# Filter Selection Guide

MSA AUER offers a wide range of full face masks, half masks, filtering face pieces, hoods and visors, in combination with filters and turbo devices which give the user the best choice in selecting the most appropriate respiratory protection

These devices have been designed to protect against numerous known contaminants, which, if inhaled, can be dangerous to health: toxic gases, vapors and particles as well as many combinations with immediate or delayed harmful effects.

Limitation of use: filters for respiratory protection may be used everywhere, except for some inherent limitation e.g. in containers or confined spaces. Principally, the following conditions must be known:

- Type, property and composition of contaminant
- Oxygen content of the inhalation air must be sufficient (> 17% vol.)
- Local or national restrictions or conditions may be different.
  In case of doubt, it is recommended to use a supplied air breathing apparatus.

All MSA filtering devices have been designed to meet the absolutely strongest requirements and been approved according to the relevant European Norm.

In order to help your selection of the right filter, search for the right protection in the following tables.

| Color Mark | Type | Application | Class | Gas concentration | Standard |
|---|---|---|---|---|---|
| | A | Organic gases and vapors - boiling point > 65°C | 1<br>2<br>3 | 1000 ml/m$^3$<br>5000 ml/m$^3$<br>10000 ml/m$^3$ | EN 141 |
| | B | Inorganic gases and vapors (not CO), i.e chlorine, $H_2S$, HCN, ... | 1<br>2<br>3 | 1000 ml/m$^3$<br>5000 ml/m$^3$<br>10000 ml/m$^3$ | EN 141 |
| | E | Sulfur dioxide and acidic gas and vapors | 1<br>2<br>3 | 1000 ml/m$^3$<br>5000 ml/m$^3$<br>10000 ml/m$^3$ | EN 141 |
| | K | Ammonia and organic ammonia derivatives | 1<br>2<br>3 | 1000 ml/m$^3$<br>5000 ml/m$^3$<br>10000 ml/m$^3$ | EN 141 |
| | AX | Organic gases and vapors - boiling point <65°C - of low boiling substances groups 1 and 2 | | gr.1: 100 ml/m$^3$<br>max 40'<br>gr.1: 100 ml/m$^3$<br>max 20'<br>gr.2: 1000 ml/m$^3$<br>max 60'<br>gr.2: 5000 ml/m$^3$<br>max 20' | EN 371 |

| Color Mark | Type | Application | Class | Gas concentration | Standard |
|---|---|---|---|---|---|
| | NO | Nitrogen oxides e.g NO, $NO_2$, $NO_x$ | | Maximum allowed time of use: 20 minutes | EN 141 |
| | Hg | Mercury vapors | | Maximum allowed time of use: 50 hours | EN 141 |
| | CO * | Carbon monoxide | | Local guidelines | DIN 3181* |
| | Reactor P3 | Radioactive iodine | | Local guidelines | DIN 3181* |
| | P3 | Particles | 1<br>2<br>3 | low efficiency<br>medium efficiency<br>high efficiency | EN 143 |

* only color mark and type standardized

For all gases and vapors which may be present in combination with particles (dust, smokes, mist, spray) a combined filter (protection from gases and particles) must be used. The filter recommendations are based on pure substances. With mixtures, by-products, or decomposition products, the impurities must be taken into account.

# Filter Selection Guide

## [Alphabetical List of Industrial Gases and Toxic Substances]

In order to help your selection of the right filter, search for the right protection in the following tables.

For all gases and vapors which may be present in combination with particles (dust, smokes, mist, spray) a combined filter (protection from gases and particles) must be used. The filter recommendations are based on pure substances. With mixtures, by-products, or decomposition products, the impurities must be taken into account.

