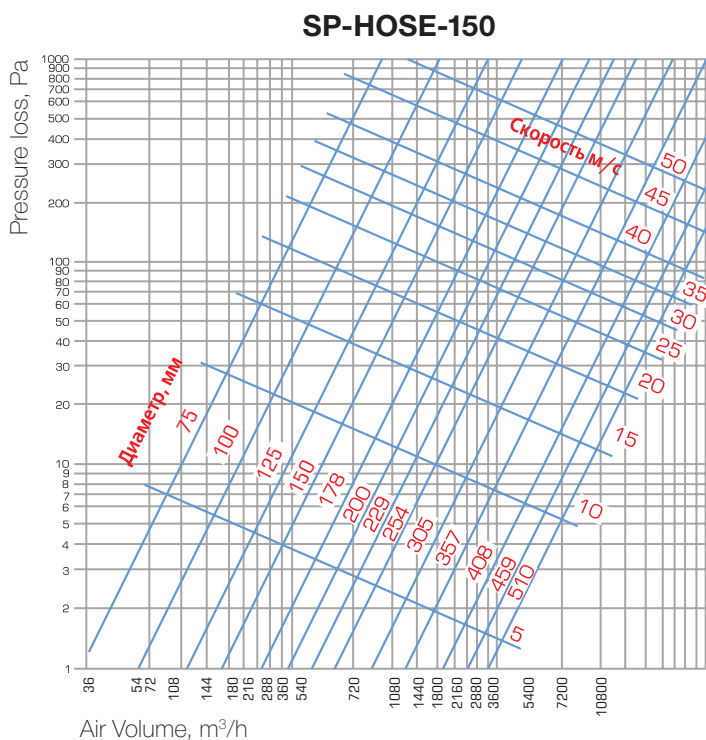
### Recommendations

Vehicle type	Required air flow on the nozzle	Hose diameter, mm
Motorcycles and cars	< 270	75
Cars, vans, small trucks	< 540	100
Buses and trucks	< 810	125
Trucks	< 1080	150
Heavy special equipment	< 1350	200

The data in the table are for your information only. Refer to the calculation algorithm on page 57 for a more accurate selection of the required air flow rate.

There are options of increasing the heat resistance of hoses up to 1100°C, which SovPlym can customize.

### Pressure loss diagram for extraction hoses



## EXTRACTION HOSE COUPLINGS AND HOSE SPLITTERS

### GENERAL INFORMATION



#### Designation

In the event that a car with two exhaust pipes enters the shop, a hose splitter with two nozzles is provided. To quickly replace the main (single) nozzle with a splitter, a quick-release connection consisting of several parts is provided:

- a quick MB coupling with latches, which is fastened with a clamp to the main hose
- a quick-release NB nipple for connecting a single nozzle to the main hose (connected to the MB coupling)
- quick-release PP hose splitter to which hose segments with gas intake nozzles are connected; on the other side, the splitter is connected to the MB coupling.

This gives us an almost universal system for servicing vehicles with different exhaust pipes.

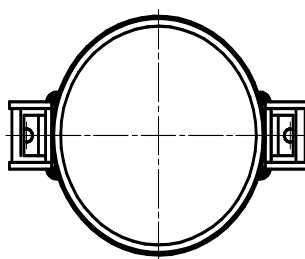
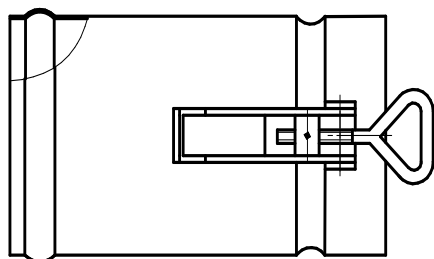
### QUICK-RELEASE COUPLING WITH MB LATCHES



#### Designation

The quick-release coupling is designed to connect additional hoses or various gas intake nozzles to the main hose of the exhaust device (for example, a coil). The coupling is used in conjunction with quick-release NB nipple or P or PP hose hose splitters. The coupling is connected to the extraction hose using a special spiral clamp of the appropriate model and diameter of the hose used. The clamp is to be ordered separately.

Code	Model	Hose diameter, mm
6370	MB-75	75
6371	MB-100	100
6372	MB-125	125
6373	MB-150	150



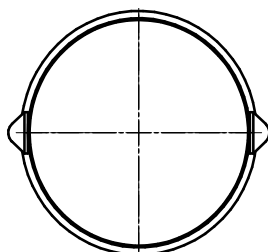
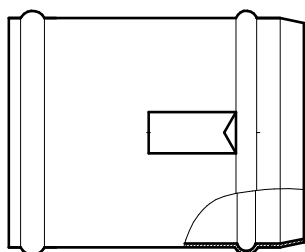
**NB QUICK-RELEASE NIPPLE WITH HOOKS**



**Designation**

The quick-release nipple is designed to connect a replaceable extraction hose with a gas intake nozzle to the main hose of the exhaust device. The nipple is used in conjunction with the MB quick coupling. The replaceable extraction hose is connected to the nipple by means of a special spiral clamp corresponding to the model and diameter of the hose used. The clamp is to be ordered separately.

Code	Model	Hose diameter, mm
6374	NB-75	75
6375	NB-100	100
6376	NB-125	125
6377	NB-150	150



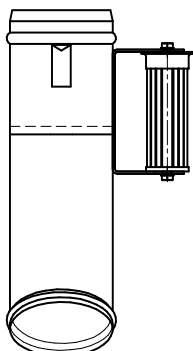
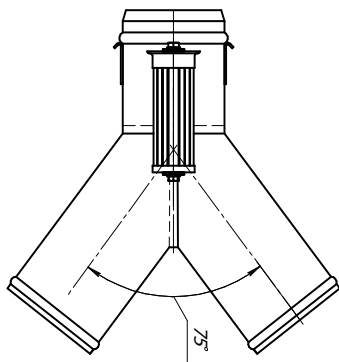
**P EXTRACTION HOSE SPLITTER**



**Designation**

Y-splitter for servicing vehicles with two spaced exhaust pipes. The splitter is connected to the main hose using a quick-release MB coupling (to be ordered separately). Extraction hoses are connected to the splitter using a special spiral clamp of the appropriate model and diameter of the hose used. The clamp is to be ordered separately.

Code	Model	Connected hose diameter, mm	Main hose diameter, mm
6365	P -75-2 -75	75	75
6366	P -100-2 -75	75	100
6367	P -100-2 -100	100	100
6368	P -125-2 -100	125	100
6369	P -125-2 -125	125	125





## PP EXTRACTION HOSE SPLITTER WITH LATCHES

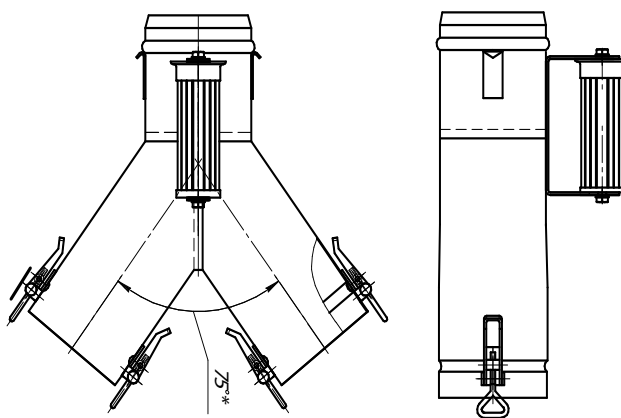


### Designation

Y-splitter for servicing vehicles with two spaced exhaust pipes. The splitter is connected to the main hose using a quick-release MB coupling (to be ordered separately). Extraction hoses are connected to the splitter using quick-release NM nipples of appropriate diameters. Nipples are ordered separately.

Code	Model	Connected hose diameter, mm
6360	PP -75-2 -75	75
6361	PP -100-2 -75	75
6362	PP -100-2 -100	100
6363	PP -125-2 -100	125
6364	PP -125-2 -125	125

*P and PP hose splitters differ from each other. A quick connection is available for the YP only on the main hose side, while it can be done in the case of the YPP on both sides of the splitter.*



## SPIRAL CLAMPS FOR EXTRACTION HOSES

Special spiral clamps for connecting hoses to exhaust devices in exhaust extraction systems or for connecting gas intake nozzles to hoses.

Clamp model	Diameters of extraction hoses to be connected, (mm)	Models of extraction hoses to be connected
Spiral clamp right side Car-Grip 70-90	75	SP-HOSE-150
Spiral clamp right side Car-Grip 100-120	100	SP-HOSE-150
Spiral clamp right side Car-Grip 120-140	125	SP-HOSE-150
Right spiral clamp Car-Grip 150-170	150	SP-HOSE-150
Spiral clamp right side Car-Grip 200-220	200	SP-HOSE-150
Spiral clamp left side Clip-Grip 70-90	75	EG; EF; HT
Spiral clamp left side Clip-Grip 100-120	100	EG; EF; HT
Spiral clamp left side Clip-Grip 120-140	125	EG; EF; HT
Spiral clamp left side Clip-Grip 140-160	150	EG; EF; HT
Spiral clamp left side Clip-Grip 180-200	200	EG; EF; HT

## 5 RADIAL FANS

### RADIAL FANS

VMK/VMA/VMS



#### Description

Industrial medium pressure radial fans with welded volute-shaped steel casing with a capacity up to 5,000 m<sup>3</sup>/h and max total pressure up to 2,450 Pa. These fans are designed for non-explosive environments with temperatures from -40°C to +40°C.

#### Scope of application:

SovPlym fans are used for various applications where clean or slightly polluted air extraction is required (dust content not more than 0.1 g/m<sup>3</sup>):

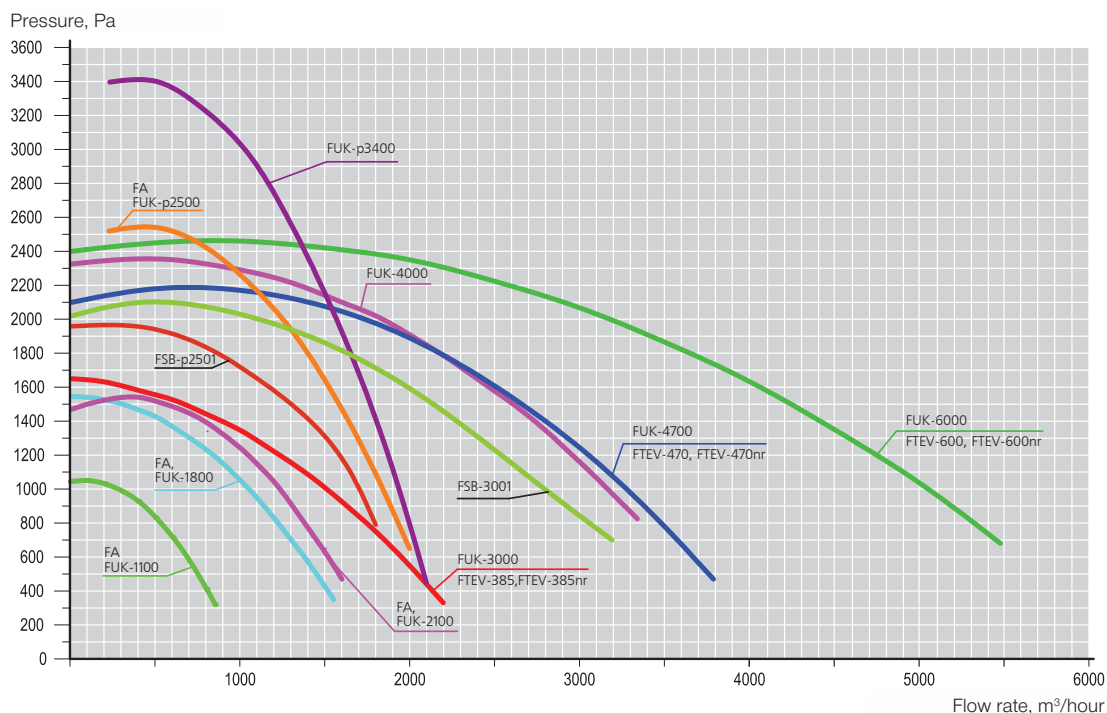
- Exhaust gas removal;
- Welding and soldering processes;
- Removal of fumes and oil mists;
- Removal of non-sticky and non-explosive dust.

The type of fan is selected depending on the required performance and pressure loss, and the calculation of the total amount of exhaust gases is presented on page 57 of the catalog.

#### Features and benefits

- Lightweight aluminum impeller
- Fine balancing
- A low vibration level
- Easy installation
- No frequent maintenance required
- Robust construction
- Reduced noise
- High-quality powder coating

#### Aerodynamic characteristics of VMK, VMA, VMS fans



## Aerodynamic characteristics of VMK, VMA, FR fans

Code	Model of the fan	Optimal operating mode		Motor				Weight, kg	
		Pressure range, Pa	Capacity, m <sup>3</sup> /h	Power, kW	Voltage, V	Current frequency, Hz	Rotating speed, rpm		
5784	VMK-1100	1100-400	150-800	0.37	380, 3f	50	2730	11	
5782	VMA-1100							10	
5785	VMK-1101				2850		11		
5783	VMA-1101						10		
5045	VMK-1800	1500-700	300-1300	0.55	380, 3f	50	2730	19	
6014	FR 1800								
5042	FS-1800								
6041	VMA-1800								
5071	VMK-1801								
6015	FR-1801				220, 1f		2840	21.8	
5043	FS-1801								
6041	VMA-1801								
5050	VMK-2100								
6013	VMA-2100								
5073	VMK-2101	1550-650	300-1500	0.75	380, 3f	50	2820	21.6	
6036	VMA-2101								
5058	VMK-3000				1550-700		500-1900		220, 1f
5075	VMK-3001								
5194	VMK-p2500	2550-1800	400-1400	1.1	380, 3f	50	2870	22.5	
6061	VMA-p2500								
5195	VMK-p2501								
6062	VMA-p2501								
5087	VMK-p3400	3400-2000	400-1600	1.5	380, 3f	50	2800	18	
5728	VMK-4000	2320-800	800-3400		220, 1f			2780	27
5729	VMK-4001								
5062	VMK-4700	2200-800	800-3500	2.2	380, 3f	50	2860	28	
5266	VMK-6000	2450-1000	1000-5000	4					2850



### VMK Series Fans

High-speed fans of this series are supplied complete with two universal brackets. They allow the fans to be attached to walls, ceilings, floors, as well as to orient the volute body in any position, including: parallel or perpendicular to the supporting plane, based on the requirements and conditions of installation.



