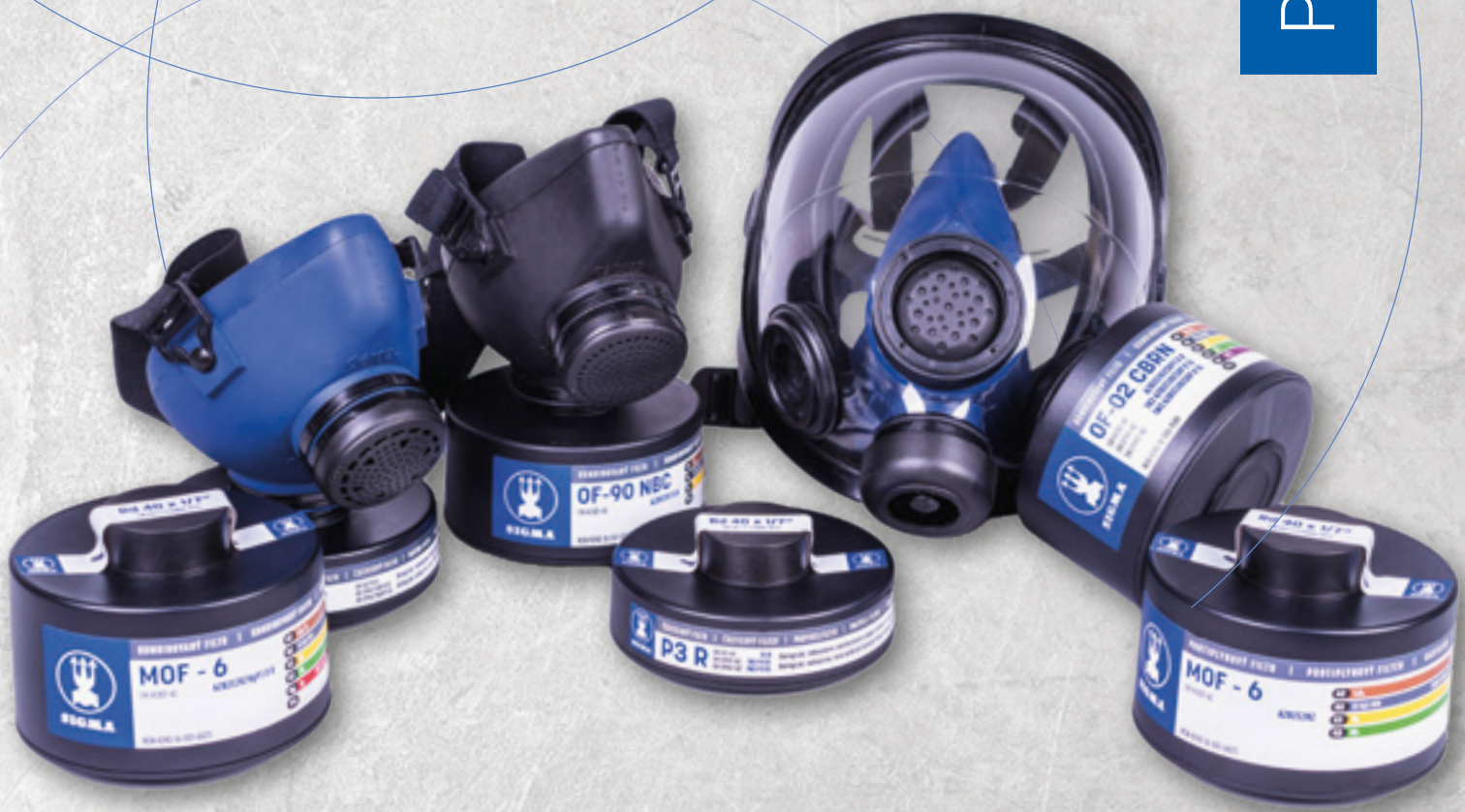
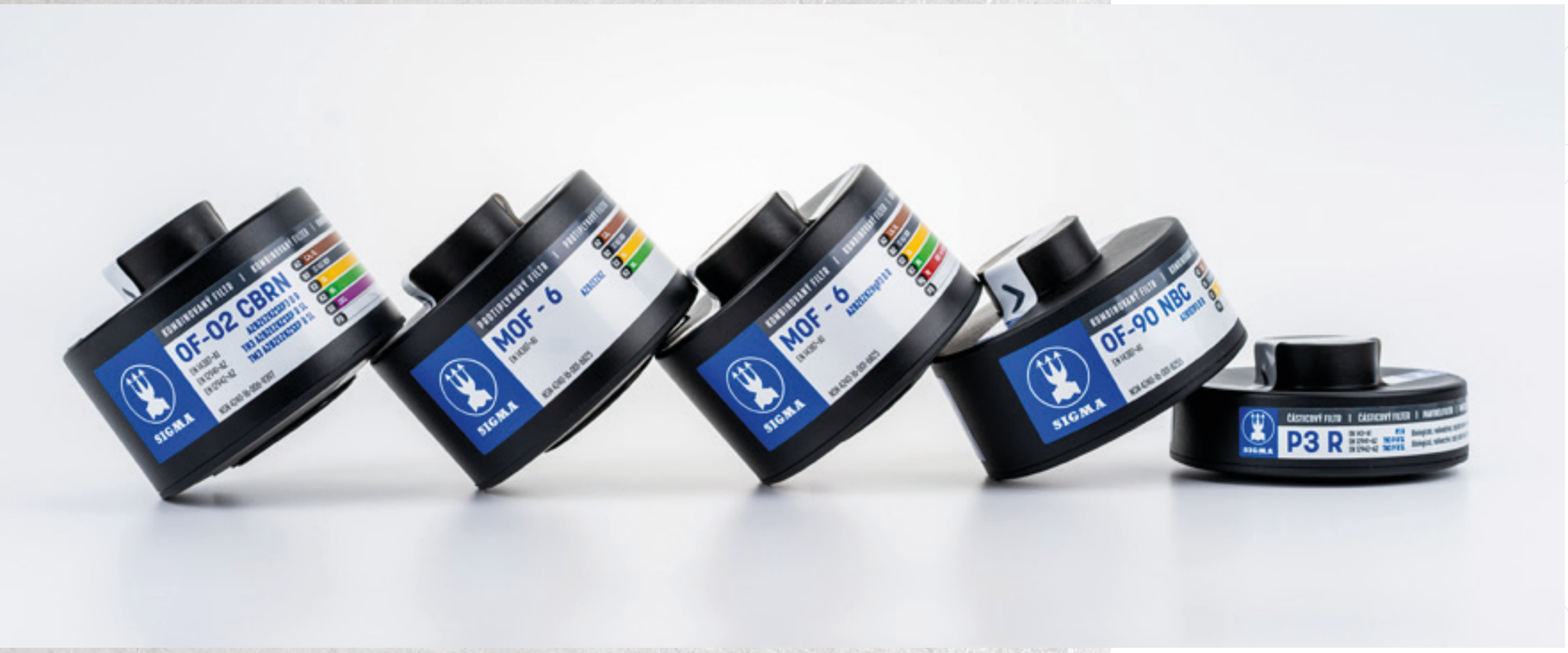
SIGMA

