

WORKBOOK

Oil mist &
Oil smoke

 **SovPlym**



With more than 25 years in the business, we know what the customers want: Reliable quality products, quick decisions, on time delivery and local support. And that's just what we offer.

SovPlym

SovPlym is a leading manufacturer and supplier of equipment for air filtration, industrial ventilation and exhaust gas removal. Based on Swedish technology manufactured in Russia.

We offer top notch solutions for air pollution control inside production facilities, bringing care of employees' health and improved work efficiency combined with environmental intelligence.

SovPlym is an international company with headquarters in St. Petersburg, Russia. Founded in 1989, SovPlym today is commercially active in several countries. Russia is the main market, with about 60% market share.

Services

We offer a full range of services for the design, construction, equipment supply, installation, engineering setup, warranty and after sale service. We also offer turnkey solutions.

Our best argument:

Happy Healthy Customers!

We bring top performance, low operating costs and a quick return on your investment!

We give you 6 clean reasons to work with us:

1. World class products.

Our filters are specifically designed for handling oil mist and oil smoke. They offer high performance, low operating costs and flexible and easy installation.

They filter up to 99,97% of all oil particles, with a proven track record of thousands of working hours. We have a long experience with installations design and of supplying our filters to industries across the world.

2. Saving in energy.

By running your process under full control, you optimize your energy cost, by only using the ventilation capacity required at any given moment.

3. Saving in machinery, premises and maintenance.

Oil mist brings heavy contamination of the equipment and building construction.

Our filters brings safety, reliable uptime and production efficiency as well as a minimal maintenance cost.

4. Saving in money.

Considering our oil filters reliable performance and long service life in 24/7 operations and that the coolant can be retrieved and reused, our filters pay off quickly. And this gets better and better year after year

5. Saving in health.

One of the most important aspects of our health and the working environment is the quality of the air that we breathe there. Several researches shows that we gain up to 20% workforce productivity with a healthy work zone. It also reduces sick-leave and other environmental absences and minimize injuries due to slippery floors.

6. Government regulations.

Regulations towards better working environment and workforce health are serious legal liabilities.



MM Oil mist Mechanical Filter



MM
Oil mist

Description

MistMagician (MM) is designed for stationary installation, direct on a machine tool with no need for ducting or additional use of floor space. The filter will effectively collect coolant smoke or mist from the machine process, and if wanted, return the recovered coolant back to the machine. The filter unit is provided with a range of options for a quick and easy installation.

Features & advantages

- Efficient filtration of oil mist and light smoke
- Return the recovered coolant back to the machine
- Indicator showing clogging level
- Easy replacement of filter cartridge
- Compact, lightweight design
- Quick and easy installation at low cost
- Low energy consumption
- Low operation cost
- Fan installed direct onto filter

Limitations:

Not recommended for very smoke intensive processes.

Technical information

Parameter	Value
Filter	
Productivity	500 m³/h
Filtering surface area	10 m²
Pressure drop for cartridge replacement	1000 Pa
Pressure drop for system calculations	1000 Pa
Class of filtration	MERV15 ASHRAE 52.2
Inlet diameter	160 mm
Outlet diameter	160 mm
Weight	14 kg (w/out fan)

Fans, recommended for installation on the filter

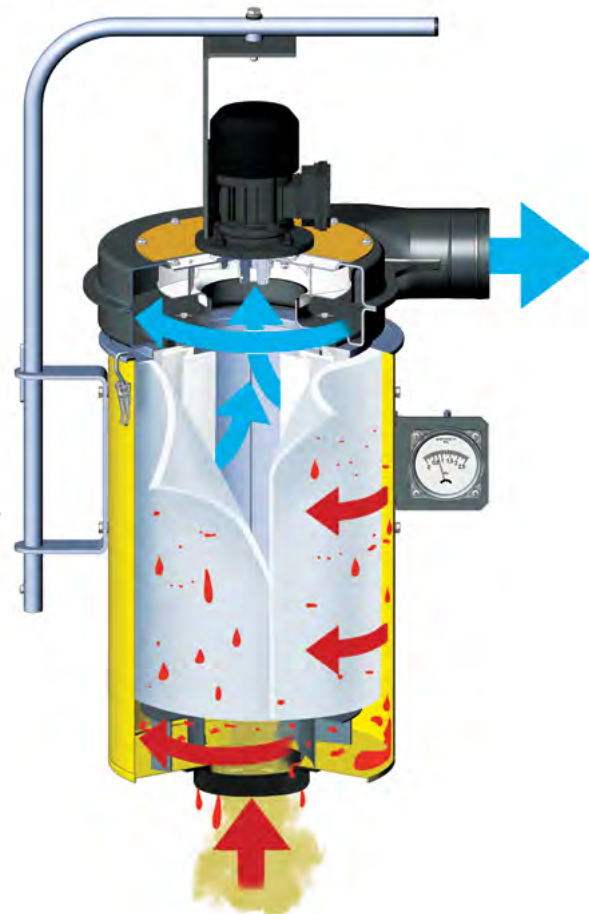
Model	Art. №	Type of mounting	Delivered with
	5780	VMA-1100 (preferred)	Radial fan; 150 – 800 m ³ /h; 1100 – 400 Pa, 0.37 kW, 380 V, 3-ph, 50 Hz
	5044	VMA-1800	Radial fan; 300-1300 m ³ /h; 1500 – 700 Pa, 0.55 kW, 380 V, 3-ph, 50 Hz
	5049	VMA-2100	Radial fan; 400-1500 m ³ /h; 1550 - 650 Pa, 0,75 kW, 380 V, 3-ph, 50 Hz
	6794	MM-F-Set	Parts for installation of the fan on the filter

3-stage cleaning principle:







Step 3.
The smallest particles (less than 1 micron) of the emulsion are stopped and separated by the fine filter. Clean air leaves the filter.