### VMA Series Fans

The fans of this series are specially designed to be installed directly on all hose reels of our manufacture. A mounting nipple for coil mounting is included with the fan.



### FR Series Fans

The fans in this series are specially designed to be mounted directly on the "DROPPER", DP/DPF/DPF1 series exhaust devices.

## RADIAL FANS

### FTEV



### Description

The FTEV series radial fans provide a capacity from 500 to 11,200 m<sup>3</sup>/h at a pressure range from 1,550 to 4,300 Pa. The square shape allows you to easily install the fan on the floor or mount it on the wall, as well as make it in a noise-absorbing casing. Operating temperatures range from -40 °C to +40 °C.

### Intended use

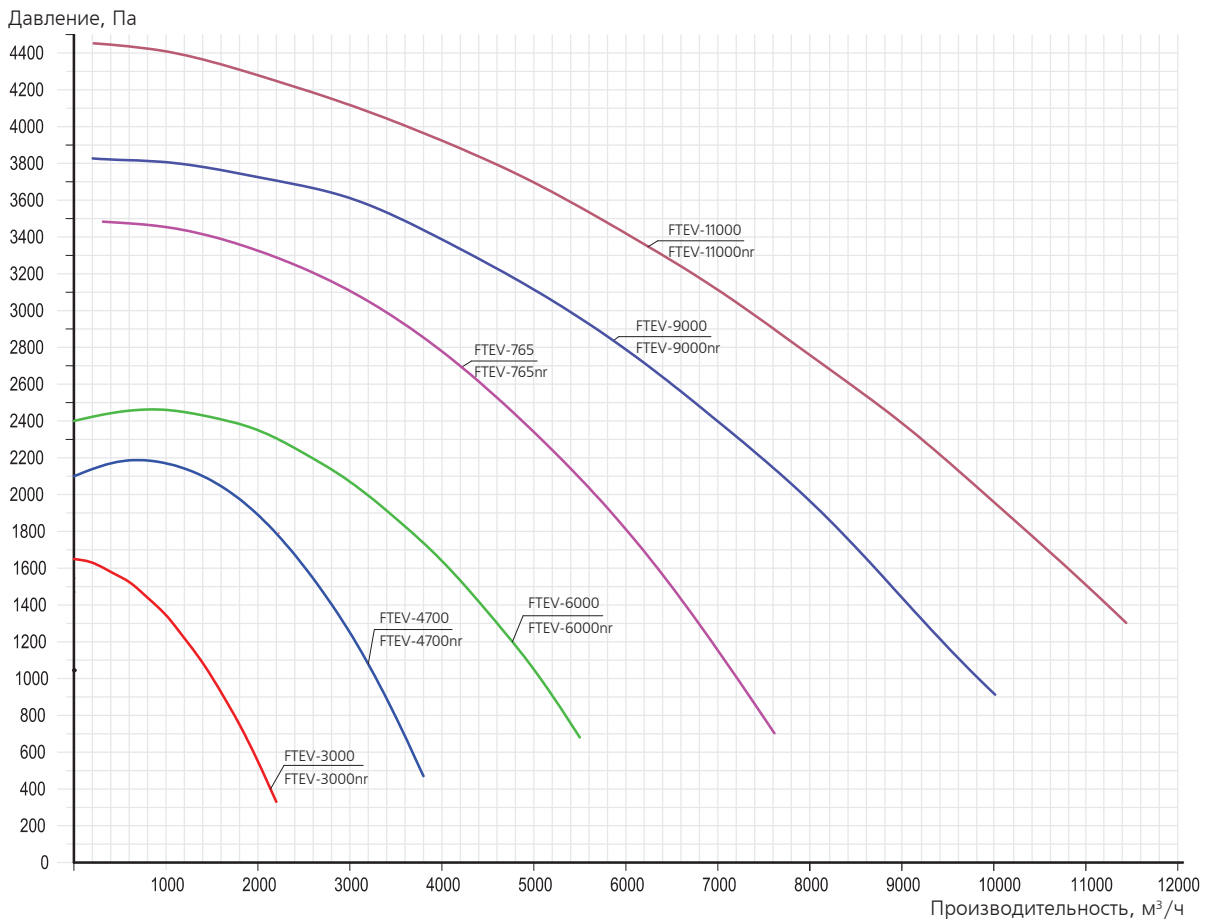
FTEV fans are designed for handling non-explosive air environments with dust concentrations up to 0.1 g/m<sup>3</sup>:

- Exhaust gas removal;
- Welding processes;
- Removal of oil fumes and mists;
- Removal of non-sticky and non-explosive dust.

### Features and benefits

- Lightweight aluminum impeller
- Fine balancing
- A low vibration level
- No frequent maintenance required
- Reduced noise
- Convenient installation, square body
- Robust non-welded construction

### Aerodynamic characteristics of FTEV fans








## FTEV fan specifications

Code	Fan model	Optimal operating mode		Three-phase electric motor				Weight, kg
		Pressure range, Pa	Capacity, m <sup>3</sup> /h	Power, kW	Voltage, V	Current frequency, Hz	Rotating speed, rpm	
Version: without noise-absorbing casing								
5405	FTEV-385	1550–700	500–1900	1.1	400	50	2810	30
5400	FTEV-470	2200–800	800–3500	2.2	400	50	2860	48
5402	FTEV-600	2450–1000	1000–5000	4.0	400	50	2850	63
5078	FTEV-765	3400–1200	1400–6900	5.5	400	50	2850	80
5180	FTEV-9000	3750–1400	1600–9000	7.5	400	50	2910	150
5191	FTEV-11000	4300–1400	1800–11200	11.0	400	50	2890	185
Version: with noise-absorbing casing								
5406	FTEV-385nr	1550–700	500–1900	1.1	400	50	2810	46
5401	FTEV-470nr	2200–800	800–3500	2.2	400	50	2860	75
5403	FTEV-600nr	2450–1000	1000–5000	4.0	400	50	2850	90
5079	FTEV-765nr	3400–1200	1400–6900	5.5	400	50	2850	110
5103	FTEV-9000nr	3750–1400	1600–9000	7.5	400	50	2910	195
5104	FTEV-11000nr	4300–1400	1800–11200	11.0	400	50	2890	255

## Accessories

Special duct joints are used to connect SovPlym fans to exhaust devices and standard air ducts.

Drawing	Model	Description
	T250-160-1	Tee joint. It is designed to connect one exhaust device or Ø 160 mm hose to fans having a Ø 250 mm suction pipe.
	T250-160-2	Tee joint. It is designed to connect two exhaust devices or Ø 160 mm hoses to fans having a Ø 250 mm suction pipe.
	OL	Pressure adapter for SovPlym fans of all series: VMK, FUA, FS, FD, FTEV. It is designed to connect a rectangular outlet flange of fans to round air ducts with standard diameters from 100 to 500 mm. Nippel connection.
	NPR	A pressure adapter for SovPlym fans to change the direction of air flow to 90.
	PC	Reducer Various combinations of large (100 to 250 mm) and small (75 to 200 mm) diameters are available. They are designed to connect hoses or air ducts of appropriate diameters to the inlet nipples of fans, filters, and other equipment.

## 6 RAIL EXHAUST EXTRACTION SYSTEMS

### STRAIGHT RAIL EXHAUST EXTRACTION SYSTEM

STP



#### Designation

The STP system is designed to eliminate exhaust gases when vehicles have to travel a straight path with a certain distance in an enclosed area or when it is necessary to alternately connect to the ventilation system a large number of stationary vehicle service stations located in rows in the area of the system. The system is the most up-to-date and economical solution for car repair shops, instrument control lines, and car service stations, as well as for other facilities that are characterized by mobile sources of pollution. The system must be operated in closed premises with air temperature from +5 to +50 °C. The environment and the air removed by the system must not be explosive and must not contain corrosive vapors and gases.

#### Advantages

- Complete indoor exhaust extraction with the STP rail system is the only possible way to remove exhaust fumes produced by a moving vehicle;
- Saving heat and electricity by removing exhaust gases directly from the exhaust pipe compared to general ventilation;
- easy installation of the system using standard suspension elements included in the system delivery kit;
- low weight of the system allows installation on almost any existing building structures;
- the possibility of servicing cars with two exhaust pipes;
- modular design allows you to create a system of the required length and serve the required number of cars;
- extraction hoses on mobile carriages do not clutter the working space and do not interfere with the passage;
- If necessary, the system can be adapted to changing requirements: increasing the number of simultaneously operated stations is achieved by simply increasing the number of mobile carriages with extraction hoses and steel gas intake nozzles;
- a single STP exhaust rail system with the required number of mobile carriages with hoses and steel gas intake nozzles (in accordance with the specified number of serviced cars) ensures the removal of exhaust gases throughout the line;
- when accompanying vehicles with two exhaust pipes, two mobile carriages with hoses and steel gas intake nozzles are used at once, each connected to a specific exhaust pipe.

## Specifications

Length of duct-rail supplied (m)	5.8 / 8.7 / 11.6 / 14.5 / 17.4 / 20.3 / 23.2 / 26.1 / 29.0	
Inner diameter of duct-rail (mm)	160	
Hose diameter (mm)	75 / 100 / 125 / 150	
Hose length (m)	5 / 7.5	
Hose temperature resistance (°C)	150 / 200 / 300	
Rail installation height (m)	minimum	maximum
	3.5	5.0
Diameter of the connecting end adapter to ventilation system (mm)	160	
Dimensions of the connecting side adapter to ventilation system (mm)	350x60 / Ø200 L=450	

## Main components

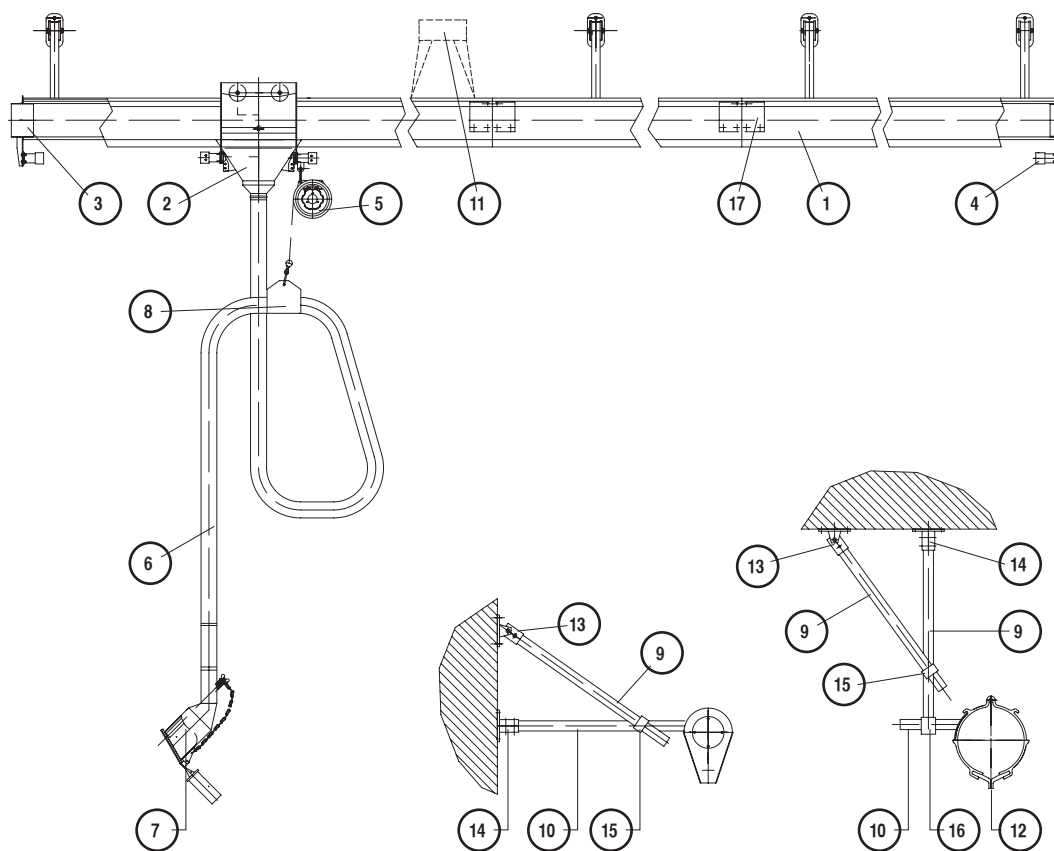


Figure 1

The system consists of 5 main elements:

1. Rail-air duct of a certain length from the existing row in the set (with mounting elements) or assembled from individual elements on request. The contents of the rail-duct delivery kit are shown in Table 1.
2. \*\*Movable carriage assembly with a slotted nipple (one or more pieces).
3. \*\*Balancer (hose returning device).
4. \*\*Flexible hose of the required heat resistance, diameter and length, one for each carriage. Conical rubber hose holder.
5. \*\*Steel gas intake nozzle of the required design and diameter, one for each hose.

\*\*– The item is not included with the system. To be ordered additionally, of the required models and in the required quantity. It is also recommended to order additionally a device for mounting the conical rubber gasket MZRP

As an option, a safety quick disconnect coupling with a diameter to match the diameter of the selected hose can be ordered to further protect the hose from bursting when the vehicle is in motion.

The system should be part of an exhaust ventilation system with a fan that provides the necessary air flow through each nozzle and a pressure sufficient to overcome the resistance of the entire ventilation system.

Each of the five main elements of the system can be selected from a range of sizes. Use the following tables of options for each element to select the elements of the system and check their completeness upon delivery.

The STP rail system is ordered and supplied complete.

Select a model from the proposed list of standard sets of STP systems (Table 1) that meets the requirements for the length of the rail-air duct in relation to the premises dimensions.

The length of the system should correspond to the distance that cars travel from the entrance to the exit from the shop.