AX Filters must be used for compounds with a boiling point below 65 °C.
If the list hereunder mentions a particle filter (e. g. A–P 2) for a specific substance, particles are commonly found with the gas or vapor.

| | Substances | Formula | Filter Code Letter | Remarks |
|---|---|---|---|---|
| A | Acetaldehyde | CH3CHO | AX | 87 AX |
| | Acetic acid | CH3COOH | E | also B or A |
| | Acetone | CH3COCH3 | AX | 87 AX |
| | Acetone cyanhydrin | CH3C (OH) (CN) CH3 | A–P 3 | – |
| | Acetonitrile | CH3CN | A | in presence of hydrogen cyanide: B |
| | Acidic gases | | E | also B |
| | Acids (fuming concentrated) | | E–P 2 | – |
| | Acrolein (2-Propenal) | CH2CHCHO | AX | 87 AX |
| | Acrylic acid-esters | CH2CHCOOR | A | – |
| | Acrylonitrile | CH2CHCN | A–P 3 | in presence of hydrogen cyanide: B–P 3 |
| | Alcohols | R·OH | A | methyl alcohol: AX |
| | Aldehydes | R·CHO | A or AX | formaldehyde: filter B |
| | Allylchloride (3-chloride-1-propen) | CH2CHCH2Cl | AX | 87 AX |
| | 2-Amino ethanol | CH2OHCH2NH2 | A | – |
| | Ammonia | NH3 | K | – |
| | Aniline | C6H5NH2 | A–P 3 | – |
| | Aqueous ammonia | NH3H2O | K | – |
| | Arsenic trioxide | As2O3 | P 3 | in presence of arsine: 89 B/St (B 2–P 3) |
| | Arsine | AsH3 | B | in presence of arsenides: 89 B/St (B 2–P 3) |
| B | Benzene | C6H6 | A | – |
| | Benzyl bromide | C6H5CH2Br | A–P 2 | also B |

| Substances | Formula | Filter Code Letter | Remarks |
|---|---|---|---|
| Beryllium | Be | P 3 | – |
| Bromine | Br2 | B–P 3 | – |
| Bromoform | CHBr3 | A | – |
| Bromomethane | CH3Br | AX | 87 AX |
| Butanone | CH3COC2H5 | A | – |
| Butyl acetate | CH3COOC4H9 | A | – |
| Butyl acrylate | CH2CHCOOC4H9 | A | – |
| Butyl alcohols (butanols) | C4H9OH | A | – |
| Carbon black | C | P 2 | – |
| Carbon dioxide | CO2 | – | self-contained SCBA |
| Carbon disulfide | CS2 | B | – |
| Carbon monoxide | CO | CO | CO filter canister, CO filter cartridge |
| Carbon oxysulfide | COS | B | – |
| Carbon tetrachloride | CCl4 | A | – |
| Caustic soda | NaOH | P 2 | – |
| Chlorobromomethane | CH2ClBr | AX | 87 AX |
| Chlorine | Cl2 | B–P 3 | – |
| Chlorine dioxide | ClO2 | B | – |
| Chloromethane | CH3Cl | – | self-contained SCBA |
| Chloroform | CHCl3 | AX | 87 AX |
| Chloroprene | CH2C (C) CHCH2 | AX | 87 AX |
| Chlorosulfonic acid | ClSO3H | B–P 2 | also E–P 2 |
| Chromium oxide | Cr2O3, CrO3 | P 3 | – |
| Cresols | | A | – |
| Cyanogen chloride | ClCN | B | 89 B/St |
| Cyclohexane | C6H12 | A | – |
| Cyclohexanol | C6H11OH | A | – |
| Cyclohexanone | C6H10O | A | – |