Step 2.
Remaining particles are mainly captured in the pre-filter.

Step 1.
The oil mist is forced to twist, and heavy particles (up to 1 micron) are removed in a self-cleaning centrifuge.

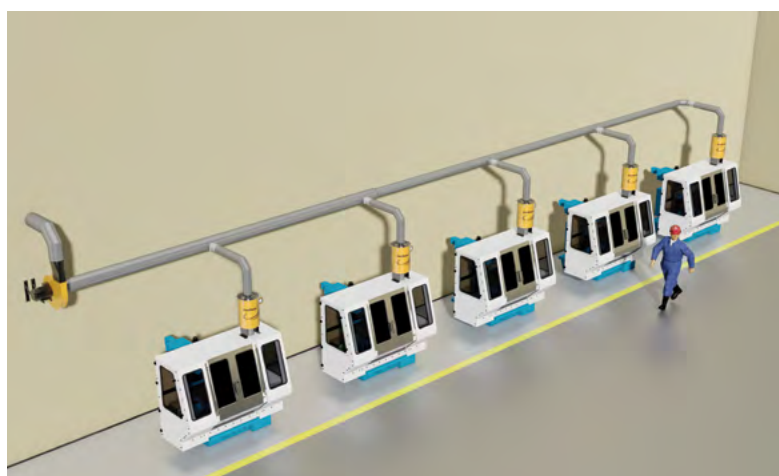
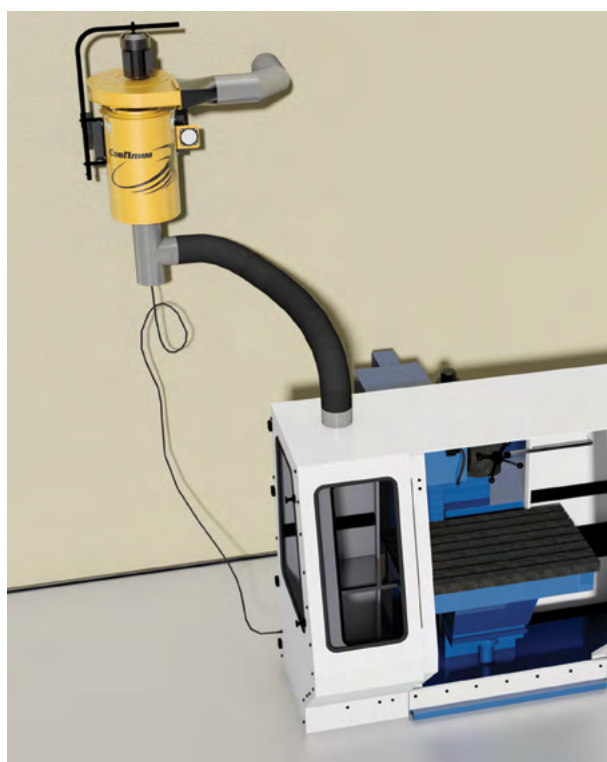


Accessories and replace filter media

	6793	MM-HOLD/W	Wall mounting bracket
	6792	MM-HOLD	Support brackets
	6795	MM-INL	Inlet Inlet for connection of MM filter with machine chamber or extraction arm (in case of mounting next to machine tool). Sizes 2 x 160 mm.
	6791	MM-AD	Mounting adapter for installation of MM filter of sPA support column.
	6796	BAG-CART	Replaceable filter cartridge with bag pre-filter Filtering surface area - 10 m ² . Replaces at 1000Pa pressure drop.
	6797	MM-BAG	Bag pre-filter for replaceable filter cartridge CART.
	6059	sPA-110	Support column for mounting of extraction arm of MM filter, L=110 cm.
	6060	sPA-220	Support column for mounting of extraction arm of MM filter, L=220 cm.

Recommended installations

- Direct mounting on metal processing CNC machine tools with closed chamber
- Installation on a separate stand near closed, semi-closed or open type machines
- Installation on a wall next to the closed, semi-closed or open type machines



Esपो Oil smoke Electrostatic Precipitator



Description

Esपो are high performance filters for oil smoke capturing particles down to 0.005 microns. It works according to the principle of electrostatic precipitation. A unique solution for cleaning air containing extremely small oil particles. The heavy duty electrostatic cells have an extremely long life and require an absolute minimum of maintenance as they don't need any normal filter replacement. Esपो is designed for 1-2 work shifts.