Standard kit includes all the necessary elements to build and install a system of the required length. The mounting kit is multipurpose: suitable for mounting on a vertical surface (wall) and on a horizontal surface (ceiling).

If the duct rail included in the standard system set does not meet the length requirements, its length can be increased by using individual construction elements: duct rail sections, connecting elements, conical rubber seals, mounting elements.

The basis of the STP rail exhaust system is a circular aluminum rail-air duct (1) assembled from sections of standard lengths of 5.8 or 2.9 m.

### Rail-air duct (possible versions and their delivery set)

Table 1.

Position in Fig. 1	Name of accessories	Designation	Name (version) of the STP rail - L / SP									
			L									
			Code	5390	5391	5392	5393	5394	5395	5396	5397	5398
			5.8	8.7	11.6	14.5	17.4	20.3	23.2	26.1	29.0	
1	Aluminum profile L=5,8 m	RR-5,8	1	1	2	2	3	3	4	4	5	
	Aluminum profile L=2.9 m	RR-2,9		1		1		1		1		
12	Conical rubber sealing, m	RRRS-X	11.6	17.4	23.2	29.0	34.8	40.6	46.4	52.2	58.0	
4	End cap	RRZ/SP	1	1	1	2	2	2	2	2	2	
3	End connection pipe $\varnothing$ 160 mm	RRTP-160/SP	1	1	1							
11	Connection pipe (lateral branch) 350x60 / $\varnothing$ 200 mm L=450 mm	RRDC-200/SP				1	1	1	2	2	2	
14	Fixed support	KEC-F/SP	2	3	3	4	4	5	5	6	6	
13	Rotary support	KEC-M/SP	4	5	5	6	6	7	7	8	8	
10	Arm L=1 m	RRSS/SP	2	3	3	4	4	5	5	6	6	
9	Pipe $\varnothing$ 48mm L=4 m	TUB-4/SP	2	3	3	4	4	5	5	6	6	
15	Double swivel clamp	BUC-M/SP	4	5	5	6	6	7	7	8	8	
16	Rigid double clamp	BUC-F/SP	2	3	3	4	4	5	5	6	6	
17	Coupling	RRS/SP		1	1	2	2	3	3	4	4	
	Mounting fixture (optional, to be ordered separately)		1	1	1	1	1	1	1	1	1	
Weight of the assembled system, kg			150	180	210	240	270	300	330	360	390	

### STP system design (Fig.1) Operating principle

The rail-air duct has a longitudinal groove in its lower part, which is equipped with conical rubber seals (12).

A movable carriage (2) moves along the rail-air duct where an extraction hose (6) and a balancer (5) are fixed; they support this hose with the help of a conical rubber support (located on the hose) in the form of a loop. The free end of the hose with the steel gas intake nozzle (7) is connected to the exhaust pipe of the car. Mandatory disconnection of the steel gas intake nozzle is provided manually at the end of the air duct rail.

The carriage on rollers, which follows the car on the outer surface of the air rail, is equipped with a slotted nozzle, which slides between the conical rubber seals of the air rail groove and discharges the exhaust gases to be removed inside the air rail.

The rail duct is fixed to the wall or ceiling using a set of fasteners included in the standard STP system kit. The supports are installed at intervals of 5-6 meters.



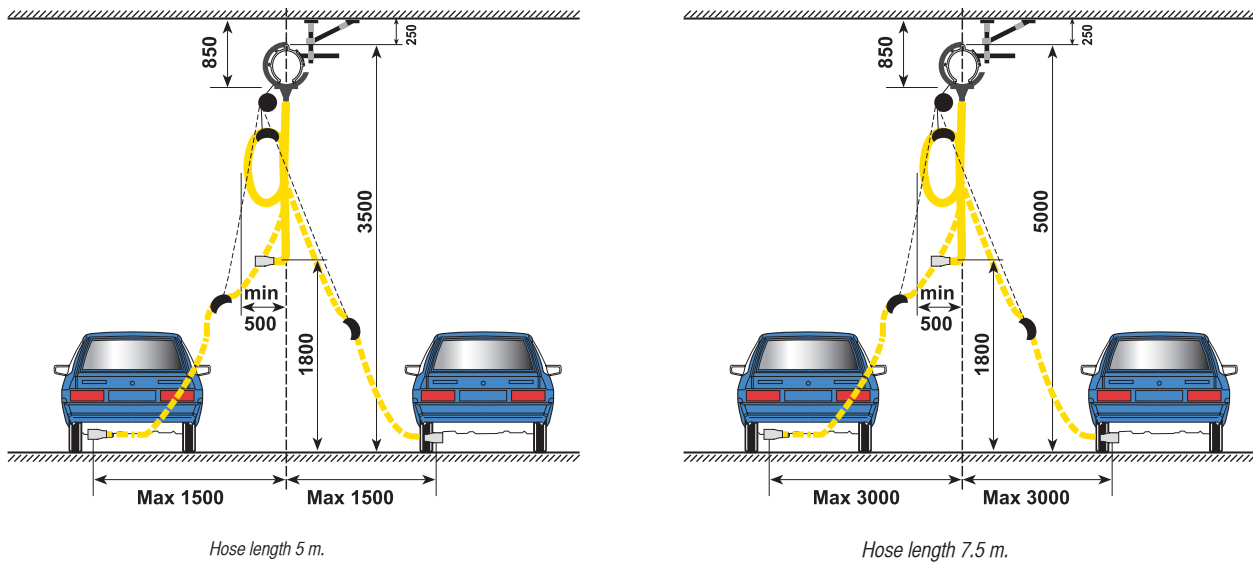
The rail system is connected to the central fan by ducts, the diameters and lengths of which are selected depending on the length of the system, the number of connection points (taps in the rail - duct), the size of the premises and the location of the air extractor where the entire system of ducts is connected.

Refer to page 58 of the catalog for fan selection for the system and the necessary data for calculation.

### System Selection. Installation site requirements

The height of the rail installation is determined by the height of the ceiling and the height of the vehicle. The rail-air duct should be located at a height of 3.5-5.0 m above the floor (Fig. 3, pos. 4) in order to leave 1-2 m of free space under the raised hose (see Fig. 2 – dimensions are indicated in millimeters) at a distance of 1.0-1.5 m from the gate (Fig. 3, pos. 6) and 0.5 m from the side of the vehicle (Fig. 3, pos. 5).

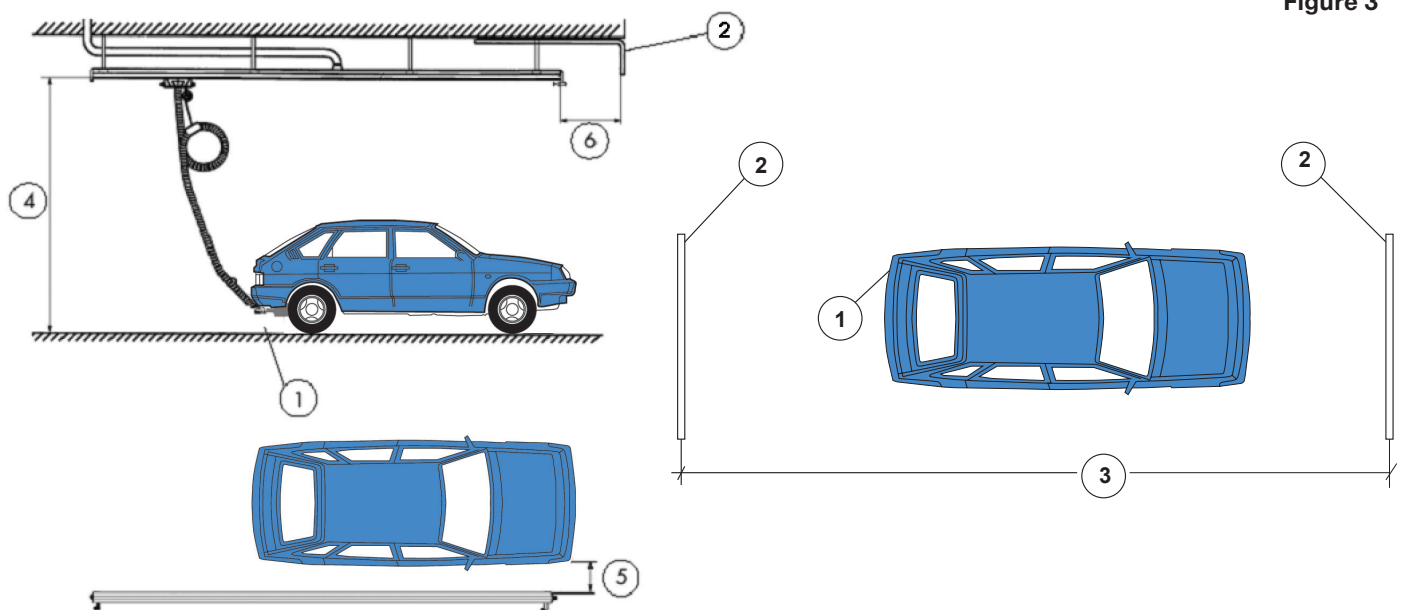
Figure 2



Determine the location of the exhaust pipe (1) (see Fig. 3) on the vehicle, the side and the diameter. Measure the height and width of the gate (2). Check at what height the rail-air duct can be positioned.

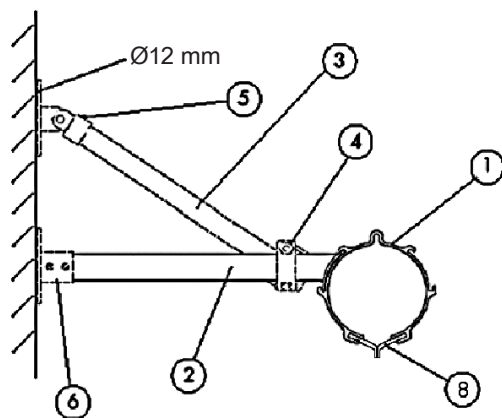
Measure the distance between the entrance gate and the exit gate (3) to determine the required length of the rail. The required length is determined by the distance from the entrance gate to the exit gate minus 3.0 m.

Figure 3

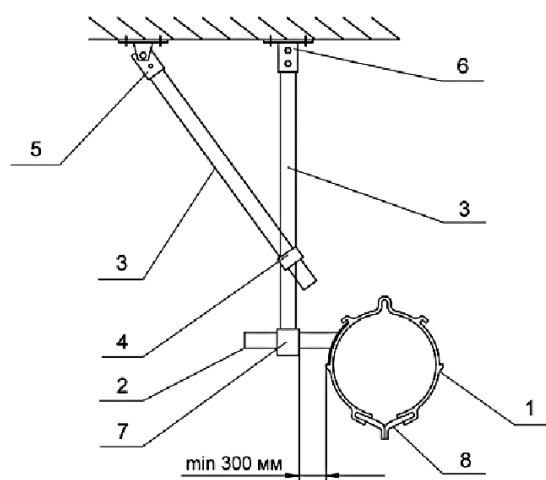
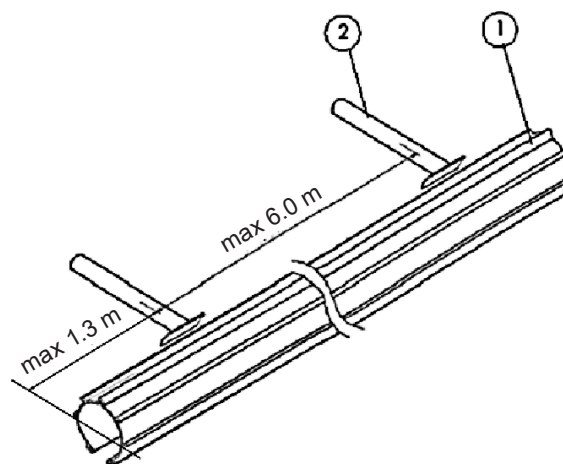


## Installation of STP system

Figure 4



Wall mounting of the rail-air duct



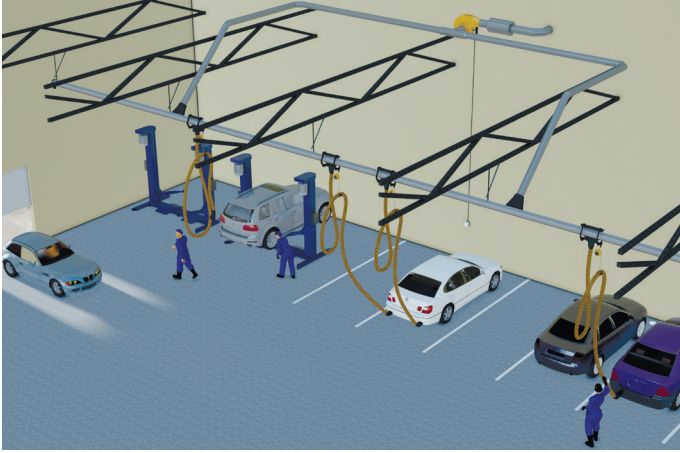
Ceiling mounting of the rail-air duct

- 1 - STP rail-air duct
- 2 - Bracket
- 3 - Strut
- 4 - Double swivel clamp
- 5 - Swivel support
- 6 - Fixed support
- 7 - Rigid double clamp
- 8 - Conical rubber seal

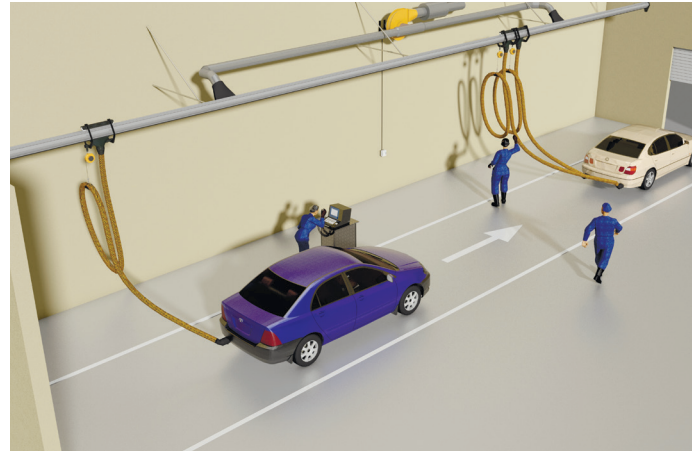
1. The edge brackets (2) must have additional struts in the horizontal plane.
2. Trim the brackets (2) and struts (3) to the desired length.
3. Drill the holes in the brackets and struts together with the supports (5) and (6).
4. Install the supports (5) and (6) on the wall or ceiling by fixing them with anchor bolts.
5. Insert the brackets (2) and struts (3) into the supports (5) and (6) and fix them with M10x80 bolts.
6. Join the brackets and struts with clamps (4) and (7), verifying the position of the consoles by a stretched cable (on the outermost consoles) or by a laser beam (level).
7. Lift and install the first element of the rail-air duct on the arm. Check the levelness of the rail. Drill  $\varnothing 10.5$  mm holes in the air duct rail (1) through the bracket strips (2). Fasten the rail-air duct on the arms with M10x25 bolts. Attach the second element of the rail-air duct to the first one and on the arms and fix it with bolts. Subsequent elements shall be installed in the same way.
8. The conical rubber seal is mounted in the assembled rail-air duct using a special mounting device MZRP. The seal is lubricated with a soap solution immediately before installation. We recommend applying Teflon or silicone aerosol on the inner surface of the conical rubber seal to improve the sliding of the carriage nozzle before putting the rail into operation.