| | Substances | Formula | Filter Code Letter | Remarks |
|---|---|---|---|---|
| D | DD-products (Desmodur-Desmophen) | | A–P 2 | – |
| | DDT dust | | P 3 | also 89 B/St |
| | Diacetonel alcohol | (CH3)2C(OH)CH2COCH3 | A | – |
| | 1,2-Dibromoethane | CH2BrCH2Br | A | – |
| | 1,2-Dichloroethane | CH2ClCH2Cl | A | – |
| | 1,2-Dichloroethylene | CHClCHCl | AX | 87 AX |
| | Dichloromethane | CH2Cl2 | AX | 87 AX |
| | 1,2-Dichloropropane | C3H6Cl2 | A | – |
| | Diesel fuel | | A | – |
| | Dimethylformamide (DMF) | HCON(CH3)2 | A | – |
| | 1,4-Dioxane | C4H8O2 | A | – |
| | Dust | | P 2, P 3 | – |
| E | Epichlorhydrin | C3H5OCl | A–P 3 | – |
| | Esters | R-COOR | A or AX | – |
| | Ethanolamine | CH2OHCH2NH2 | A | – |
| | Ethers | ROR | A or AX | – |
| | Ethyl acetate | CH3COOC2H5 | A | – |
| | Ethyl alcohol (ethanol) | C2H5OH | A | – |
| | Ethyl benzene | C6H5CH2CH3 | A | – |
| | Ethylene chloride | CH2ClCH2Cl | A | – |
| | Ethylene dichloride | CH2ClCH2Cl | A | – |
| | Ethylene oxide (T-gas) | C2H4O | AX | 87 AX |
| | Ethyl formate | HCOOC2H5 | AX | 87 AX |
| F | Formaldehyde (formalin) | HCHO | B–P 3 | – |
| | Formic acid | HCOOH | E | also B |
| | Furfuryl alcohol | C5H4O2 | A | – |
| G | Gasoline | | A | – |

| | Substances | Formula | Filter Code Letter | Remarks |
|---|---|---|---|---|
| H | Halogenated hydrocarbons | R-Hal | A or AX | no filter for chloromethane |
| | | | B–P 2 or | if they produce HCl/H2O |
| | | | B–P 3 | – |
| | Halogens | Hal2 | B | – |
| | Hexachlorocyclohexane | C6H6Cl6 | A–P 3 | also 89 B/St |
| | Hydrazine | N2H4 | K–P 3 | – |
| | Hydrocarbons | R-H | A | – |
| | Hydrochlorid acid | HCl/H2O | E–P 2 | also B–P 2 |
| | Hydrofluoric acid (hydrogen fluoride) | HF/H2O | E | also B |
| | Hydrogen bromide | HBr | E–P 2 | also B |
| | Hydrogen chloride | HCl | E–P 2 | also B |
| | Hydrogen cyanide | HCN | B | – |
| | Hydrogen halogenides | HF, HCl, HBr, HJ | E–P 2 | also B–P 2 |
| | Hydrogen selenide | H2Se | B–P 2 | – |
| | Hydrogen sulfide | H2S | B | – |
| I | Insecticide (organic) | | A–P 2 | – |
| | Iodine | J2 | B–P 2 | also A–P 2 |
| | Iodine (radioactive) | J2 | Reactor P3- | – |
| | Iodomethane | CH3J | AX | 87 AX |
| | Iodomethane (radioactive) | CH3J | Reactor P3 | – |
| | Iron pentacarbonyl | Fe(CO5) | CO–P 3 | CO filter canister with particle filter P 3 |
| | Isocyanates (organic) | R-NCO | B–P 2 | in case of spray and propellent gas |
| | | | B | if vapors only are present |
| | Isopropyl alcohol | CH3CH(OH)CH3 | A | – |
| K | Ketenes | R-CH2=CO | – | self-contained SCBA |
| | Ketones | R-CO-R | A | Acetone: AX |
| L | Lead fumes | Pb | P 2 | – |
| M | Maleic anhydride | C4H2O3 | A–P 2 | – |
| | Mercaptans | R-SH | B | – |
| M | Mercury compounds | | Hg–P 3 | 89 Hg/St |
| | Mercury vapour | Hg | Hg–P 3 | 89 Hg/St |