Features & advantages

- Perfect for oil smoke
- Maximum initial concentration is 30 - 40 mg/m³
- Suitable for processes with oil smoke from strong heating oil
- Suitable for thick oil (high kinematic viscosity)
- Does not require replacement of filter elements
- Built-in alarm for filter clogging
- Comes with a special agent for washing the electrostatic cassettes

Applications:

Well suited for:

- Heat treatment
- Cold-drawing
- Forging operations and cold pressing

Limitations

- Not suitable for processes with metal grinding or any use of oils containing metal particles
- Requires emulsions with minimum 5% oil content
- Use with oils with a flash point below 150° C
- Operations including water steam

Technical information

Article №	Model	Recommended fan	Recommended airflow, m ³ /h, max	Recommended number of extraction units	Delivered with	Filter surface, m ²	Filter efficiency	Weight, kg
27082	ESPO-2000	VMA-3000	1000	1	sIMP-2000 – 1 pc sFFO-2000 – 1 pc sIOO-2000 – 1 pc sEC-2000 – 1 pc	9,6	92 %	80
27054	ESPO-3000	VMA-4700	1500	1-2	sIMP-3000 – 1 pc sFFO-3000 – 1 pc sIOO-3000 – 1 pc sEC-3000 – 1 pc	16,4	92 %	102
27083	ESPO-5000 (special order)	VMA-6000	3000	2-3	sIMP-3000 – 1 pc sFFO-3000 – 2 pc sIOO-3000 – 2 pc sEC-3000 – 2 pc	32,8	92 %	151

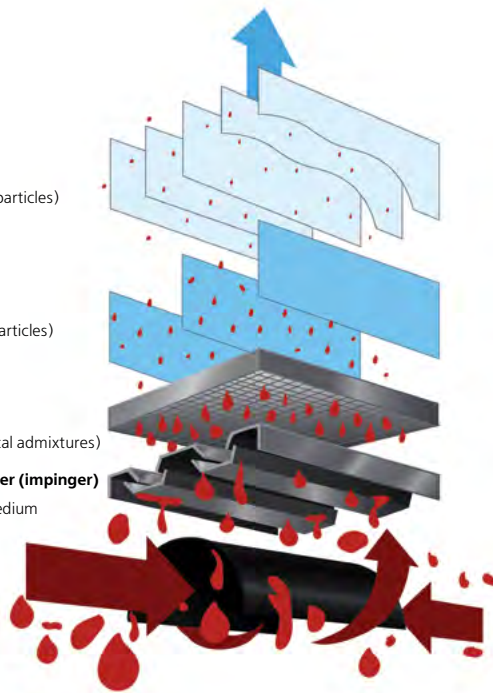
Design and operating principles

3+2 stage cleaning principle

The initial **3 stage mechanical** pre filtration captures 80% of all oil particles, optimizing the efficiency of the following **2 stage electrostatic** filtration.

This also minimizes the need of cleaning the electrostatic cells and eliminates the need for replacement.

1. **Liquid fraction separator**
(stops large drops of oil)
2. **Labyrinth type filter (impinger)**
(stops large and medium parts of aerosol)
3. **Net pre-filter**
(captures mechanical admixtures)
4. **Ionization cell**
(charges smallest particles)
5. **Precipitating cell**
(captures smallest particles)