## STP System Uses

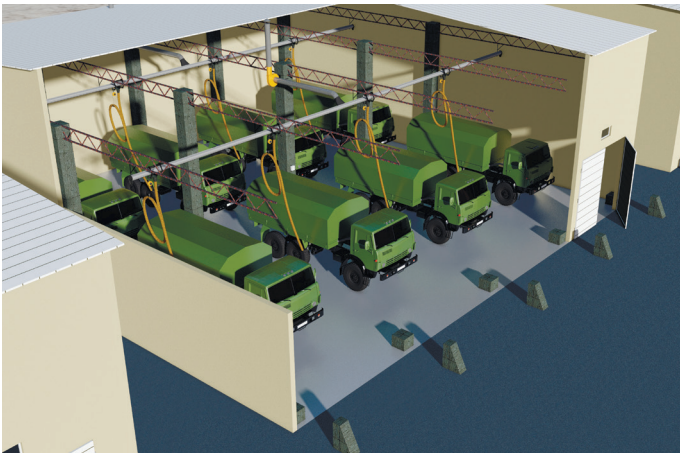
STP system for stationary workplaces at maintenance stations. System installation on the ceiling slabs.



STP system to accompany moving cars. System installation on the wall.



Covered parking for vehicles. Rail-air duct across the column. Connection to the exhaust pipes from different sides of the vehicle.



Covered parking for vehicles. Rail-air duct along the column. Accompanying the car at the entrance and exit from the shop.



## 7 EXHAUST EXTRACTION SYSTEMS IN FIRE-FIGHTING SERVICES

Order of the Ministry of Labor of Russia dated December 11, 2020 No. 881n "On Approval of the Rules for Occupational Safety in Fire Fighting Units"

### VI. General requirements for labor protection during the operation of the garage

cl. 30 "The garage provides gas exhaust from the exhaust pipes to remove gases from the working engines of fire trucks.

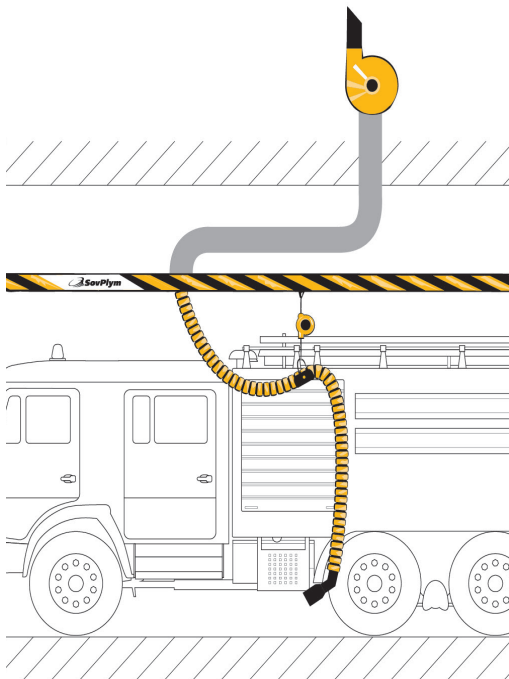
At the same time, a constant connection of the gas exhaust system to the exhaust system of fire trucks and self-opening is ensured at the beginning of their movement."

Order No. 630 of December 31, 2002 "On Approval and Enactment of Occupational Safety Rules in the Units of the State Fire Service of the Ministry of Emergency Situations of Russia"

(POTRO-01-2002) prescribes to equip the premises where fire equipment is kept with gas exhausts from exhaust pipes to remove gases from operating engines of cars. At the same time, the gas exhaust system must be constantly connected to the exhaust system of the car and open itself at the beginning of its movement (paragraph 187 of the Order of the Ministry of the Russian Federation).

## EXHAUST EXTRACTION SYSTEM WITH A SLIDING BALANCER

SBT



Exhaust extraction system with sliding balancer and pneumatic gas intake nozzle with automatic disconnection from the exhaust pipe when the car leaves the shop.

### Use:

SBT is used in fire and rescue stations for one parking space inside the building with a maximum distance of 10 meters from the gate to the exhaust pipe of the car (the exhaust pipe is located on the side at the bottom of the truck).

The pneumatic steel gas intake nozzle (pneumatic gripper) provides independent disconnection from the exhaust pipe when the truck leaves the box.

The set of supplied systems includes all you need for installation and operation. A fan of the required capacity can be ordered as an option.

To ensure automatic operation of the air extractor when the car engine is started, an automation kit must be ordered additionally:

1. automatic central fan control unit PCU-1000,
2. pS-1500 pressure sensor,
3. AD automatic damper,
4. ICE-LC Automatic Damper Control Panel.

### Features and benefits

The SBT system consists of a 6 or 6-meter-long aluminum profile (track), a movable carriage, a balancer, a flexible hose, and a pneumatic gripper (pneumatic gas intake nozzle). The track is mounted along the vehicle sidewall on the side of the exhaust pipe. The track mounting height ranges between 3.5 and 5 m. The distance from the sidewall of the car is 500 – 700 mm. The pneumatic grip is similar to a glove, which tightly covers the exhaust pipe of the truck when filled with compressed air, ensuring 100% removal of exhaust gases from the room.

A pneumatic grip is put on the exhaust pipe of the truck when it enters the garage. The exhaust gases cause the pressure in the exhaust system to increase, which triggers a pressure sensor that starts the fan. The extraction hose is suspended on the balancer and moves freely on the carriage along the rail synchronously with the truck.

When the truck leaves the gate, the pneumatic limit switch is triggered (compressed air pressure is released) and the pneumatic gripper is automatically disconnected from the exhaust pipe. The hose returns to its original position using the balancer. The fan is switched off after an adjustable time interval in the range from 7 seconds to 6 minutes from the moment of pressure drop in the system (this occurs when the truck leaves the station and the pneumatic grip is automatically disconnected or when the car has taken its place in the shop and the engine is turned off).

While the car is standing in its place inside the shop, the nozzle is constantly connected to the exhaust pipe, and the automatic devices are in standby mode. When the engine is started (with periodic scheduled warm-ups), the fan turns on automatically and operates until the engine is shut off. Thus, a fully automatic mode of the system operation is achieved without the involvement of the fire department personnel.

- The system is suitable for installation on ceiling or wall structures, both existing buildings and newly constructed fire stations. Low weight of the system allows installation on almost any existing building structures. Easy installation using standard suspension elements included in the system kit.
- The extraction hose of the system is securely connected to the truck by means of a pneumatic gas intake nozzle that tightly compresses the exhaust pipe. The system provides automatic detachment of the nozzle from the exhaust pipe when the vehicle leaves the box. The hose does not obstruct when driving.
- The pneumatic gas intake nozzle creates a closed system and completely prevents the breakthrough of exhaust gases into the room. The nozzle is permanently connected to the exhaust pipe of the standing truck and the system is always ready for operation (in standby mode).
- The system is equipped with a safety quick-release coupling for emergency opening of the hose in case of its breakage when the vehicle is moving.
- The system is equipped with high-speed automatic devices that turn on the fan at the time of engine start (responds to pressure changes in the system) and stop the fan after a certain (adjustable) time after the truck leaves the box. So the system is fully autonomous, requiring no intervention or distraction of personnel.
- It is possible to combine several SBT systems and connect them to one air extractor, which reduces noise, saves energy, and simplifies the installation of air ducts. In this case, the central fan removes air only through the system to which the truck with the running engine is connected, while the remaining systems are closed by automatic dampers that open when the engine starts (heat saving). The system can also be equipped with automation, allowing to change the fan speed (increase or decrease the air flow rate) depending on the number of cars working at the moment.
- Complete elimination of exhaust fumes from the premises.

## Specifications

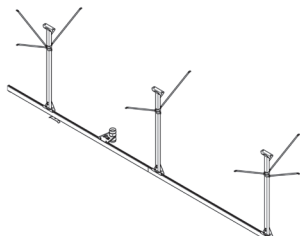
Rail length	6; 9 m	
Extraction hose diameter	100; 125; 150 mm	
Extraction hose length	6; 10 m	
Maximum exhaust temperature	150°C	
Pneumatic nozzle diameter	180 mm	
Exhaust pipe diameter	60-170 mm	
Rail mounting height	minimum	maximum
	3.5 m	5.0 m
Compressed air hose diameter	8 mm	
Required compressed air pressure	minimum	maximum
	1 atm	6 atm
Weight	SBT-6	SBT-9
	42 kg	49 kg

## Description of the main units (elements) of the SBT system

The SBT rail system is ordered and delivered as a complete system.

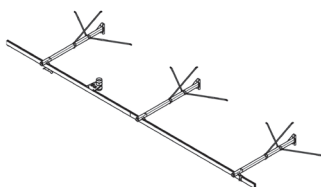
You should select the model that meets the length requirements of the guide profile from the proposed list of standard SBT system kits. The length of the profile should correspond to the distance that the truck exhaust pipe passes from the shop entrance to the parking place. Standard kit includes all the necessary elements to build and install the system.

### SBT mounted on the ceiling



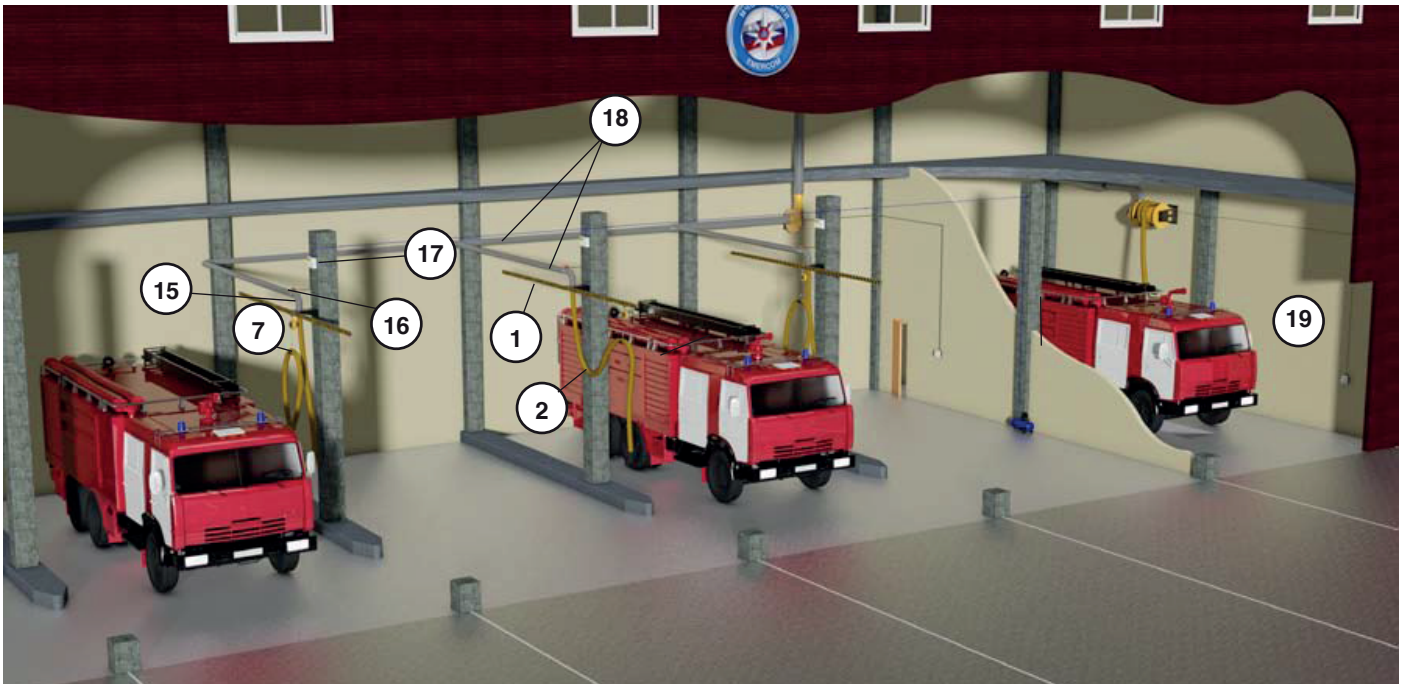
Code	Model	SBT		
		Rail length, m	Extraction hose diameter, mm	Exhaust hose length, m
5933	SBT-6-100	6	100	6
5934	SBT-6-125	6	125	6
5935	SBT-6-150	6	150	6
5939	SBT-9-100	9	100	10
5940	SBT-9-125	9	125	10
5941	SBT-9-150	9	150	10