PROTECTIVE **FILTERS**



EN

WHY SHOULD YOU CHOOSE SIGMA PROTECTIVE FILTERS?



Protective filters of the SIGMA brand are currently at the forefront of respiratory protection, reliably preventing health hazards and protecting the lives of civilians and health professionals, workers in laboratories, chemical, food, metallurgical and power plants, and professionals in rescue and armed forces.

SIGMA products not only meet all the requirements of applicable European standards for the development, production, testing and use of protective filters, they also create a standard of quality, resistance and durability through the use of top quality materials, precision manufacturing and 100% production control.

SIGMA

... and life is important to us

WHY SHOULD YOU CHOOSE SIGMA PROTECTIVE FILTERS?

- Tradition of the development and production of protective filters since 1935
- First-class filter materials for capturing a wide range of harmful substances
- Know-how verified by use in extreme conditions such as dangerous diseases, industrial accidents or war conflicts
- Precision production based on a quality system pursuant to standards
- ISO 9001:2001, ISO 14001:2004, ISO 45001:2018 and AQAP 2110
- subject to regular inspections and annual audits
- Testing of resistance to the penetration of harmful substances in our own chemical laboratory
- Multilevel quality control by visual, physical
- and chemical methods on special test equipment
- 100% outgoing inspection, high durability and long service life

CERTIFIED ISO 14001:2015 COMPANY

CERTIFIED ISO 9001:2015 COMPANY

CERTIFIED ISO 45001:2018 COMPANY

P3 R

OF-90 NBC

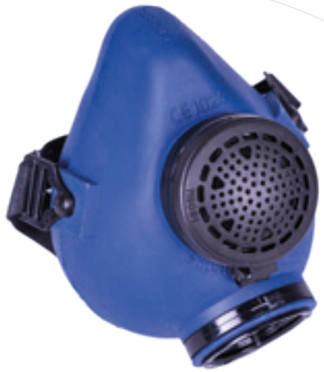
OF-02 CBRN

MOF-6 gas filter

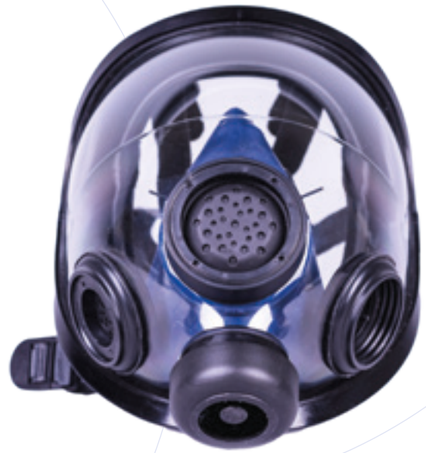
MOF-6 combined

	P3 R	OF-90 NBC	OF-02 CBRN	MOF-6 gas filter	MOF-6 combined
DUST BACTERIA VIRUSES	●	●	●		●
CYCLOHEXANE OZONE		●	●	●	●
SULFUR CHLORIDE HYDROGEN CYANIDE		●	●	●	●
SULFUR DIOXIDE		●	●	●	●
AMMONIA			●	●	●
MERCURY					●
PHOSGENE			●		