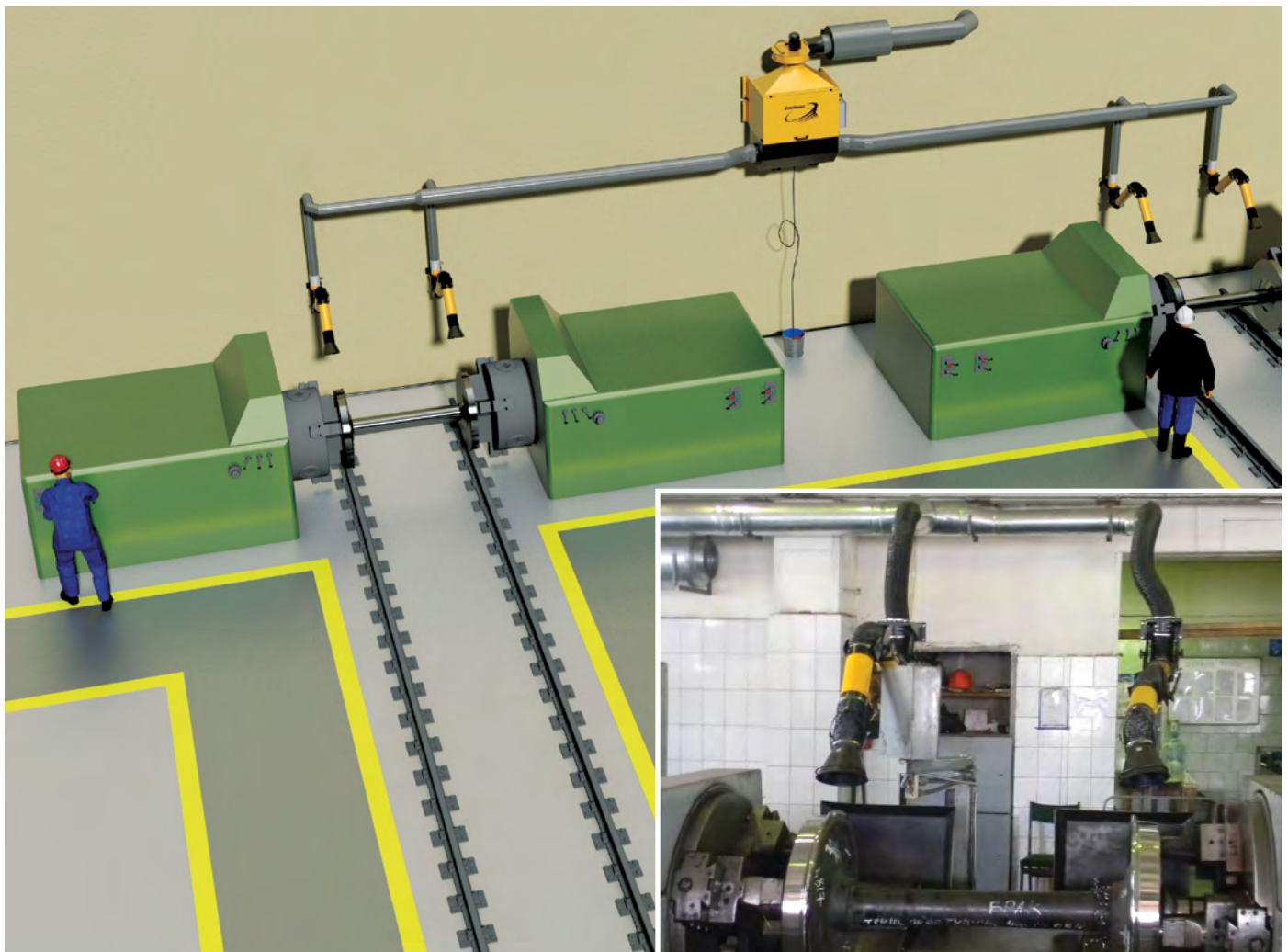


Mechanical filtration, stage 1-3

80% of the oil particles (i.e. all in liquid form), are arrested in the mechanical filters.

Electrostatic filtration, stage 4-5

In stage 4, the electrostatic filter's ionizing cell, all remaining particles are charged with 12 000 V, hereafter, stage 5, they efficiently are attracted to the negatively charged collector plates of the collection cell



MT-31/MT-32 Oil mist/smoke Mechanical Filters



Description

The MistTerminator (MT) is a modular filtration system that captures oil smoke/mist. For handling oil mist, you shall choose the MT-31. If you need to handle both oils mist and oil smoke you require MT-32 that contains an additional HEPA filter. All MT filter units and filter banks are modular and can be tailored to your needs (See page 12-13).

Features & advantages

- Intended for 1 - 2 work shift, easy mode (processing parts at low and medium speed)
- Suitable for processes involving contamination of coolant in the form of a thick sludge of metallic particles and burnt oil
- Handles combined wet and dry metal processing
- Use oils with a flash point below 150 °C (300°F)
- Maximum initial oil concentration is 30 - 40 mg / m³
- Main filters has indicator showing clogging level
- Prepares for mounting the fan direct on the filter
- New mechanism for quick filter replacement during scheduled maintenance
- Two input sockets for easy alternative duct installation

Applications:

Well suited for:

- Cutting, boring, drilling, honing using various metalworking equipment and CNC machine tools
- Cold pressing and stamping operations
- Hardening and wet grinding of metal

Limitations

Do not use the MT-31/MT-32 and MT-41/MT-42 for the following applications or in the following circumstances:

- aluminium laser cutting
- arc-air gouging
- paint mist
- extraction of hot gases (more than 45°C/113°F continuously)

Technical information see page 10

Delivery set

of all single filter units MT-31, MT-32, MT-41 and MT-42 includes:

- Filter body, preassembled with all filter elements and pre-filters
- Ø250mm inlet nipple (in the inlet module)
- Ø250mm cover (in the inlet module)
- Ø250mm outlet for direct installation of the fan (on top cover of the filter)

To be ordered separately:

- Extraction fan
- Pressure adapter for the fan connection to round section duct line
- Silencer
- Fan starter
- Connection flange (see p.9)
- Outlet nipple for connection to the extraction fan

Design and operating principles

5 stage (MT-32)

Stage 5 (MT-32)
HEPA-filter (MT-32)
 (ultra fine cleaning, class of filtration MERVIG ASHRAE 52.2)

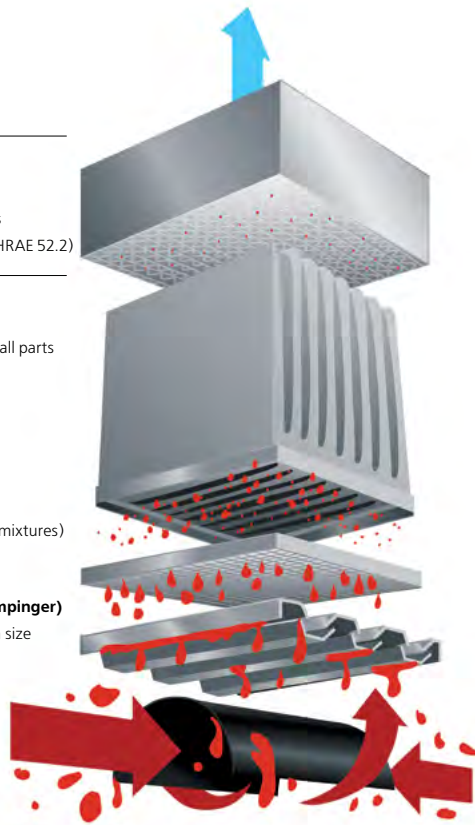
4 stage (MT-31)

Stage 4 (MT-31)
Bag filter
 (main filter, captures small parts of oil; class of filtration F9 DIN EN 779; 11,2 m², fiberglass)

Stage 3
Net pre-filter
 (captures mechanical admixtures)

Stage 2
Labyrinth type filter (impinger)
 (stops large and medium size aerosol particles)

Stage 1
Inlet with a screen for liquid fraction and drops



Return drain pipe.
 The oil is drained back either to a collector tank or back to the machine.

Various connections

MT-31, MT-32 and MT-41, MT-42

Connection of fans to single filter units

The fan is installed on top of the filter and attached to adapter, included in the delivery set.



Connection of single filter units to external fan

The filter is connected to Ø250mm duct line with the connection flange (ordered separately).