### SBT mounted on a wall

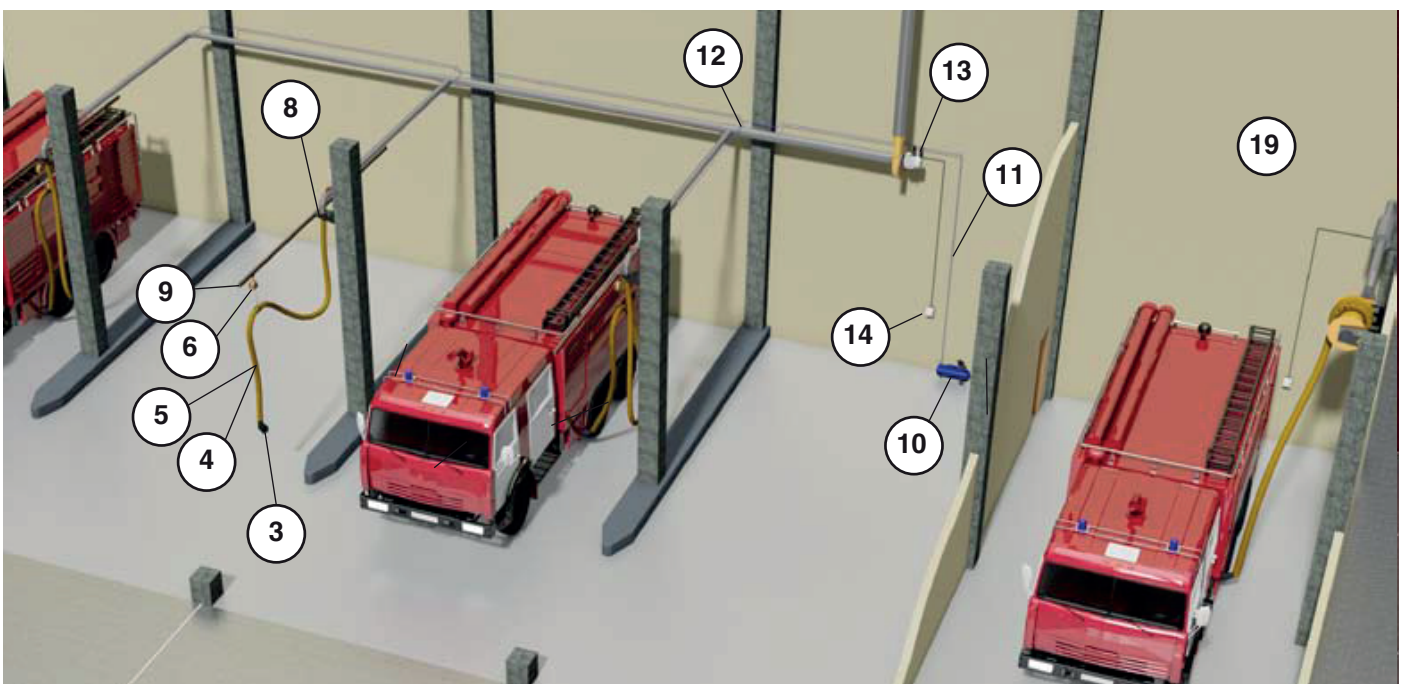


Code	Model	SBT		
		Rail length, m	Extraction hose diameter, mm	Extraction hose length, m
5930	SBT-6-W-100	6	100	6
5931	SBT-6-W-125	6	125	6
5932	SBT-6-W-150	6	150	6
5936	SBT-9-W-100	9	100	10
5937	SBT-9-W-125	9	125	10
5938	SBT-9-W-150	9	150	10

## Fire Station General Arrangement

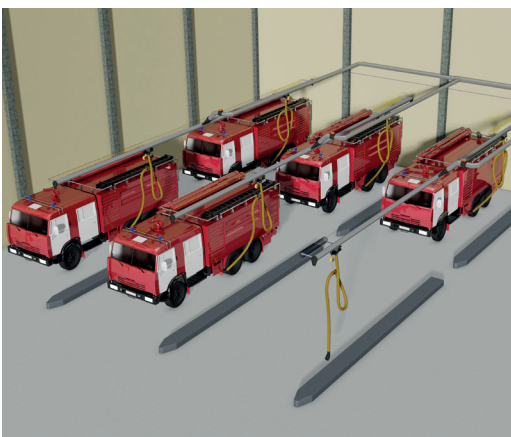
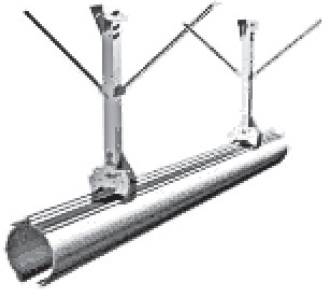


1. Aluminum guide profile (track) L=5.8 m.
2. Heat-resistant extraction hose (150°C) Ø125 mm L=6 m.
3. Pneumatic gas intake nozzle (pneumatic gripper).
4. Pneumatic valve for supplying compressed air to the nozzle.
5. Safety quick coupling on magnets.
6. Movable carriage with a balancer that supports the hose in the upper position.
7. Conical rubber hose support for the balancer cable connection.
8. Bracket for fastening a hose with a branch pipe for connecting to the air duct of the exhaust system and elements for compressed air supply.
9. Pneumatic valve for the discharge of compressed air from the pneumatic gripper when the vehicle leaves the shop (automatic detachment of the nozzle).
10. Compressor with oil and moisture separator.
11. Compressed air supply line (Ø 8mm pipe) from the compressor to the systems.
12. Quick-connect tee joint to connect the SBT system to the compressed air line.
13. Air extractor VMK-4700.
14. Automatic central fan control unit PCU-1000.
15. The PS-1500 pressure transmitter is mounted in the duct in front of the automatic damper.
16. AD Automatic Damper.
17. ICE-LC Automatic Damper Control Panel.
18. Air ducts of the central exhaust system.
19. Reserved shop. Washing, maintenance and repair stations.



## STRAIGHT RAIL SYSTEM

ARSR



TO ELIMINATE EXHAUST GASES WITH AUTOMATIC DISCONNECTION OF THE STEEL GAS INTAKE NOZZLE (PNEUMATIC GRIPPER) FROM THE EXHAUST PIPE WHEN THE VEHICLE LEAVES THE SHOP

### Description

The ARSR direct-rail exhaust system is specially designed for equipping extended garages of fire stations, ambulance stations, garages of the Ministry of Emergency Situations or military units. The system allows exhaust gases to be removed from the exhaust pipe, allowing the vehicle to move freely indoors. This system is used for garages where cars are parked in a platoon and must be equipped with means of automatic disconnection of the steel gas-receiving nozzle (pneumatic grip) from the exhaust pipe of the car when leaving the garage in case of an emergency call.

The maximum number of vehicles in the platoon is 2 with a total length of the platoon not exceeding 30 m. The exhaust pipe should be located on the side or back of the lower part of the vehicle.

### Features and benefits

- The possibility of simultaneous maintenance of two vehicles by one exhaust system.
- The system provides automatic detachment of the nozzle from the exhaust pipe when the vehicle leaves the shop.
- The system is equipped with fast-operating automation, which turns on the fan at the moment of engine start (reacts to the change of pressure in the system) and stops the fan after a certain (adjustable) time after the car leaves the shop. So the system is fully autonomous, requiring no intervention or distraction of personnel.
- The pneumatic steel gas intake nozzle creates a closed system and completely prevents exhaust gases from escaping into the premises. The nozzle is permanently connected to the exhaust pipe of a parked vehicle and the system is ready for operation (on standby) at all times.
- Removal of exhaust fumes while the vehicle is moving inside the box.
- Easy and economical installation, reliable operation, low operating costs.
- Full compliance with the labor protection rules in the fire fighting services.
- Prevention of occupational diseases associated with the harmful exhaust gases indoors.

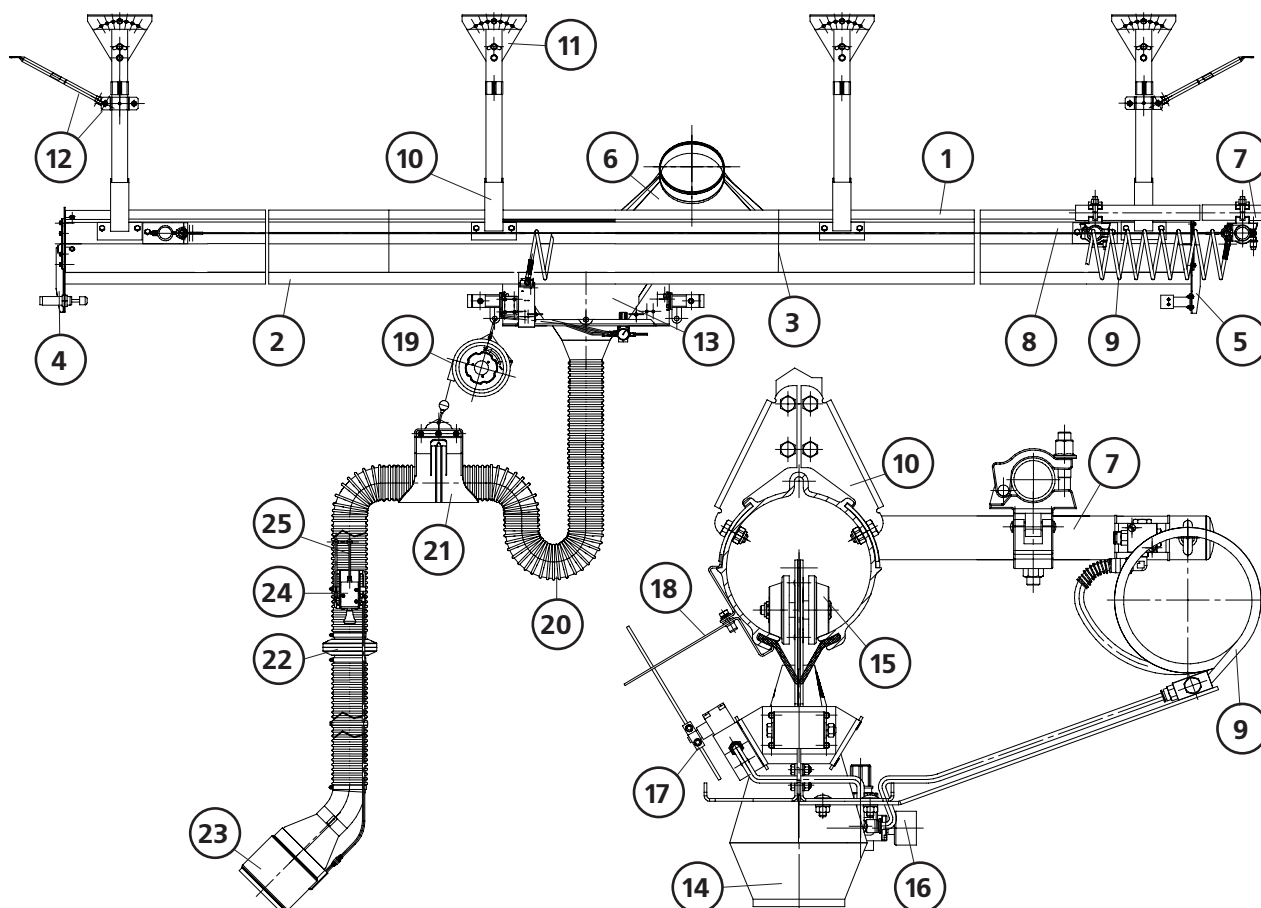
### Specifications

Length of duct-rail supplied	8.7; 11.6; 14.5; 17.4; 20.3; 23.2; 26.1; 29.0 m	
Inner diameter of duct-rail	160 mm	
Extraction hose diameter	100; 125; 150 mm	
Extraction hose length	6 or 10 m	
Extraction hose heat resistance	150°C	
Rail installation height	minimum	maximum
	3.5 m	5.0 m
Dimensions of the connecting side adapter to the ventilation system	350*60 / 200 mm L=450 mm	
Recommended airflow values (taken according to regulatory documents depending on power (hp), airflow velocity in hoses (11:15 m/s))		
For reference:	cars 100 hp	cars 300 hp
	360 m³/h	1,080 m³/h
Pneumatic gripper diameter	180 mm	
Car exhaust pipe diameter	60-170 mm	
Diameter of the compressed air supply pipe to the system	8 mm	
Compressed air pressure:	minimum	maximum
	1 atm	6 atm

### Delivery set of systems

8 standard models of ARSR exhaust rail systems are supplied with a length of the rail-air duct ranging between 9 and 30 m. The kit of systems supplied includes everything necessary for assembly and installation. The system kit is intended for servicing one vehicle. For a two-car service, an additional order is required:

- ARSR-MZ spiral pneumatic hose accumulator;
- CA-15 or CA-30 Spiral pneumatic hose for supplying compressed air to the pneumatic grip (length 15 or 30 m; depending on system length).





## List of assemblies included in the standard kit for building ARSR rail systems of a certain length corresponding to the system model

No. in Fig.	Description	Model	ARSR 9 (5920)	ARSR 12 (5921)	ARSR 15 (5922)	ARSR 18 (5923)	ARSR 21 (5924)	ARSR 24 (5925)	ARSR 27 (5926)	ARSR 30 (5927)
1.	5.8 m long rail-air duct	RR-5,8 (pos. 1)	1	2	2	3	3	4	4	5
1.	2.9 m long rail-air duct	RR-2,9 (pos. 1)	1		1		1		1	
2.	Rail - duct conical rubber seal (m)	RRRS-X (pos. 2)	12	24	30	36	42	48	54	60
3.	Coupling for rails - air ducts	RRS (pos. 3)	1	1	2	2	3	3	4	4
4.	End plug of the rail with hydraulic shock absorber (installed on the side of the box gate)	RRIBC (pos. 4)	1	1	1	1	1	1	1	1
5.	Rail end plug with conical rubber shock absorber	RRZ (pos. 5)	1	1	1	1	1	1	1	1
6.	Connection adapter $\varnothing$ 200 mm to connect the rail system to the air duct system leading to the central fan	RRDC-200 (pos. 6)		1	2	2	3	3	3	3
7.	Spiral pneumatic hose accumulator at the end position of the carriage	ARSR-MZ (pos. 7)	1	1	1	1	1	1	1	1
8.	Spiral air hose rope with eyebolts and one suspension arm (length 15 or 30 m, depending on the length of the system)	W-15 W-30 (pos. 8)	1	1	1	1	1	1	1	1
9.	Spiral pneumatic hose to supply pneumatic grip with compressed air (length 15 or 30 m, depending on the length of the system).	CA-15 CA-30 (pos. 9)	1	1	1	1	1	1	1	1
10.	Upper rail-air duct suspension bracket (set)	RRTS (pos. 10)	3	3	4	4	5	5	6	6
11.	Vertical rail-air duct fixing kit (for mounting on the ceiling)	SBT-MKV (pos. 11)	3	3	4	4	5	5	6	6
12.	Rail suspension side support kit (support length 1800 mm)	SBT-SBKL (pos. 12)	3	3	4	4	5	5	6	6
13.	Mounting beam (aluminum pipe 50*50 mm), L=5.8 m	SBT-SL (pos. 13)	1	1	2	2	2	2	2	2

## List of necessary accessories for ARSR systems. ICCA extraction hose carriage

13. Carriage body.
14. Diffuser with nozzle for the extraction hose connection.
15. Rollers to move the carriage along the rail-air duct.
16. Compressed air supply system with pressure regulator.
17. Pneumatic pressure relief valve (purge valve) in the pneumatic gripper when the vehicle leaves the shop.
18. Purge valve release plate (installed at the end of the rail in front of the exit gate).
19. Balancer.