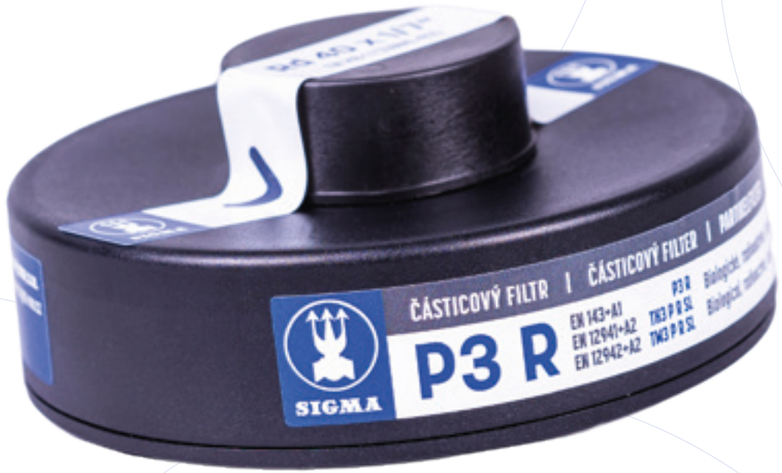
PRODUCT OVERVIEW



PM-1



HORIZONT



P3

PROTECTIVE FILTER
P3 R

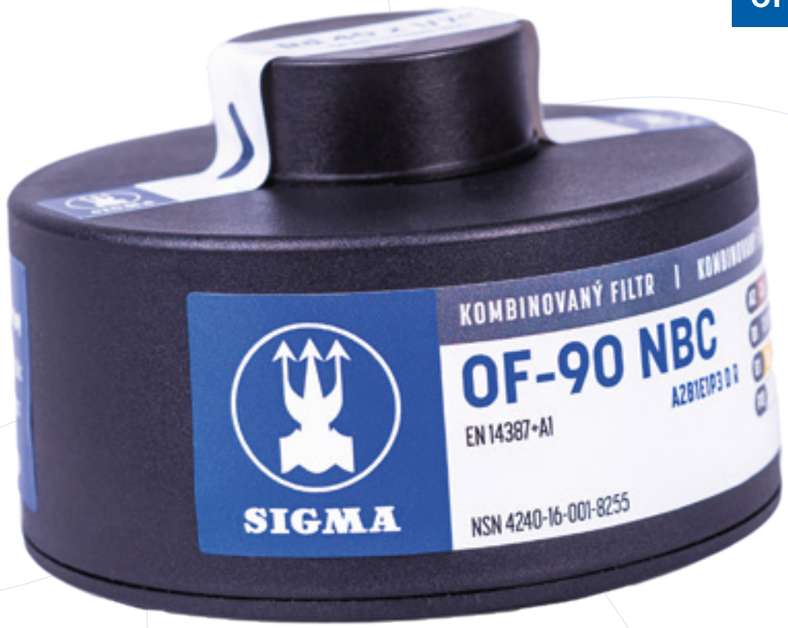
This is a particle filter with a hydrophobic layer for capturing biological, toxic and radioactive solid and liquid particles, dust, aerosols, microorganisms, bacteria and viruses. It is not designed to filter harmful gases. It can be connected to a filtration device with auxiliary ventilation.

TYPICAL USE

Chemical, food and pharmaceutical plants, production of electronics and packaging materials, foundries, paint shops, protection against viral and bacterial infections.

TECHNICAL INFORMATION	
Type	P3 R TH3 P R SL TM3 P R SL
Material	special plastic
Diameter and height	110 x 47 mm
Weight	115 g
Breathing resistance	max. 60 Pa – 30 l/min max. 190 Pa – 95 l/min
Filtration efficiency	99,995%
Threaded connection	Rd 40x1/7” OZ 40x4 mm

○ DUST, BACTERIA, VIRUSES ● CYCLOHEXANE ● SULFUR CHLORIDE, HYDROGEN CYANIDE ● SULFUR DIOXIDE ● AMMONIA ● MERCURY ● PHOSGENE



A2 B1 E1 P3

PROTECTIVE FILTER
OF-90 NBC

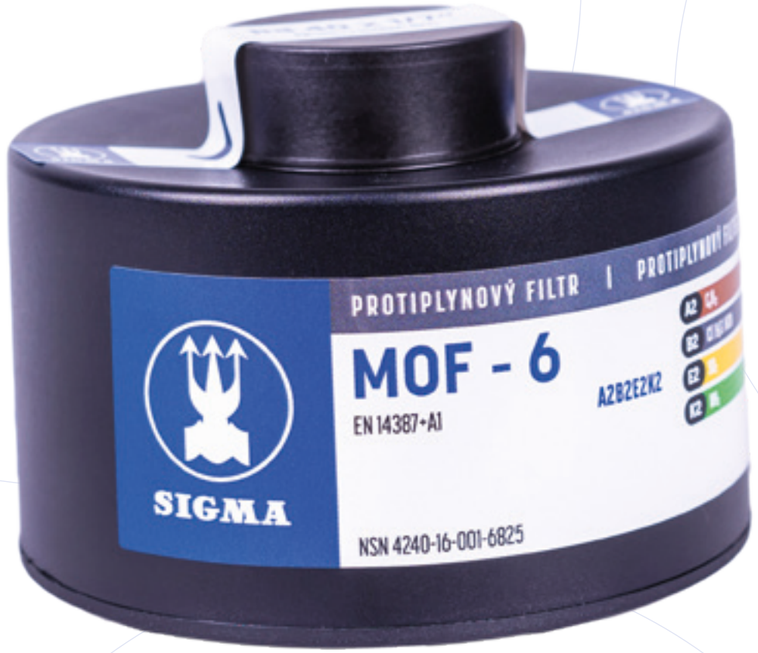
This is a civilian version of a military filter that meets the most stringent criteria for protection against chemical warfare agents. It is a light compact filter suitable for use with half-mask respirators.

TYPICAL USE

By the army, police, special rescue units and fire brigade units. Chemical, food and pharmaceutical plants, production of electronics and packaging materials, foundries, paint shops, laboratories, hospitals and endangered populations.