Connection of the ducting to the intake module of single filter units

The inlet nipple is placed on the right side of the inlet module.

Alternatively the ducting might be connected from the left side of the filter.

All single filter units come with a 250 mm inlet.



MT-41/MT-42 Oil mist/smoke Mechanical Filters



Description

The MistTerminator (MT) is a modular filtration system that captures oil smoke/mist. For handling oil mist, you shall choose the MT-41. If you need to handle both oils mist and oil smoke you require MT-42 that contains an additional HEPA filter. All MT filter units and filter banks are modular and can be tailored to your needs (See page 12-13).

Features & advantages

- Selfcleaning
- Intended for 2-3 work shifts, heavy mode (processing parts at high speed)
- Suitable for processes using low viscosity oils, which are kept clean and reusable
- Suitable for synthetic oils
- Use with water-oil emulsions
- Oil might be continuously recycled and reused!
- Main filters has indicator showing clogging level
- Prepares for mounting the fan direct on the filter

Applications:

- Cutting, boring, drilling, honing using various metalworking equipment and CNC machine tools
- Cold pressing and stamping operations
- Hardening and wet grinding of metal

Technical information

	MT-31 art. 5290	MT-32 art. 5293	MT-41 art. 5296	MT-42 art. 5299
Airflow, m ³ /hour, max	3,000	3,000	2,000	2,000
Pressure loss (for calculation purposes), Pa	700	1,200	1,300	1,500
Weight, kg	98	134	104	138
Filtration class: DIN EN 779(F9)/ DIN EN 1822 (H13); ASHRAE 52.2(MERV15/MERV16)	F9/MERV15	H13/MERV16	F9/MERV15	H13/MERV16
Negative pressure (max.), Pa	4,000			
Oil receiver capacity (makes part of the delivery package), l	8			
Suction tube diameter (in the input module), mm	2x250 (1 tube and 1 plug in the package)			
Diameter of connecting flange sFF-DUCT/250 airduct (to be ordered additionally), mm	250			
sFF-FAN-B connecting flange (for VMA-3000-4700 fans)	250			
Maximum pressure drop on the filtering element, at which there is performed its replacement (control over the pressuredrop is realized by readings of the differential manometer in built into the door of every filtration stage), Pa				
sFIL BAG BF MT-31 hose filter (for MT-31, MT-32)	500			
sOS-1 self-draining cassette (for MT-41, MT-42)	500			
sOS-2 self-draining cassette (for MT-41, MT-42)	800			
sHEPA-FIL sHEPA- sHFME filter (for MT-32, MT-42)	800			
Capacity and amount of OilContainer oil receivers (makes part of the delivery package)	8 l /1 piece			

Delivery set see page 8

Design and operating principles

5 stage (MT-42)

Stage 5 (MT-32)
HEPA-filter (MT-32)
 (ultra fine cleaning, class of filtration H13 DIN EN 1822)

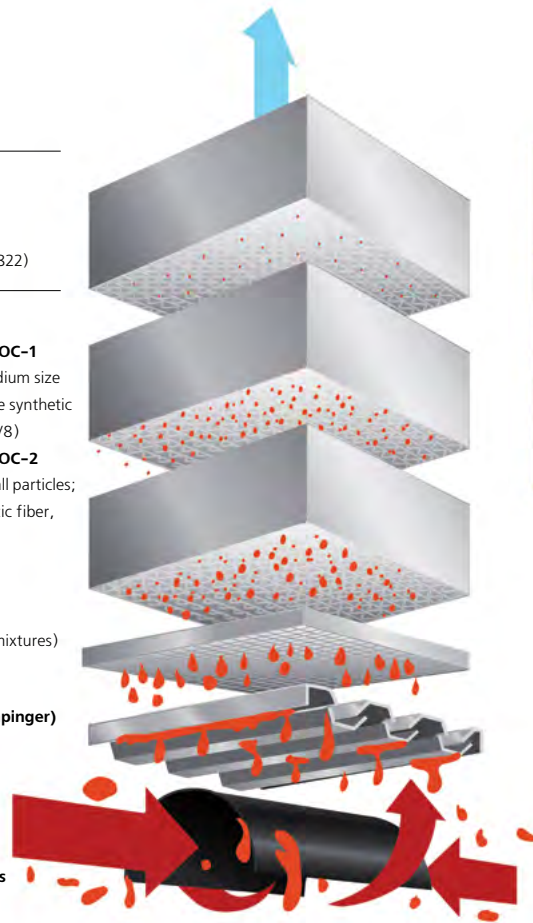
4 stage (MT-41)

Stage 4 (MT-31)
Self-draining cartridge OC-1
 (main filter, captures medium size particles; 16m², polyolefine synthetic fiber, ASHRAE 52.2 MERV8)
Self-draining cartridge OC-2
 (main filter, captures small particles; 24m², polyolefine synthetic fiber, ASHRAE 52.2 MERV15)

Stage 3
Net pre-filter
 (captures mechanical admixtures)