## Pneumatic grip kit for ARSR system with HPA automatic disconnection from the exhaust pipe of the vehicle

20. Specialized extraction hose for exhaust gas elimination with heat resistance of 150°C.
21. Conical rubber support for fixing the balancer cable.
22. Safety quick coupling on magnets (consists of two parts).
23. Pneumatic gas intake nozzle — pneumatic grip.
24. The pneumatic compressed air pressure supply/relief valve to/from the pneumatic grip that operates manually and in the automatic mode.
25. Pipes to supply compressed air from the carriage to the pneumatic grip.

## 8 ENERGY-SAVING EQUIPMENT



### The general principle of the automation system operation

In automatic mode, the air extractor switching signal comes to PCU-1000 from the RS-1500 pressure sensor. The sensor responds to an increase in pressure in the exhaust system when the vehicle engine is started. The sensitivity of the pressure sensor can be adjusted under any type of car engine by turning the adjusting screw. When the car engine is started, the pressure sensor is triggered and gives a signal to open the automatic damper and turn on the fan. The pressure transmitter is installed in the duct approximately 100 mm from the hose bracket.

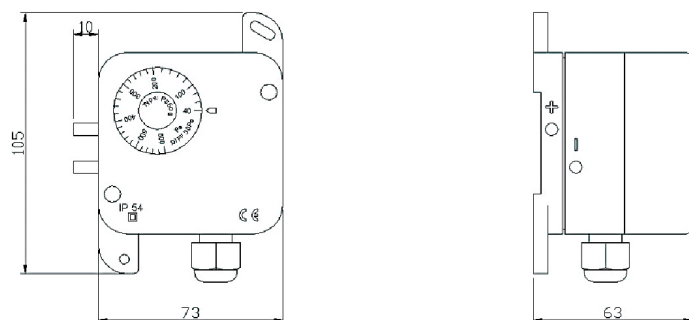
When the car engine is started, the pressure sensor is triggered and gives a signal to open the automatic damper and turn on the fan. When the car engine is turned off, the pressure in the exhaust system decreases and the signal from the pressure sensor disappears, after which the automatic damper closes with a certain delay and the air extractor turns off. The delay time for shutting off the air extractor can be adjusted from 7 seconds to 6 minutes.

When the control device is switched on in the "manual" mode, the air extractor operates continuously. The control unit also has an air extractor shutdown button.

### PS-500 & PS-1500 PRESSURE SENSORS

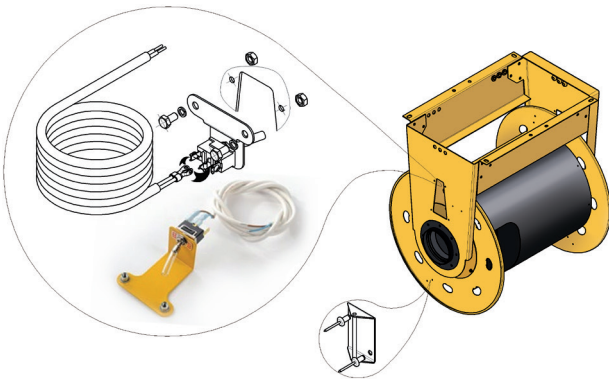


The pressure sensors are mounted in a nipple that connects the exhaust system or exhaust device to the air duct of the central system leading to the air extractor. The sensors are mounted directly in front of the AD automatic damper. The sensor responds to a change in pressure in the system when connected to the exhaust pipe and starting the vehicle engine. The sensor is adjustable so that the sensor triggering timing is optimized for the system and the vehicle. The sensors are used with automatic control devices of the PCU-1000 central fan.



Code	Model	Pressure range	Sensor accuracy in low pressure zone	Sensor accuracy in high pressure zone	Permissible electrical power of contacts. Resistance load	Permissible electrical power of contacts. Inductive load
98058	PS-500	30...500 Pa	±5 Pa	±30 Pa	3A / 250VAC	2A / 250VAC
98059	PS-1500	100...1500 Pa	±10 Pa	±50 Pa	3A / 250VAC	2A / 250VAC

## MSR MICROSWITCH FOR COIL FAN CONTROL



The MSR microswitch is designed to remotely turn on and off the fan when winding and unwinding the extraction hose of the SER and MER coils.

## AUTOMATIC CONTROL DEVICE OF THE CENTRAL FAN PCU-1000



The PCU-1000 provides automatic switching on/off of the central fan on the signal from the pressure sensor. Up to 6 PS pressure sensors can be connected to the same device at the same time. The PCU-1000 has a thermal relay to protect the fan motor from overloads.

The MS thermal relay must be ordered additionally according to the power of the fan used.

An adjustable fan off delay (7 sec to 6 min) allows you to remove the remaining exhaust gases in the exhaust system after the car engine is shut off.

The PCU-1000 control unit is used along with the PS-1500 and PS-500 pressure sensors (in the operation of rail exhaust systems), with the MSR microswitch (in the operation of hose reels), and to automate the control of the air extractor in any exhaust gas systems using AD automatic dampers.



**WARNING!** If the control unit is used in the manual on/off mode of the exhaust fan, make sure that the exhaust fan is switched on when starting the vehicle engine, as otherwise there is a risk of exhaust gases leaking from the exhaust system and the exhaust hose being melted by the hot exhaust gases.

### Operating modes

Automatic	Fully automatic start/stop of the air extractor on the signal from PC-500.
Manual	The air extractor is permanently switched on.
Stop mode	Manual shutdown of the air extractor.

### Specifications

Power supply:	Alternate 3 phase 380V
Internal voltage:	Alternate 24 V
Power consumption:	Max 35 W
Outputs:	Fan motor AC power 3 phases
Control signal from PS pressure sensors or MSR microswitch	
Relay output:	Normally open

NOTE: Relay outputs can be used, for example, to create an external alarm system.

## PU F COIL FAN CONTROL PANEL



A PU F panel and MSR microswitch are provided to control the fan of the hose reels, both single (with individual fan) and as part of centralized systems. The microswitch is installed on the coil. When the hose is unwound (lowered down), it closes the electrical circuit for switching on the fan through the PU F console where a magnetic starter and a thermal relay are installed (the latter protects the fan motor from overloads). When the hose is rewound (lifted), the fan is turned off. The control panel additionally provides a manual mode for controlling the fan using the buttons on the console.

### Specifications

Power voltage	3 phases, 380 V ± 10%
Transformer:	220/24/12V — 60 W
Mains frequency	50Hz
Permissible number of MSR/SP switches:	6 pc
Dimensions:	242 x 266 x 162 mm

### PU F console models and their compliance with the models of fans used

Code	Model	Fan	Electric motor, kW; V	Thermo relay, A
6390	PU F -1800	F-1800	0.55; 3 f 380 V	1.1 – 1.4
6391	PU F -2100	F-2100	0.75; 3 f 380 V	1.7 – 2.3
6392	PU F-3000/Fp-2500	F-3000/F-p2500	1.1; 3 f 380 V	2.7 – 3.7
6393	PU F -p3400	F-p3400	1.5; 3 f 380 V	3.4 – 4.6
6394	PU F -4700	F-4700	2.2; 3 f 380 V	4.2 – 5.8
6395	PU F -6000	F-6000	4.0; 3 f 380 V	7.0 – 10.0



### Frequency Converter

Provides the required air flow in the system by changing the speed of the fan motor rotation according to the signal from the Signal Matching Device.



### Signal Matching Device

The signal matching device sends a signal to change the parameters of the converting frequency depending on the number of triggered induction, light or other sensors. Designed to connect up to 8 control signals coming from the ICE-LC device.

## AD AUTOMATIC DAMPER



Automatic damper with electric drive. It has different diameters depending on the diameter of the duct to which this system is connected. The damper is controlled by the ICE-LC panel (ordered additionally to each damper). Damper opening/closing time – 8 sec to 6 min.

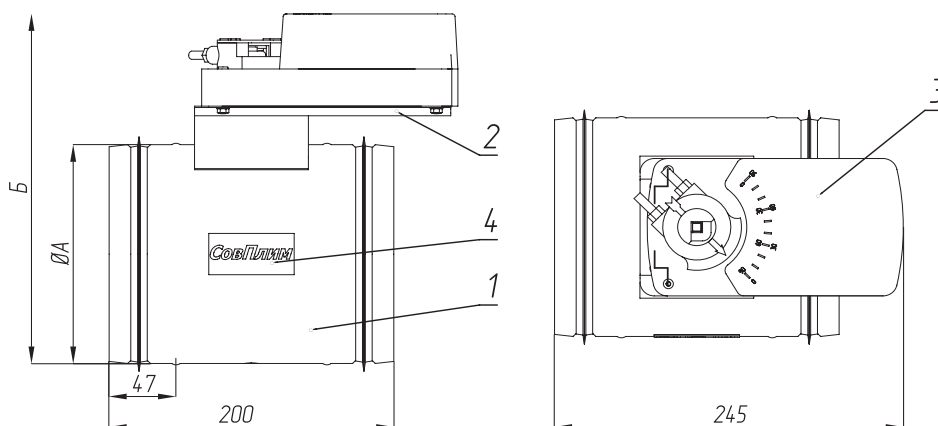
The automatic damper (as part of an exhaust ventilation system with a single central fan) ensures that the air flow is restricted to the system (or exhaust unit) to which the vehicle with the engine running is currently connected.

## Specifications

Parameter	Parameter value
Electric drive torque	8 Nm
50 Hz AC voltage	24 V
Flap rotation time	8 sec
Electric drive power consumption:	
– rotation;	8W
– limit position;	0.4W
– rated power.	13 VA
Damper rotation angle	0-90°
Noise level of the electric drive (operation), 1 m	NMT 50 dB (A)
Service life	60,000 cycles

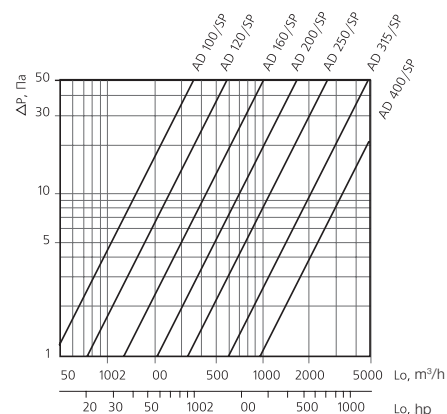
## Models. General view, composition, and dimensions of the dampers

Code	Model	∅ A, mm	B, mm	Torque, Nm	Weight, kg
6770	AD-100	99	194	1.0	1.7
6771	AD-125	124	219	1.0	1.9
6772	AD-160	159	254	1.0	2.1
6773	AD-200	199	294	1.0	2.5
6774	AD-250	249	344	1.5	2.9
6775	AD-315	314	409	2.0	3.5
6776	AD-400	399	494	2.0	4.3



1. Damper body
2. Electric drive bracket
3. Accelerated electric drive (model DA08F24)
4. Manufacturer's nameplate

Pressure loss diagrams  
for dampers with different diameters



ICE-LC AUTOMATIC DAMPER CONTROL PANEL

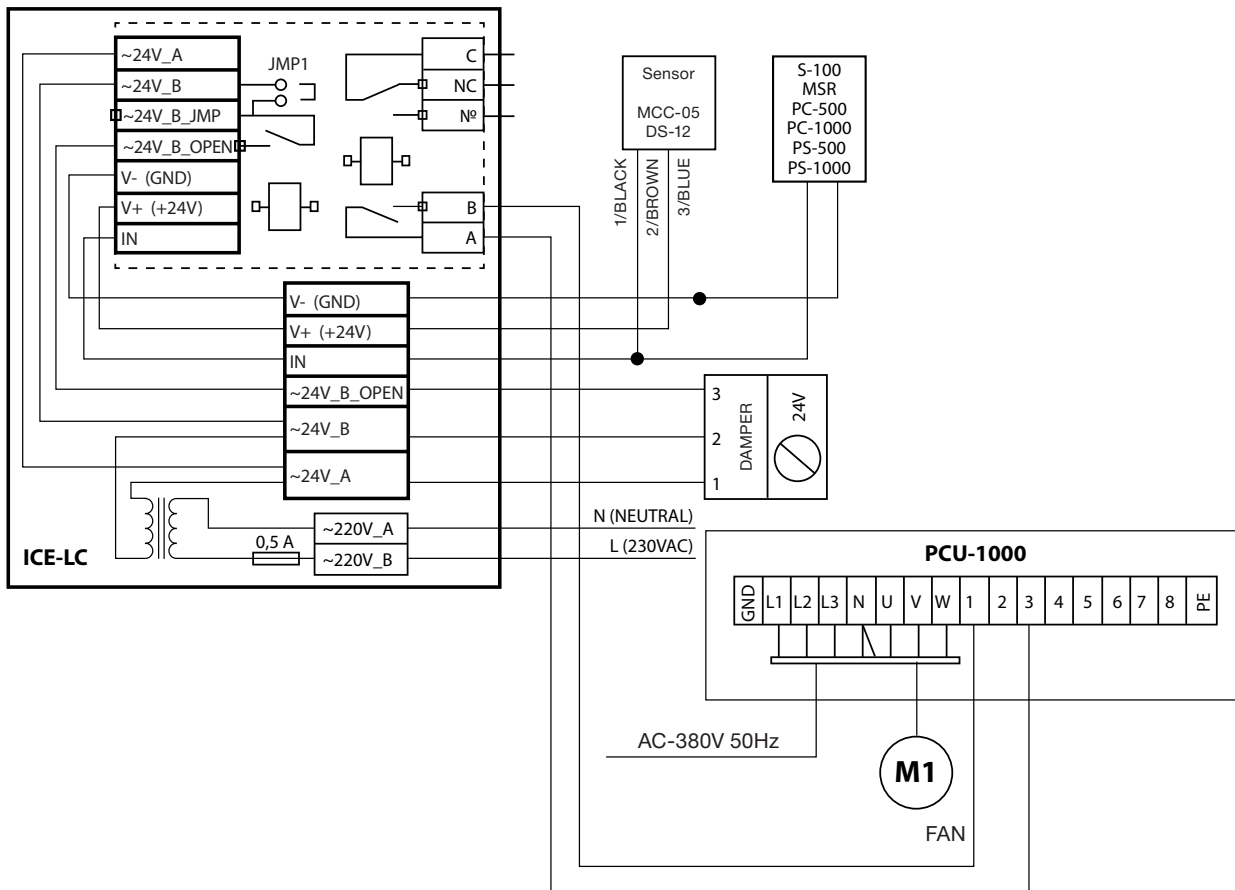


The ICE-LC controls the damper actuator by a signal from the PS pressure sensor. It has a preset (adjustable) time delay for closing the damper (15 sec) after the signal from the pressure sensor disappears. LC is a controller that allows fully automatic control of the damper, thereby changing the performance of the ventilation system according to the selected requirements. Used in exhaust systems (SBT, STP), exhaust coils, and other exhaust devices.