TECHNICAL INFORMATION	
Type	A2B1E1P3 D R
Material	Noryl™
Diameter and height	110 x 73 mm
Weight	287 g
Breathing resistance	max. 150 Pa – 30 l/min max. 490 Pa – 95 l/min
Filtration efficiency	99,992%
Threaded connection	Rd 40x1/7”

○ DUST, BACTERIA, VIRUSES ● CYCLOHEXANE ● SULFUR CHLORIDE, HYDROGEN CYANIDE ● SULFUR DIOXIDE ● AMMONIA ● MERCURY ● PHOSGENE



A2 B2 E2 K2

PROTECTIVE FILTER
MOF-6 gas filter

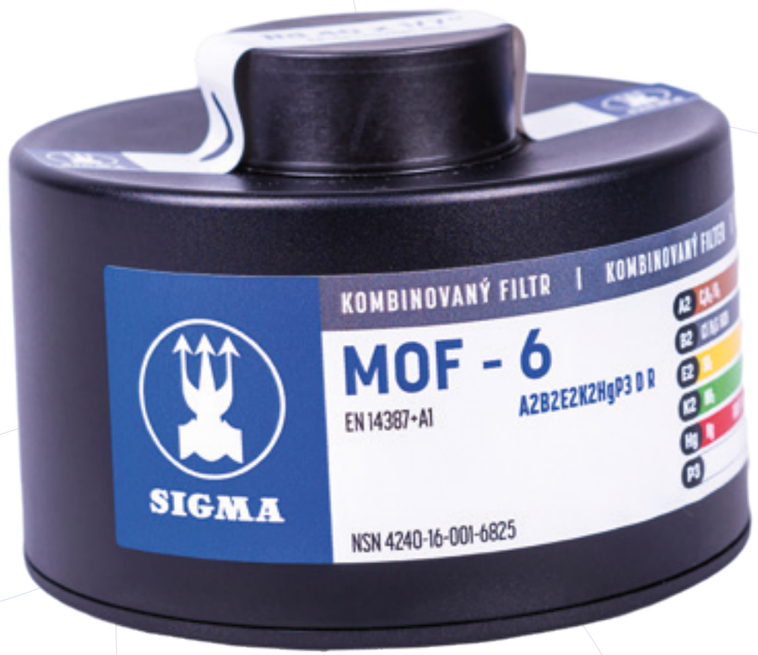
This gas filter without a filter layer is designed to filter gas without particles. It is suitable for industrial use. It has a lower airway resistance compared to combined filters.

TYPICAL USE

By the army, police, special rescue units and fire brigade units. Chemical, food and pharmaceutical plants, production of electronics and packaging materials, foundries, paint shops, laboratories, hospitals and endangered populations.

TECHNICAL INFORMATION	
Type	A2B2E2K2
Material	special plastic
Diameter and height	110 x 81 mm
Weight	320 g
Breathing resistance	max. 130 Pa – 30 l/min max. 450 Pa – 95 l/min
Threaded connection	Rd 40x1/7” OZ 40x4 mm

○ DUST, BACTERIA, VIRUSES ● CYCLOHEXANE ● SULFUR CHLORIDE, HYDROGEN CYANIDE ● SULFUR DIOXIDE ● AMMONIA ● MERCURY ● PHOSGENE



A2 B2 E2 K2 Hg P3

PROTECTIVE FILTER
MOF-6 combined

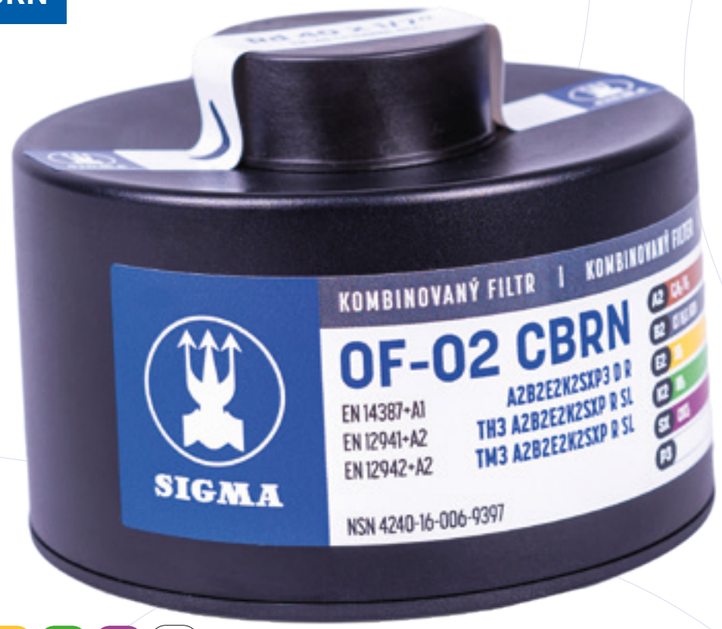
This combined filter with a particle layer protects against industrial gases and aerosols as well as mercury vapour, with an excellent price-performance ratio.

TYPICAL USE

By the army, police, special rescue units and fire brigade units. Chemical, food and pharmaceutical plants, production of electronics and packaging material, foundries, paint shops, laboratories, hospitals and endangered populations.