| | Substances | Formula | Filter Code Letter | Remarks |
|---|---|---|---|---|
| | Metal fumes | | P 2, P 3 | – |
| | Methyl alcohol (methanol) | CH3OH | AX | 87 AX |
| | Methyl bromide | CH2Br | AX | 87 AX |
| | Methyl chloride | CH3Cl | – | self-contained SCBA |
| | Methyl chloroform | CH3CCl3 | A | – |
| | Methylene chloride | CH2Cl2 | AX | 87 AX |
| | Methyl ethyl ketone (MEK) | CH3COC2H5 | A | – |
| | Methyl isobutyl ketone (MIBK) | CH3COC4H9 | A | – |
| N | Nickel tetracarbonyl | Ni (CO)4 | CO–P 3 | CO filter canister and particle filter P 3 |
| | Nitric acid | HNO3/H2O | NO | 89 NO/St |
| | Nitro compounds (organic) | R-NO2 | A | – |
| | Nitrogen oxides | NO, NO2, N2O5 | NO | 89 NO/St |
| | Nitrous fumes | NO, NO2, N2O5, HNO2, HNO3 | NO | 89 NO/St |
| O | Organic nitro compounds | R-NO2 | A | – |
| | Organic vapors, solvent | | A, AX | – |
| | Ozone | O3 | CO | CO filter canister |
| | | | NO | 89 NO/St |
| P | Paint sprays, vapors | | A–P 2 | – |
| | Pentachloroethane | CHCl2CCl3 | A | – |
| | Perchloroethylene | CCl2CCl2 | A | – |
| | Pesticides | | A–P 2 | – |
| | Petrol | | A | – |
| | Phenols | | A | – |
| | Phenylhydrazine | C6H5NHNH2 | A | also K |
| | Phosgene | COCl2 | B | – |
| | Phosphine | PH3 | B | – |
| | Phosphorus trichloride | PCl3 | B–P 2 | – |
| | Polyacrylates | | A–P 2 | – |
| P | Potassium cyanide (dust) | KCN | B–P 3 | – |
| | Propyl alcohol (propanol) | CH3CH2CH2OH | A | – |
| | Pyridine | C5H5N | A | also K |
| Q | Quartz | SiO2 | P 2 | – |

| | Substances | Formula | Filter Code Letter | Remarks |
|---|---|---|---|---|
| S | Sodium hydroxide | NaOH | P 2 | – |
| | Solvents | | A | – |
| | Stibine | SbH3 | B–P 3 | – |
| | Styrene | C6H5CHCH2 | A | – |
| | Sulfur compounds (burning) | (SO2) | E–P 2 | – |
| | Sulfur dioxide | SO2 | E | – |
| | Sulfuric acid | H2SO4 | B–P 2 | – |
| | Sulfur monochloride | S2Cl2 | B–P 2 | – |
| | Sulfur trioxide | (SO3) | P 2 | – |
| | Sulfuryl chloride | SO2Cl2 | B | – |
| T | 1,1,2,2-Tetrachloroethane | CHCl2CHCl2 | A | – |
| | Tetrachloroethylene | CCl2CCl2 | A | – |
| | Tetrachloromethane | CCl4 | A | – |
| | Tetrahydrofuran | C4H8O | A | – |
| | T-gas (etylene oxide) | (C2H4O) | AX | 87 AX |
| | Toluene | C6H5 · CH3 | A | – |
| | Tribromomethane | CHBr3 | A | – |
| | Trichloroethane (TCA) | CH3CCl3 | A | – |
| | Trichloroethylene (Tri) | C2HCl3 | A | – |
| | Trichloromethane | CHCl3 | AX | 87 AX |
| | Turpentine | | A | – |
| V | Vanadium pentoxide dust,fumes | V2O5 | P 2 | – |
| | Vinyl acetate | C4H6O2 | A | – |
| | Vinyl chloride | CH2CHCl | AX | 87 AX |
| | Vinylidene chloride | CH2CCl2 | AX | 87 AX |
| | Vinyltoluene | CH3C6H4CHCH2 | A | – |
| X | Xylenes | CH3C6H4CH3 | A | – |
| Z | Zinc oxide | ZnO | P 2 | – |
| | Zyklon (hydrogen cyanide with irritant) | | B | – |

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