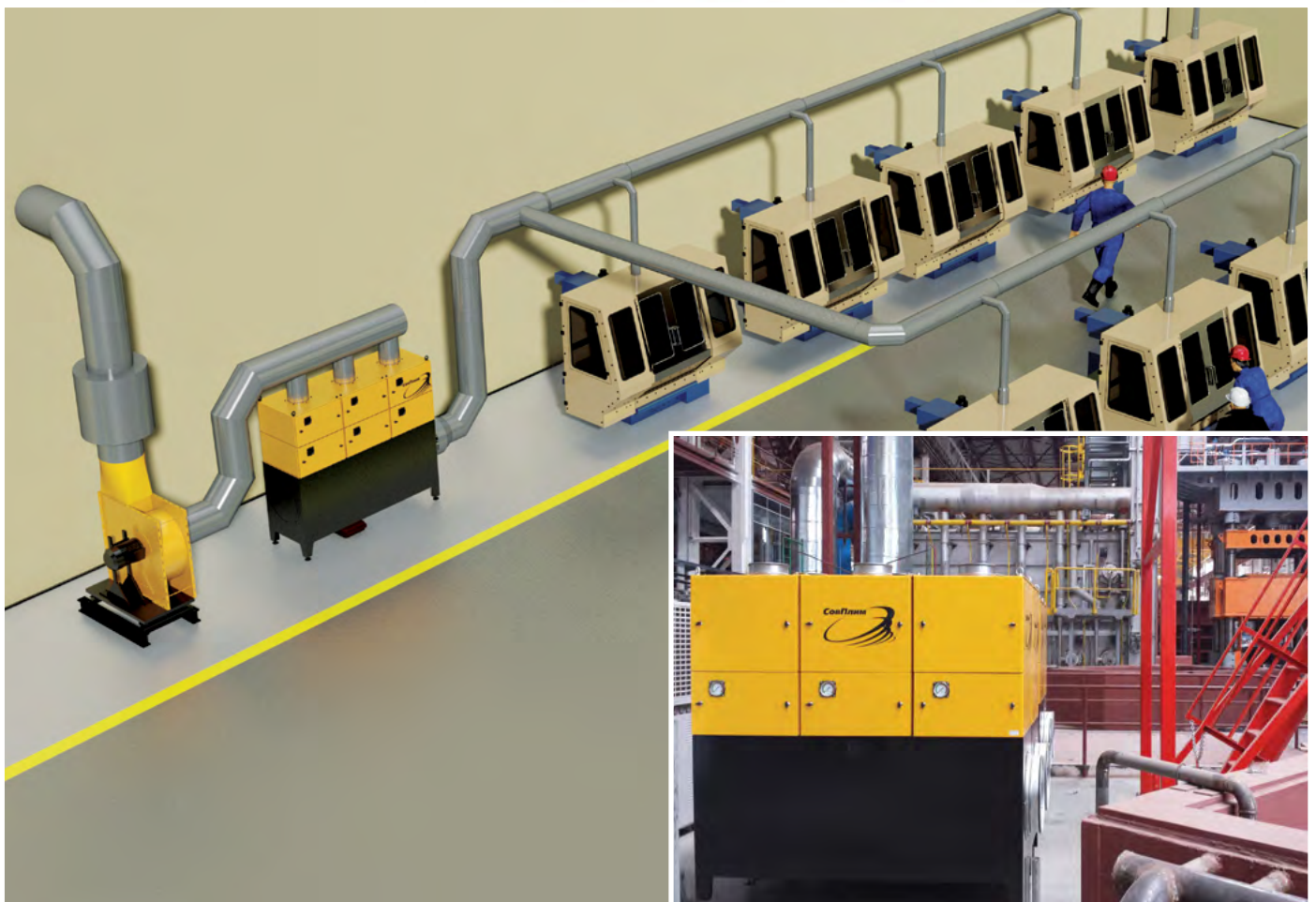
Stage 2
Labyrinth type filter (impinger)
 (stops large and medium size aerosol particles)

Stage 1
Inlet with a screen for liquid fraction and drops



Return drain pipe.

The oil is drained back either to a collector tank or back to the machine.

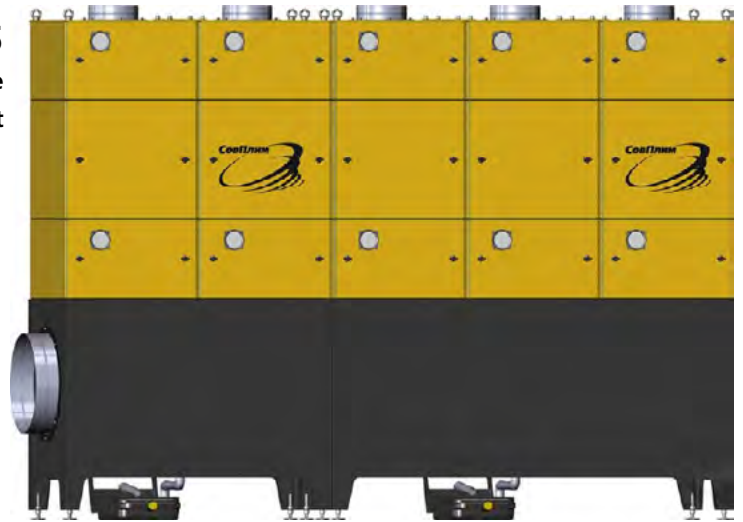


MT-3X/X Oil mist/smoke Modular Filters

MT-31/2 Oil mist



**MT-32/5
Oil smoke
Oil mist**



Features & advantages

The MT filter is a modular filter system which can be tailored to the requirements of your application today and expanded tomorrow when your business grows.

The efficient and effective performance of each module also allows compact solutions. The range of technical features and the latest filter technology results in

a filter system that is cost-effective to operate and maintain.

Each filter has indicator showing clogging level.