TECHNICAL INFORMATION	
Type	A2B2E2K2HgP3 D R
Material	special plastic
Diameter and height	110 x 81 mm
Weight	360 g
Breathing resistance	max. 190 Pa – 30 l/min max. 650 Pa – 95 l/min
Filtration efficiency	99,95 %
Threaded connection	Rd 40x1/7” OZ 40x4 mm

○ DUST, BACTERIA, VIRUSES ● CYCLOHEXANE ● SULFUR CHLORIDE, HYDROGEN CYANIDE ● SULFUR DIOXIDE ● AMMONIA ● MERCURY ● PHOSGENE



A2 B2 E2 K2 SX P3

PROTECTIVE FILTER
OF-02 CBRN

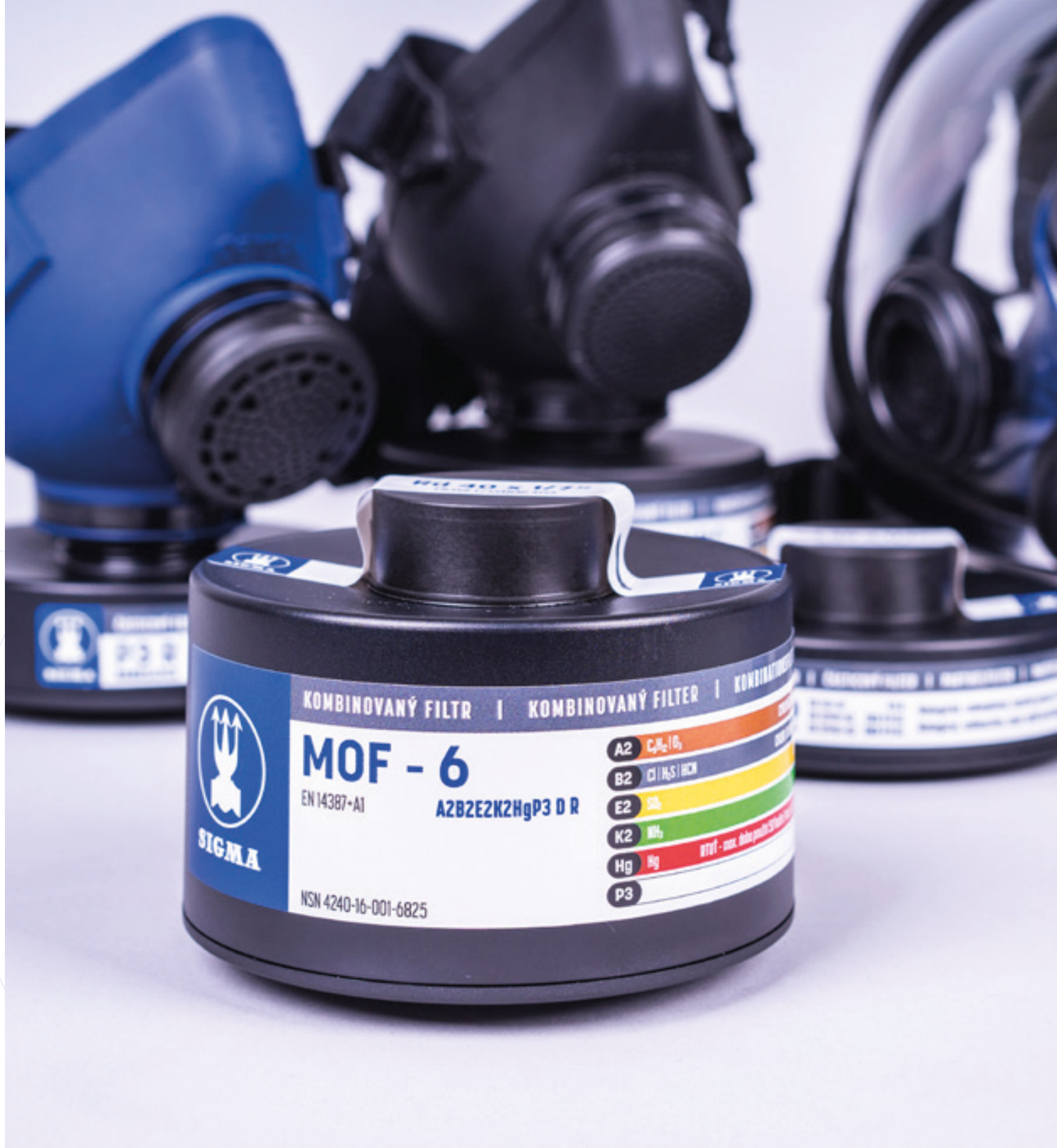
This is a top-notch filter in all its parameters. It filters industrial and military gases, and it is made of special plastic certified for mustard gas penetration. It can be connected to a filtration device for auxiliary ventilation.