Specifications

Model	ICE-LC
Protection rating	IP66 (EN 60529) / UL94-V2
Ambient temperature	Max 40°C /105°F Min 0°C / 32°
Storage Temperature	-10°C to 65°C
Voltage rating	200-240 VAC
Primary fuse	0.5 A
Cable connections	Under the screw terminal
Damper control voltage (number of cable cores)	24 VAC (2/3 wire)
Fan On/Off delay	7 sec – 6 min
Weight	1.8 kg

Electrical wiring diagram



## ENGINEERING PECULIARITIES OF EXHAUST EXTRACTION SYSTEMS



100% exhaust extraction (if selected correctly)



Individual solutions for various types of equipment and tasks of increased complexity



High level of automation (in many processes the use of equipment without additional manpower)



Versions from standard values (lengths, diameters, colors, customization) possible



Compliance with standards and legislation



Reducing sickness certificates costs



Reducing the cost of the ventilation system maintenance



Protecting expensive equipment and premises interiors from gas soot and chemicals



Prevention of occupational diseases



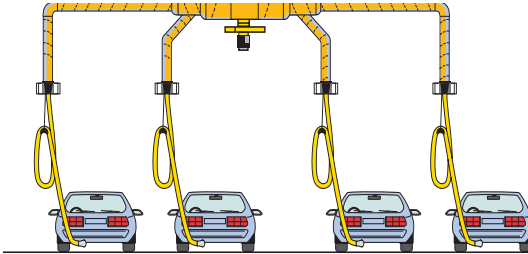
Increasing labor productivity



Wide model range (mobile and stationary versions for any tasks)

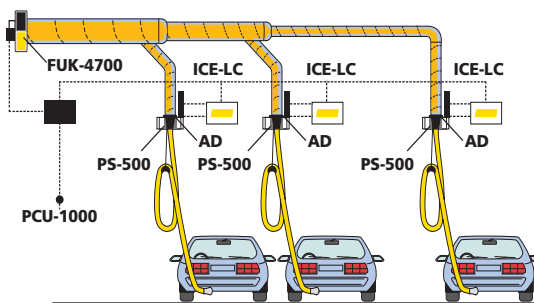
## 9 STANDARD SOLUTIONS

### Centralized exhaust extraction system



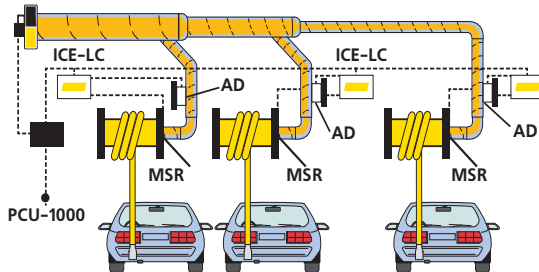
Several workplaces are equipped with DP-100-6 exhaust devices connected by an air ducts system. The system is operated by the central fan VMK-4700. The extracted air is discharged to the outside through a hole in the wall. This approach requires the use of steel gas intake nozzles with flaps to avoid unnecessary venting when one of the devices is not in use. This reduces air consumption and saves heat.

### Centralized ventilation system with exhaust devices



Several workplaces are equipped with DP-100-6 exhaust devices connected by an air ducts system. The system is operated by the central fan VMK-4700. The extracted air is discharged to the outside through a hole in the wall. Automatic control of the system operation is performed by the PCU-1000 automatic control unit. The AD automatic dampers control the exhaust air flow and thus the heat savings. RS-500 Pressure sensors are mounted in the mounting flanges of exhaust devices.

### Centralized automated ventilation system with exhaust coils



The figure schematically illustrates a centralized exhaust extraction system consisting of 3 SER series mechanical exhaust coils with a central air extractor. The general control of the system is performed by the PCU-1000 automatic control unit where the automatic dampers (AD) and the central fan are connected. When one of the coils starts working (the extraction hose is being unwound), the MSR microswitch is triggered, sending a signal to open the automatic damper, and it activates the automatic control device that starts the central fan.

The dampers of the other exhaust devices remain closed until work on the vehicles begins, preventing unnecessary venting of air. At the end of the work (winding the extraction hose), the damper automatically closes and the fan is switched off.



## RECOMMENDATIONS FOR CALCULATING EXHAUST SYSTEMS

Exhaust devices with individual fans for each workplace are mainly used in cases where it is difficult to combine them into a single air ducts system. For example, this option is used in case of a significant distance between workplaces. With this approach, a minimum of calculations and installation work is required. And if necessary, the equipment is easy to dismantle and move to a new location.

If you want to get an economical solution for equipping a large number of workplaces, connect all exhaust devices with a air ducts system and connect it to a central air extractor. The fan must be sized for the total airflow through all exhaust units, taking into account the pressure loss in the system.

In systems combining a large number of exhaust devices, it is advisable to place the central fan in the middle of the system. This solution makes it possible to reduce pressure losses in the system and use smaller air ducts.

The use of energy-saving automation improves the ease of control of ventilation equipment and significantly reduces energy consumption.

### Calculation of the amount of exhaust gases to be eliminated

$$L = (V \times n \times nf \times 1.06) : (z \times 60 \times 1,000) \text{ (m3/sec).}$$

L – amount of exhaust gases to be removed, (m3/s);  
 V – total volume of cylinders, (l) ;  
 n – engine speed, (rpm);  
 nf – coefficient that takes into account the degree of compression:  
 nf = 0.8 – 1.0 – for gasoline internal combustion engines (ICEs);  
 nf = 1.5 – max for atmospheric diesel ICEs;  
 nf = 1.7 – max for turbocharged diesel ICEs;  
 nf = 1.87 – max for turbocharged diesel ICEs with intercooling of charge air.  
 z – ICE response factor:  
 z = 1 for two-stroke ICEs;  
 z = 2 for four-stroke ICEs.  
 60 – conversion factor from minutes to seconds;  
 1,000 – conversion factor from liters to cubic meters.

To reduce the temperature (hoses have different heat resistance), the exhaust gases must be cooled (especially for gasoline ICEs) by diluting with "cold" air taken inside the premises. Therefore, the steel gas intake nozzles we supply have a larger diameter than the exhaust pipe. Additional air is sucked into this gap. The performance of the required fan must take into account the amount of this intake air. Therefore, another coefficient of 1.25 is introduced.

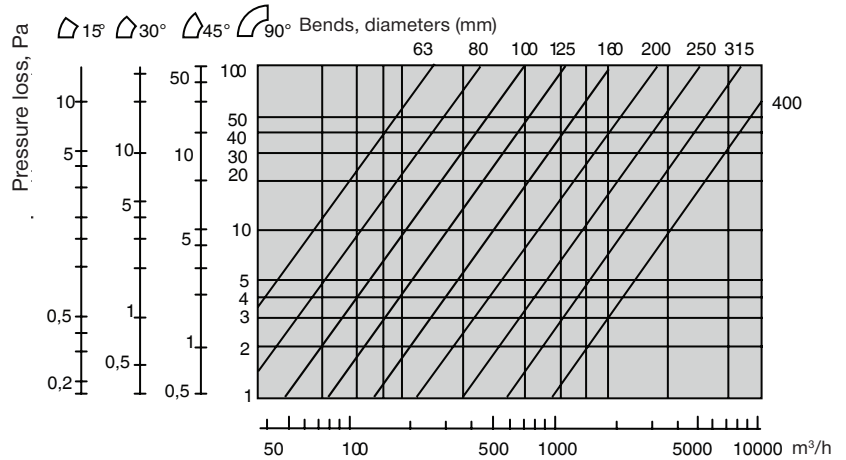
$$Q \text{ of the fan} = L \text{ (m3/s)} \times 1.25 \times 3,600 \text{ (m3/h)}$$

## HOW TO CALCULATE PRESSURE LOSS?

Pressure is measured in Pascals (Pa). You will need to find out how much air passes through this duct before you calculate how much Pa you lose in a particular duct. The air volume per unit time is measured in m<sup>3</sup>/h or hp. The information below will give you a general idea of how to calculate the pressure loss.

Correlation:  
1 m<sup>3</sup>/h = 0.28 hp

Recommended values:  
Speed inside the duct: 10–15 m/s  
Air flow rate per one standard exhaust device Ø160 mm —  
1,000 m<sup>3</sup>/h

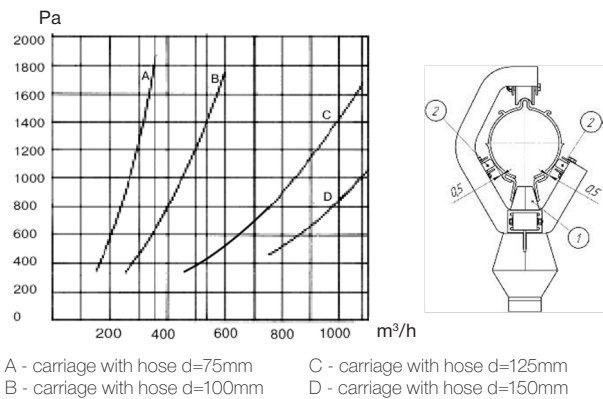


## CALCULATION OF PRESSURE LOSS

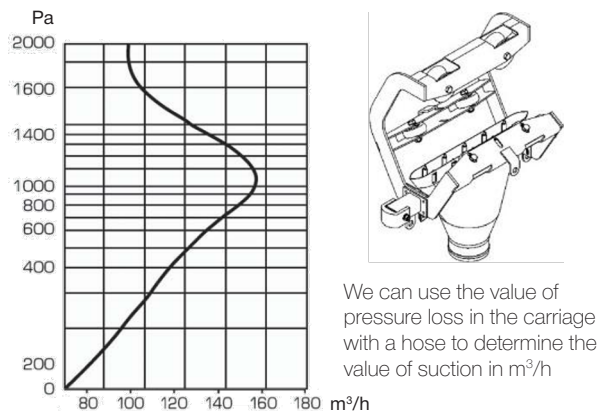
Air duct diameter, mm	1,000 m <sup>3</sup> /h		2,000 m <sup>3</sup> /h		3,000 m <sup>3</sup> /h		4,000 m <sup>3</sup> /h		5,000 m <sup>3</sup> /h		6,000 m <sup>3</sup> /h		7,000 m <sup>3</sup> /h		8,000 m <sup>3</sup> /h		9,000 m <sup>3</sup> /h		10,000 m <sup>3</sup> /h		
	Pa	m/s	Pa	m/s	Pa	m/s	Pa	m/s	Pa	m/s	Pa	m/s	Pa	m/s	Pa	m/s	Pa	m/s	Pa	m/s	
Ø 160	18	13	60	26																	
Ø 200	5	9	20	18	45	26	75	35													
Ø 250	2	5.5	6	11	14	17	22	22	40	28	50	34	70	39							
Ø 315			2	6.5	3	9	6	13	9	16	11	19	17	22	22	26	27	28	32		
Ø 400					1	7	2	9	3	11	5	12	6	15	8	17	10	18	12	22	
Ø 500							1	6	1	7	2	8	2	10	3	11	3	13	4	14	

The table shows the pressure losses in Pa per 1 m of air ducts of different diameters at different speeds and volumes of air.