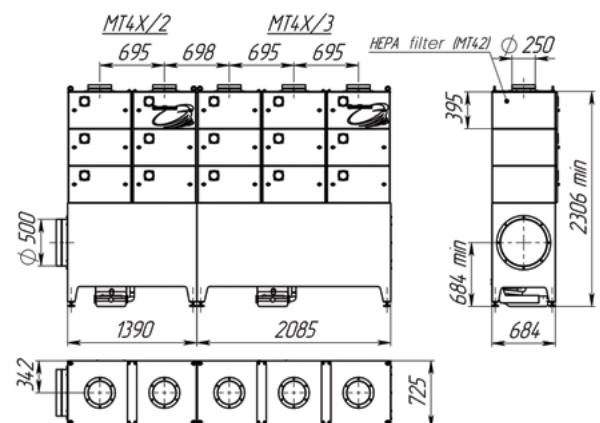
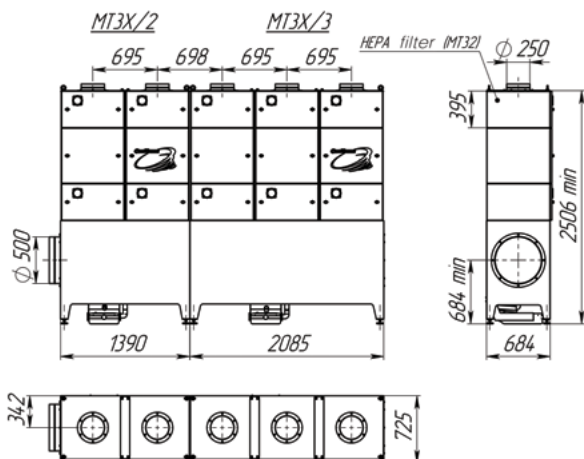
Connections

Connection of modular filters MT to the extraction fan

There are two types of outlets for connection of MT filters to the ventilation system:

- with side connection
- with top connection

	Article №	Outlet for connection to duct line: SIDE connection	
	6780	ME-OUTLET/2S	for MT-XX/2; Ø400 mm
	6781	ME-OUTLET/3S	for MT-XX/3; Ø400 mm
	6782	ME-OUTLET/4S	for MT-XX/4; Ø500 mm
6783	ME-OUTLET/5S	for MT-XX/5; Ø500 mm	
	Article №	Outlet for connection to duct line: TOP connection	
	6784	ME-OUTLET/2T	for MT-XX/2; Ø400 mm
	6785	ME-OUTLET/3T	for MT-XX/3; Ø400 mm
	6786	ME-OUTLET/4T	for MT-XX/4; Ø500 mm
	6787	ME-OUTLET/5T	for MT-XX/5; Ø500 mm

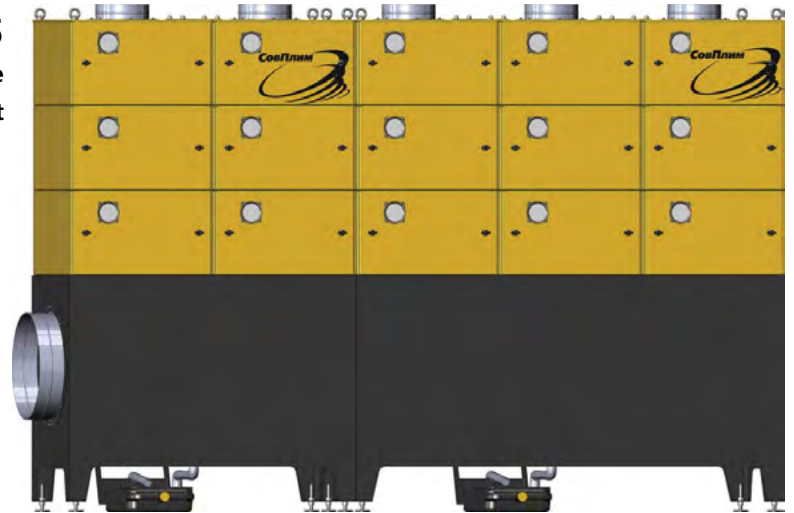


MT-4X/X Oil mist/smoke Modular Filters

MT-41/2 Oil mist



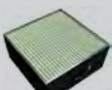



MT-42/5
Oil smoke
Oil mist



Accessories and replaceable filter media

The filter media should be replaced if the pressure drop exceed the value below.

	Article №	Type of filtering cartridge	Filter cartridge model	Pressure drop
	37254	Bag filter	BFMT-31	500 Pa
	98801	Self-draining cartridge	OC-1	500 Pa
	98802	Self-draining cartridge	OC-2	800 Pa
	98803	HEPA filter	HFMT-3	800 Pa

Capacity

MT-31/2, MT-32/2	6 000 m³/h
MT-31/3, MT-32/3	9 000 m³/h
MT-31/4, MT-32/4	12 000 m³/h
MT-31/5, MT-32/5	15 000 m³/h
MT-41/2, MT-42/2	4000 m³/ h
MT-41/3, MT-42/3	6000 m³/ h
MT-41/4, MT-42/4	8000 m³/ h
MT-41/5, MT-42/5	10,000 m³/ h