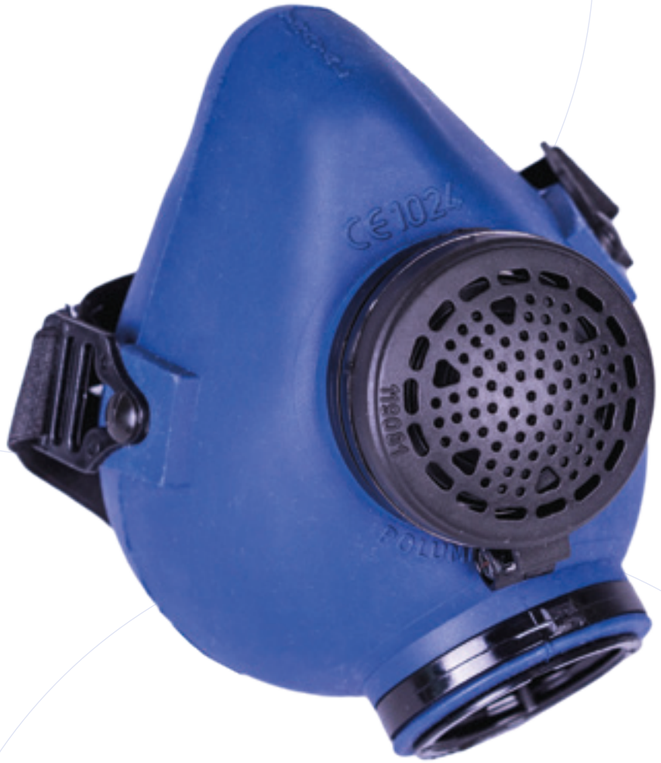
TYPICAL USE

By the army, police, special rescue units and fire brigade units. Chemical, food and pharmaceutical plants, production of electronics and packaging materials, foundries, paint shops, laboratories, hospitals and endangered populations.

TECHNICAL INFORMATION	
Type	A2B2E2K2SXP3 D R TH3 A2B2BE2K2SXP R SL TM3 A2B2BE2K2SXP R SL
Material	Noryl™
Diameter and height	110 x 81 mm
Weight	350 g
Breathing resistance	max. 180 Pa – 30 l/min max. 600 Pa – 95 l/min
Filtration efficiency	99,995 %
Threaded connection	Rd 40x1/7” OZ 40x4 mm

○ DUST, BACTERIA, VIRUSES ● CYCLOHEXANE ● SULFUR CHLORIDE, HYDROGEN CYANIDE ● SULFUR DIOXIDE ● AMMONIA ● MERCURY ● PHOSGENE





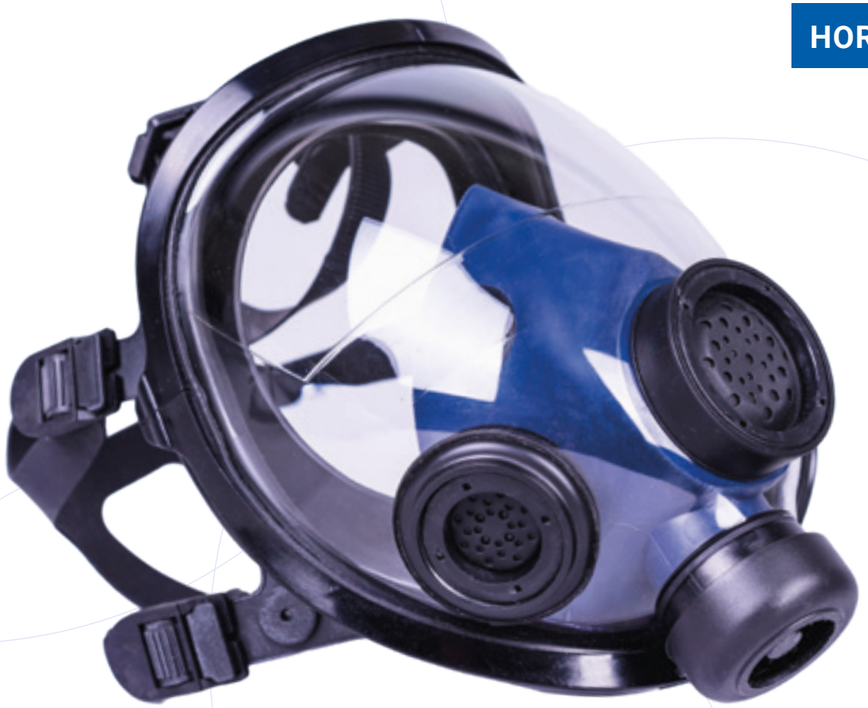
HALF-MASK
PM-1

This PM-1 compact half-mask has an excellent price-performance ratio. It can be used with both particle filters and the OF-90 NBC filter.

TYPICAL USE

By the police, special rescue units and fire brigade units, chemical, food and pharmaceutical plants, foundries, paint shops, laboratories, hospitals and endangered populations.

TECHNICAL INFORMATION	
Material	brombutyl
Connecting thread	Rd 40x1/7" pursuant to ČSN EN 148-1
Weight	160 g
Inhalation resistance	max. 35 Pa – 30 l/min
Exhalation resistance	max. 250 Pa – 160 l/min
Size	universal



FULL-FACE MASK
HORIZONT

Together with a suitable filter or breathing apparatus, it protects the face, eyes and respiratory system from the effects of dangerous substances. It provides reliable protection in a temperature range of -30 ˚C to +70 ˚C. The large panoramic lens ensures very good spatial orientation with minimal distortion during normal activities.

TYPICAL USE

By the army, police and special rescue units, chemical, food and pharmaceutical plants, production of electronics and packaging material, foundries, paint shops, laboratories, hospitals and endangered populations.

TECHNICAL INFORMATION	
Material	chlorobutyl + polycarbonate
Connecting thread	Rd 40x1/7" pursuant to ČSN EN 148-1
Weight	600 g
Speech intelligibility	>90 %
Field of view	>90 %
Inhalation resistance	max. 25 Pa – 30 l/min
Exhalation resistance	max. 150 Pa – 160 l/min
Size	universal

Do you need protective filters

for specific substances?

Do you have filters that you would like to test?

Do you want to check the adsorption capacity of your filters?

Do you have protective filters with an expired warranty period and you don't know if they can still be used?

The quality of our products is based on long-term research, development and testing of filter materials and other structural elements of filters using simulation of the real effect of a wide range of harmful substances.