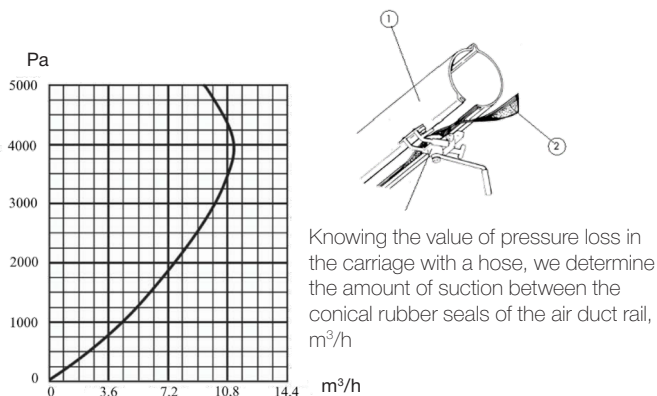
### Pressure loss in the hose carriage



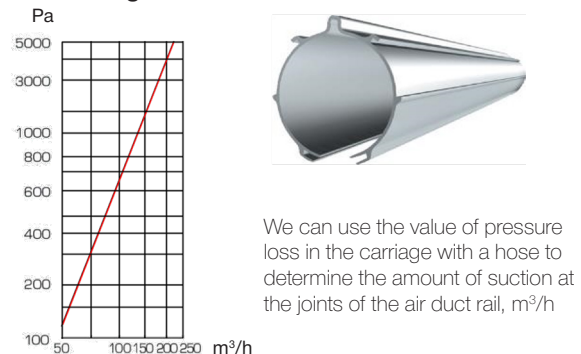
### Determination of suction in the carriage

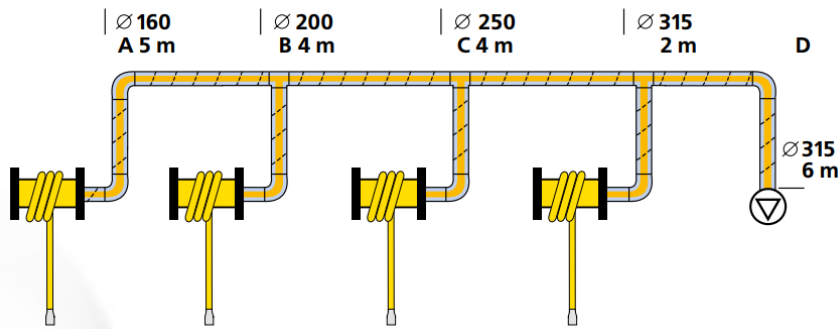


### Determination of suction along the length of the rail-air duct



### Identifying suction at the rail-airway junction and returning rail





lengths of the duct sections between them, and then determine the airflow through each section of the system, taking into account that the airflow through each gas intake nozzle of the exhaust device is 840 m<sup>3</sup>/h, and calculate the pressure losses and duct diameters for each of the straight sections (A), (B), (C) and (D).

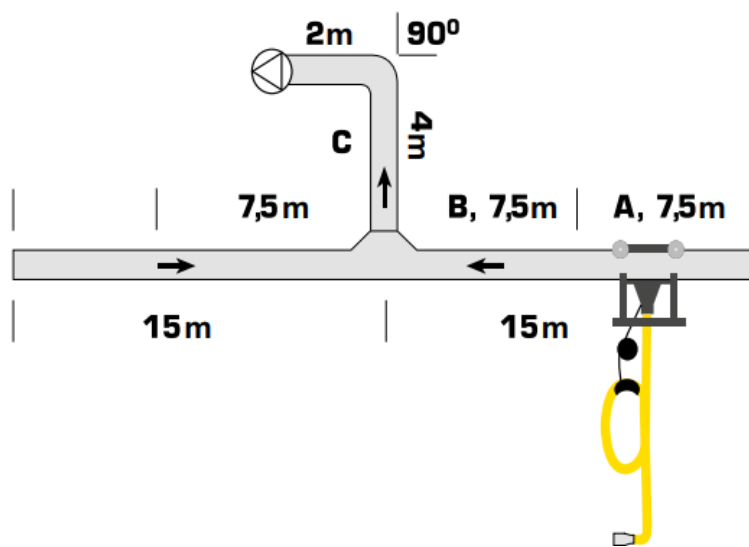
Determine the pressure losses for sections (A), (B), (C), and (D): - Section A We use the friction pressure loss schedule in circular air ducts to determine the diameter of the air duct and the pressure loss in it provided that you need to ensure the speed of the polluted air within 10-15 m/s with a flow rate of 840 m<sup>3</sup>/h. A: 840 m<sup>3</sup>/h, duct diameter 160 mm, speed 11 m/s, pressure loss 8 Pa x 5=40 Pa - Section B We will repeat the same calculations while keeping in mind that the airflow through this section will be 1,680 m<sup>3</sup>/h. B: 1,680 m<sup>3</sup>/h, duct diameter 200 mm, speed 13 m/s, pressure loss 7 Pa x 4=28 Pa - Section C We will repeat the same calculations while keeping in mind that the airflow through this section will be 2,520 m<sup>3</sup>/h. C: 2,520 m<sup>3</sup>/h, duct diameter 250 mm, speed 13 m/s, pressure loss 8 Pa x 4=32 Pa - Section D We will repeat the same calculations while keeping in mind that the airflow through this section will be 3,360 m<sup>3</sup>/h. D: 3,360 m<sup>3</sup>/h, duct diameter 315mm, speed 12m/s, pressure loss 4 Pa x (2+6)=32 Pa 2. When the calculation of pressure losses in rectilinear sections is completed, you need to determine the pressure losses in local resistances (bends, transitions, tees, etc.). Here we have 6 branches at 90°C, 3 junctions, and 3 tees, with a total pressure loss of 568 Pa.

Now we add up the friction pressure loss, losses in local resistances, and losses in the exhaust device farthest from the fan where the pressure loss at an airflow rate of 840 m<sup>3</sup>/h is 900 Pa. The required value is 132 Pa+568 Pa+900 Pa=1,600 Pa. Now we have calculated the system by ensuring the same speeds along its entire length and determined that we need a fan that removes up to 3,500 m<sup>3</sup>/h of air with a network resistance of 1,600 Pa. Taking into account the possibility of universal installation and the characteristics required for the system operation, we will be satisfied with the fan VMK-4700/SP.

#### Calculation of the straight-rail exhaust system

The calculation will begin with a drawing of the system indicating the location of the air extractor, as well as the lengths of the sections of the rail-air duct and the connecting air duct.

Then we will determine the airflow through each section of the network while keeping in mind that it is necessary to remove 360 m<sup>3</sup>/h from the exhaust pipe of a vehicle with an engine power of up to 150 hp and calculate the pressure loss for each of the sections (A), (B) and (C), determine the pressure loss in the carriage with the selected extraction hose (Ø100 mm, length 5 m) and the amount of air intake in the system. 1. We will use the diagram of pressure loss in the carriage with extraction hose (diagram 3) to determine this value while keeping in mind that the diameter of the extraction hose is 100 mm and that we need to ensure an airflow rate of 360 m<sup>3</sup>/h. This value is 641 Pa. Now let's determine the amount of air intake between the carriage nozzle and the conical rubber seals of the rail-air duct using this diagram (Diagram 4). This value is 137 m<sup>3</sup>/h 3. Now let's determine the amount of air suction between the carriage nozzle and conical rubber seals of the rail-air duct using this diagram (diagram 4). This value is 137 m<sup>3</sup>/h 3. Now let's determine



the amount of air intake between the conical rubber seals of the rail using this diagram (Diagram 5). This value is 2.9 m<sup>3</sup>/h, x 15 m=43.5 m<sup>3</sup>/h.

4. Let's determine the pressure loss in these areas: - Section A: we can use the friction pressure loss diagram in round steel air ducts (Diagram 1) to determine the pressure loss in it at an airflow rate of 360 m<sup>3</sup>/h + 137 m<sup>3</sup>/h=497 m<sup>3</sup>/h A: the air flow rate is 497 m<sup>3</sup>/h, the inner diameter of the rail-air duct is 160mm, the pressure loss is 3 Pa x 7.5 m=22.5 Pa - Section B: we repeat the same calculations while keeping in mind that the airflow through this area will be 497 m<sup>3</sup>/h + 43.5 m<sup>3</sup>/h=540.5 m<sup>3</sup>/h B: the air flow rate is 540.5 m<sup>3</sup>/h, the pressure loss is 3.8 Pa x 7.5 m=28.5 Pa - Section C: we repeat the same calculations while keeping in mind that the airflow through this area will be 540.5 m<sup>3</sup>/h + 43.5 m<sup>3</sup>/h=584 m<sup>3</sup>/h, and the air duct diameter is 200 mm C: the air flow rate is 584 m<sup>3</sup>/h, the pressure loss is 1.5 x (4+2) m=9 Pa 5. When the calculation of the last section is completed, we will need to determine the pressure losses in the bends and half-bends which have the same diameter as the straight air ducts in these sections. In our case, this is a 90° elbow with a diameter of 200 mm. The pressure loss in it can be determined from the friction pressure loss schedule in round bends, which is equal to 6Pa at an airflow rate of 584 m<sup>3</sup>/h. 6. Now let's add all the calculated values of the pressure loss 641 Pa+22.5 Pa+28.5 Pa+9 Pa+6 Pa=707.4 Pa. The required value is 707.4 Pa. Now we have calculated the system and determined that we need a fan that removes up to 620 m<sup>3</sup>/h of air, with a network resistance of 707.4 Pa. Taking into account the possibility of universal installation and the characteristics required for the system operation, we will be satisfied with the fan VMK-2100/SP.

# DATA ACQUISITION QUESTIONNAIRE

## TO SELECT VEHICLE EXHAUST EXTRACTION SYSTEMS

### 1. Technical parameters of the premises.

Designation of the building or premises:	<input type="checkbox"/> Covered parking lot for vehicles
	<input type="checkbox"/> vehicle/repair workshop
	<input type="checkbox"/> Vehicle washing and cleaning station
	<input type="checkbox"/> A maintenance flow line with vehicle handling
	<input type="checkbox"/> Diagnostic station (instrumental control station)
	<input type="checkbox"/> Other:
The exhaust gas removal system is necessary for:	<input type="checkbox"/> Stationary workplaces (parking places) <input type="checkbox"/> When the vehicle is moving (accompanying the vehicle while it is moving)

### 2. Technical parameters of vehicles.

Vehicle type:	<input type="checkbox"/> Passenger car	<input type="checkbox"/> Truck
	<input type="checkbox"/> Motorcycles and power equipment (motorcycles, quad bikes, snowmobiles)	<input type="checkbox"/> Special equipment
	<input type="checkbox"/> Bus	<input type="checkbox"/> Another vehicle type
Vehicle dimensions:	length*width*height	
Number of exhaust pipes	<input type="checkbox"/> one <input type="checkbox"/> two <input type="checkbox"/> more than two	
Location of the exhaust pipe on the vehicle	<input type="checkbox"/> behind <input type="checkbox"/> on the side <input type="checkbox"/> upwards <input type="checkbox"/> under the bottom <input type="checkbox"/> hidden in the bumper (behind the facing)	
Outer diameter (size, configuration) of the exhaust pipe, mm:		
The height of the pipe from the floor level, mm:		
Vehicle engine type:	<input type="checkbox"/> diesel <input type="checkbox"/> gasoline <input type="checkbox"/> turbocharging	
Engine power (horsepower or kW):		
Engine cylinder capacity, l;		
Specify the technological operations associated with the engine operation at high speeds (increase in the amount of exhaust gases and their temperature) Maximum number of revolutions, rpm	<input type="checkbox"/> diagnostics <input type="checkbox"/> washing of the engine and nozzles <input type="checkbox"/> particulate filter burning <input type="checkbox"/> braking stand <input type="checkbox"/> control testing <input type="checkbox"/> other	
Exhaust gas temperature, °C:		

**Please attach a floor plan to the questionnaire on which you will mark:**

- The dimensions of the premises, including the height of the ceilings (structural trusses).
- Gates, doors and windows openings.
- Arrangement of the vehicles (in accordance with the technical parameters of clause 2) and binding to building structures (walls, columns).
- Mark the vehicles whose engines can run at the same time.
- Indicate the locations of the technological equipment: lifts, brake stands, etc.
- Indicate the possible installation locations of the ventilation equipment.

**Attach photos if possible.**

# DATA ACQUISITION QUESTIONNAIRE

## FOR THE SELECTION OF EXHAUST EXTRACTION SYSTEMS IN FIRE SERVICES AND EMERGENCY RESCUE SERVICES OF AIRPORTS

### 1. Technical parameters of vehicles.

Vehicle type:	<input type="checkbox"/> Fuel trucks		<input type="checkbox"/> Ladder trucks		
	<input type="checkbox"/> Motor pumps		<input type="checkbox"/> Fast response vehicles		
	<input type="checkbox"/> Special		<input type="checkbox"/> Airfield vehicles		
	<input type="checkbox"/> Other:				
Vehicle dimensions:	length*width*height				
Number of exhaust pipes	<input type="checkbox"/> One		<input type="checkbox"/> Two		<input type="checkbox"/> More than two
Location of the exhaust pipe on the vehicle:	<input type="checkbox"/> On the right	<input type="checkbox"/> On the left	<input type="checkbox"/> Behind	<input type="checkbox"/> Upwards	
	<input type="checkbox"/> Under the bottom				
Outer diameter (size, configuration) of the exhaust pipe, mm:					
The height of the pipe from the floor level, mm:					
Vehicle engine type:	<input type="checkbox"/> Diesel		<input type="checkbox"/> Gasoline		<input type="checkbox"/> Turbocharging
Engine power (horsepower or kW):					
Engine cylinder capacity, l:					
Maximum engine speed, rpm:					
Exhaust gas temperature, °C:					

### 2. Technical parameters of the premises.

What type of fire brigade units is it?	<input type="checkbox"/> State fire-fighting service		<input type="checkbox"/> Voluntary fire-fighting service						
	<input type="checkbox"/> Municipal fire-fighting service		<input type="checkbox"/> Private fire-fighting service						
	<input type="checkbox"/> Institutionalized fire-fighting service								
Designation of the building or premises:	<input type="checkbox"/> Fire stations for urban settlements protection								
	<input type="checkbox"/> Search and rescue flight operations								
	<input type="checkbox"/> Fire stations for protection of organizations								
	<input type="checkbox"/> Fire stations for rural settlements protection								
	<input type="checkbox"/> Other:								
Number of vehicles in the depot, pcs:	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 6	<input type="checkbox"/> 8	<input type="checkbox"/> 10	<input type="checkbox"/> 12	<input type="checkbox"/> Other:
Vehicle placement at a fire station:	<input type="checkbox"/> In a row (each vehicle has its box)								
	<input type="checkbox"/> In a column (vehicles are parked one after another in a box)								
Distance from the entrance gate to the exhaust pipe of the car, m:									

**Please attach a room plan to the questionnaire where you should mark:**

- The dimensions of the premises, including the height of the ceilings (structural trusses).
- Gates, doors and windows openings.
- Arrangement of the vehicles (in accordance with the technical parameters of the vehicle) with binding to building structures.
- Mark the vehicles whose engines can run at the same time.
- Mark the combat and reserve visits (washing post, maintenance and repair) on the plan.

**Attach photos if possible.**

Fill out the questionnaire on the website



Download the questionnaire







# Contacts:




[sovplym.com/contacts](https://sovplym.com/contacts)