Recommendations on filter model choice

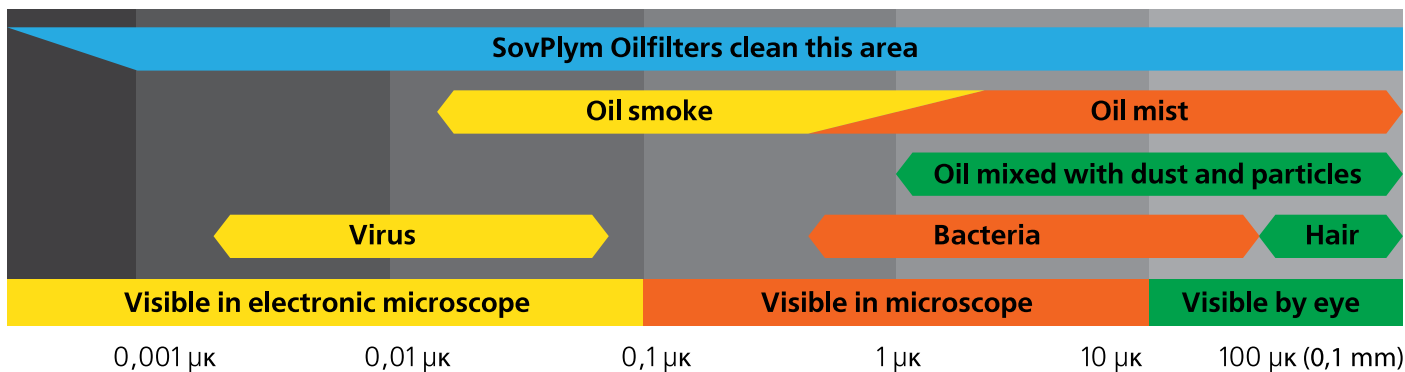
	Type of metal processing machine from the point of cutting (part rotation) speed			Other typical industrial processes			
	High speed	Medium speed	Low speed	Grinding	Forming and pressing	Electrical discharge machining	Rinsing
RPM	10000-22000	1000-10000	less than 1000	500-5000	No	No	No
Type of coolant	Clean oil with water basis	Clean oil with water basis	Water basis	Water basis	Mineral oil	Dielectric oil	Water with corrosion inhibitor
Reason of mist formation	Part's collision and heating	Part's collision and heating	Part's collision	Part's collision and heating	Part's heating	Part's heating	Collision and hot steam
Working regime	Heavy duty	Medium to heavy duty	Light duty	Medium duty	Medium to heavy duty	Light duty	Heavy duty
Special attention	Positioning of capturing device, air speed at extractor inlet and its temperature	Positioning of capturing device, air speed at extractor inlet and its temperature	Positioning of capturing device	Presence of metal particles		Presence of very fine fume particles	Steam
Recommended filter type	MT-42 MT-32	MT-41/ MT-42 MT-31/ MT-32	MT-41/ MT-42 MT-31/ MT-32	MT-31	MT-42	MT-42 MT-32	MT-41

Approximate contents of evaporation of various coolants

When choosing the filter model and determining the necessity of additional HEPA stage, it is possible to use experimental data:

Type of coolant	The distribution of pollutants in the contents of coolant evaporations	
	Smoke	Mist
Clean emulsion oil	70 %	30 %
Water-oil emulsion	10 %	90 %
Synthetic based oil	30 %	70 %
Vegetable oil	20 %	80 %

Oil smoke and Oil mist



Determination of filter productivity

% decrease in the airflow through the filter can be determined with the following table:

Load parameters	Low	Medium	High
Rotation speed of the part (from low to high)			
Coolant, containing mineral oil (from 0 % to clean oil)			
Duration of machine work per day from 0 to 24 hours			
Recommended airflow (% from maximum)			
Filter model	Low	Medium	High
MT-31, MT-32 (3000 m³/h)	100 % 3000 m ³ /h	from 60 to 100 % from 1800 to 3000 m ³ /h	up to 50 – 60 % up to 1500 - 1800 m ³ /h
MT-41, MT-42 (2000 m³/h)	100 % 2000 m ³ /h	from 60 to 100 % from 1200 to 2000 m ³ /h	up to 50 – 60 % up to 1000 - 1200 m ³ /h

Reasons of lowering of filter's productivity

Factors of heavy duty for oil mist filters

- 3-shift working regime (up to 24 hours/day)
- High speed of cutting (part rotation)
- Formation of water vapour
- Smoke allocation (for example, due to high speed or heating of parts)

All mentioned situations demand lowering of the airflow !!!

Determination of necessary airflow

- For closed chamber machines with often part change: 0,3 – 0,5 m/s – in the open door frame
Example: $L \text{ m}^3/\text{h} = 0,5 \times S \text{ (door)} \times 3600$
- For closed chamber machines with door closed during operation: 200 – 250 times chamber volume (subtracting the support and part volume) per hour
Example: $L \text{ m}^3/\text{h} = V \text{ (chamber)} \times 250$
- For open type machines – determined by the type and number of capturing devices:
 - LabArm-125** - 500-700 m³/h
 - BEA-M - 900** - 1200 m³/h

SovPlym Ltd.

Revolution Highway 102/2,
St. Petersburg, Russia

Export tel.: +7 (812) 416 40 16

Export e-mail: export@sovplym.com

www.sovplym.com

SovPlym India Pvt Ltd.

R K Plaza, Survey No. 206/3, Plot No. 17
Near Rosary School, Viman Nagar,
Pune-411014, India

Phone: +91 202 674 1021

Mobile: +91 982 3263247
+91 982 3361945

E-mail: sovplymindia@gmail.com
(sales@sovplymindia.com)

SovPlym Israel Ltd.

25 Trumpeldor st.,
Zichron Ya'akov 3091726, Israel

Mobil: +(972) 505968504

E-mail: sovplymisrael@gmail.com