Our laboratory can verify the adsorption capacity of new, prospective, filtration materials and determine the extent of protection, the resistance time and filter capacity as needed by the customer. We also test the service life of filters and determine residual capacities for subsequent use.

In addition to tests for the penetration of chemical substances, we also use mechanical and thermal stress tests in various modes to test filters; we check the weight, pressure gradient (SIGOD) and the paraffin oil mist penetration coefficient.

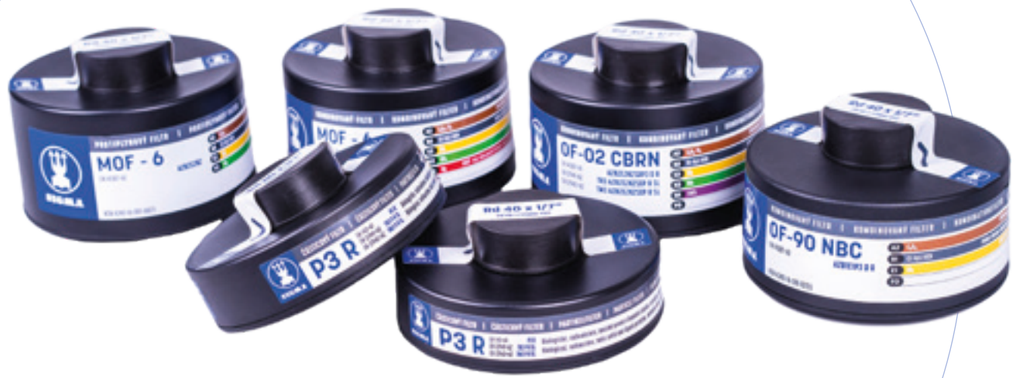
RESEARCH, DEVELOPMENT AND TESTING

We test the resistance of filters to penetration with the following gases as standard:

FORMULA	GAS
HCN	hydrogen cyanide
ClCN	cyanogen chloride
$COCl_2$	phosgene
$C6H_{12}$	cyclohexane
SO_2	sulfur dioxide
NH_3	ammonia
CH_2Cl_2	dichloromethane
$CHCl_3$	chloroform
CCl_4	carbon tetrachloride
CH_3OH	methanol
CCl_2CHCl	trichlorethylene
$(CH_3)_2CO$	acetone
$C_6H_5CH_3$	toluene
C_6H_6	benzene

We can also test filters against the penetration of specific gases such as chloropicrin, chlorine, nitrogen dioxide, hydrogen sulfide, sarin, mustard gas, mercury and its vapours, if requested by customers.

We use an ANSYCO gas spectrometer with digitally controlled modules to test the capacity of filters and adsorption properties of materials. The test parameters correspond to the requirements of ČSN EN 14387.



WARRANTY, STANDARDS AND STORAGE

WARRANTY

Thanks to the use of top quality materials and consistent production control, we provide an above-standard quality warranty for our products, if the storage conditions are complied with.

STANDARDS

All SIGMA protective filters meet the requirements of Czech and European technical standards governing the development, production, testing and use of these important respiratory protection devices. In many respects, our filters significantly exceed the parameters required by standards, providing the highest possible filtration efficiency, high user comfort and extended exposure time in environments with harmful substances. All this while maintaining optimal weight and high mechanical resistance.

STORAGE

Long-term preservation of filtration properties in storage is ensured by vacuum packaging of protective filters in a special, durable multilayer plastic or aluminum film. Products are distributed in cardboard boxes according to customer requirements.

SUPPORT

We provide technical support in the form of instructions for use, storage and ecological disposal of products.

OTHER MARKING

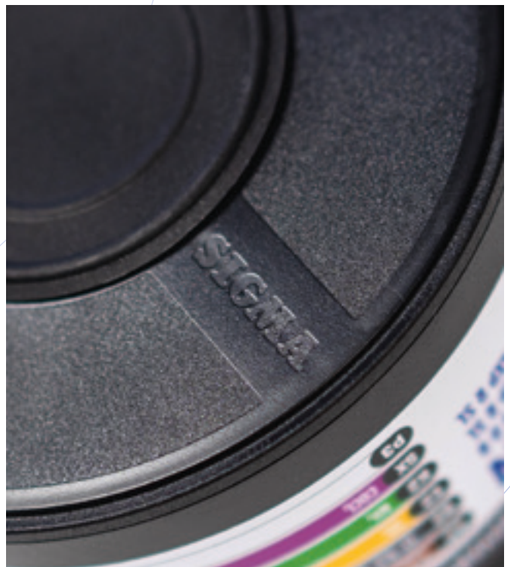
D (Dolomite) – the filter is resistant to dust clogging

R (Re-usable) – the filter is designed for repeated use

TH – filter for auxiliary ventilation devices attached to a helmet or balaclava

TM – filter for auxiliary ventilation devices connected to mask, half-mask respirator and quarter-mask respirators

SL (Solid Liquid) – filter for the filtration of solid and liquid aerosols



MARKING

REQUIREMENTS PURSUANT TO ČSN EN 14387

Colour	Type	Class	Concentration of test gas	Test gas	Minimum penetration time	Area of use
BROWN	A	1	0.1 % (1000 ppm)	cyclohexane	70 minutes	organic gases and vapours with a boiling point > 65 °C
		2	0,5. % (5000 ppm)	cyclohexane	35 minutes	
		3	0,8. % (8000 ppm)	cyclohexane	65 minutes	
GREY	B	1	0,1. % (1000 ppm)	chlorine, hydrogen sulfide, hydrogen cyanide	20, 40, 25 minutes	inorganic gases and vapours
		2	0,5. % (5000 ppm)	chlorine, hydrogen sulfide, hydrogen cyanide	20, 40, 25 minutes	
		3	1,0. % (10000 ppm)	chlorine, hydrogen sulfide, hydrogen cyanide	30, 60, 35 minutes	
YELLOW	E	1	0,1. % (1000 ppm)	sulfur dioxide	20 minutes	sulfur dioxide, acid gases and vapours, hydrogen chloride
		2	0,5. % (5000 ppm)	sulfur dioxide	20 minutes	
		3	1,0. % (10000 ppm)	sulfur dioxide	30 minutes	
GREEN	K	1	0,1. % (1000 ppm)	ammonia	50 minutes	ammonia and organic amines
		2	0,5. % (5000 ppm)	ammonia	40 minutes	
		3	1,0. % (10000 ppm)	ammonia	60 minutes	
RED	Hg	–	1,6 ml/m3	mercury	min. 100 hours	mercury, mercury and its compounds, max. time of use 50 hours
PURPLE	SX	–	0,1. % (1000 ppm)	phosgene	min. 100 minutes	asphyxiant acid gases

REQUIREMENTS PURSUANT TO ČSN EN 143

Colour	Type	Class	Maximum penetration of the test aerosol	Area of use	Test gas
WHITE	P	1	20 %	Filters for coarse particles (insects, sand, pollen)	Sodium chloride and paraffin oil at 95 l/min.
		2	6 %	Filters for fine particles (tobacco smoke, soot)	
		3	0,05 %	Filters for microparticles (bacteria, viruses, aerosols)	

1868
Craftsman Ludvík Sigmund establishes a pump company in Lutín. He starts with the manufacture of wooden floor pumps. The company soon gains a reputation in the field of pump production, well drilling and the construction of water supply systems.

1922
Registration of the trademarks „SIGMA“ and „Neptunův trojzubec“. In the late 1920s, the company named Sigmund Pumpy is the largest manufacturer of pumping technology in Czechoslovakia, with branches in 24 countries around the world.

1935
With the war looming, the Sigmund family founds a new company in Lutín called Chema, s.r.o., which is engaged in the research, production and sale of products for protection against war gases and anti-aircraft protection products. They specializes in the production of breathing masks, protective filters for masks and filtration devices.

1938
Chema acquires a status of special importance for the defence of the state in civilian and military protection against gases. The daily production of protective filters is up to ten thousand pieces. The product range is expanded with disinfectants, sanitation aids, chemical warfare detectors, plastics and vulcanizing agents. New production halls and laboratories are built in Lutín. Branches in France and Jugoslavia begin to operate.

1948
During the German occupation administration, Chema was merged with a pump company for arms production, and the company Sigmund - Chema was established, which was nationalized after the war; as a national company, Sigma resumed the production of pumps and protective filters under the SIGMA brand in 1948. In 1954 it also began producing breathing masks, and in 1956 the Research Center for Respiratory Technology in Prague was incorporated into the filter and mask production department.

1962
Production begins in a new production hall for respiratory technology. Sigma now only specializes in the production of protective filters, and it begins mass production of a new series of small protective filters (MOF) with a body made of sheet metal, which provide protection against unpleasant war gases and industrial organic and inorganic chemicals in various modifications.

ABOUT US

1976
A structurally new, 4th generation MOF-4 protective filter with a light body made of AlMg5 alloy and a combined filter insert for protection against a wide range of solid, liquid and gaseous substances is created.

1997
The latest generation of the combined protective filter MOF-6, with protection extended to gaseous substances containing sulfur oxides and ammonia, enters serial production. This generation has a new plastic body, and it uses top-notch filtration components that meet all applicable European standards.

1998
Based on the requirements of the Army of the Czech Republic, a new type of protective filter for military use labelled OF-90 is developed. The light and highly durable plastic filter contains a unique filtration material that provides protection against a wide range of unpleasant war gases, bacteria and viruses. The filter meets all requirements for use in NATO armies.

2003
Production of the P3 particle protective filter (in the P3 R variant it can be reused) begins; this filter is primarily intended for the civilian sector. The hydrophobic filtration insert in a slim, light plastic body provides protection against dust, pollen, aerosols, bacteria and viruses.

2006
The production of top-notch protective filter OF-02 CBRN begins. This is an improved version of the filter MOF-6 with extended protection against mercury gases and vapours.

2013
Research and development of frame filters for stationary ventilation and filtration units with a capacity of 40-50 m3/h is conducted; these filters are intended for collective protection of persons in rooms and buildings against chemical and biological substances in the air (including radioactive substances) affecting the civilian population, e.g. as a result of environmental accidents, combat or terrorist attacks.

2020
A new variant of the OF-90 NBC filter, based on the OF-90 military protective filter, is certified.

IMPORTANT REFERENCES

- Army of the Czech Republic (since 1998)
- Police of the Czech Republic (since 2006)
- Fire brigades, Czech Republic (since 2006)
- Slovak Armed Forces (since 2000)
- Ministry of Defence of the Czech Republic
- State Material Reserves Administration
- Ministry of the Interior of the Czech Republic
- Ministry of Health of the Czech Republic
- Saudi Arabian Army (2005, 2011)
- Police, Turkey (2007)
- Police, Latvia (2005)
- Police, Greece (2020)

SIGMA

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