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SUNDSTRÖM
WELDING SYSTEM

Sundström®

OUR MISSION IS TO PROTECT YOU

Welding and welding sites present numerous hazards to health and safety, both for welders and for people in the vicinity.

WELDING FUMES/RESPIRATORY HAZARDS

The fumes are composed of very small, solid metal oxide particles that form during the welding process. The majority of the fumes (90-95%) come from the filler metal used, so the chemical content of the welding fumes is the same as that of the filler metal.

Short-term effects of welding fumes

The short-term effects of overexposure to welding fumes include irritation of the eyes, nose and throat, coughing, shortness of breath, bronchitis, increased risk of infection of the respiratory tract, fluid in the lungs and a flu-like illness often called metal fume fever.

Long-term effects of welding fumes

Welders' health is affected in the long term in that they face a 30 to 40 percent increased risk of lung cancer. The exact reason for this is still under careful study worldwide. It may be due to the fact that many welders are heavy smokers and are often exposed to asbestos and/or welding fumes.

The most likely carcinogenic components of welding fumes are hexavalent chromium and nickel. Exposure to manganese often results in damage to the central nervous system. The link between this nerve damage and welding fumes is currently under investigation.

RECOMMENDATION

Always use respiratory protection equipment suited to the type of welding you are carrying out.

SPARKS AND SPLASHES

Welding normally gives rise to atomised sparks and splashes. If the shielding gas does not have a sufficiently high argon content, larger quantities of sparks and splashes arise and may even be in the form of drops.

If drops, sparks or splashes hit the welder, e.g. during welding from underneath or if the welder is lying down, they may cause burns.

RECOMMENDATION

Use all-over protective clothing if there is a risk of being hit by large quantities of drops, sparks or splashes.

UV RADIATION

Overexposure to UV radiation affects health, and welders are the largest occupational group exposed to UV radiation.

Short-term effects of UV radiation

Skin sunburn. Damage accumulates during the day and does not become visible until a few hours later. Welders' flash, also known as arc-eye and snow-blindness. This is a painful irritation of the cornea and the conjunctiva (the membrane connecting the eyeball with the inner eyelid). It feels like 'sand in the eye', and can be felt at the slightest touch. UVB is the principal cause of 'sunburn of the eye'.

The eye is more sensitive than the skin to UV radiation because it lacks the skin's outer layer and protective pigment. Symptoms appear from six to 24 hours after exposure and usually disappear within the following 48 hours.

No permanent damage to the eyes results, unless the exposure has been severe.

Long-term effects

Damage to the retina may ultimately result in loss of vision. This may be caused by UV radiation in people who have had an eye lens surgically removed, for example as a result of a cataract. Such damage to the retina can be prevented by the use of UV-absorbing glasses or the implantation of UV-absorbing lenses. In the normal eye, the retina is protected from UV injury because the vitreous body filters out UV radiation.

Recent research indicates that exposure to UV radiation can adversely affect the immune system.

RECOMMENDATION

Always use a welding filter suited to the type of welding being carried out.

RESPIRATORY PROTECTION IN THE HIGHEST PROTECTION CLASS

Respiratory protection is divided into two main groups:

Filter protection	Breathing apparatus
Breathing air passes through a filter which purifies it. (May only be used with normal oxygen content)	Breathing apparatus supplied with compressed air. Portable respiratory devices

If you are welding in a confined or poorly ventilated space, good filter protection is not sufficient. You also need respiratory protection supplied with compressed air in order not to put your health at risk. Medium-heavy work requires an average air consumption of 50-70 l/min.

HOW GOOD IS MY RESPIRATORY PROTECTION?

To state the protective effect of the respiratory protection, you can calculate the protection factor on the basis of measurements. If the concentration of a substance inside the mask is a twentieth of what it is outside the mask, the protection factor of the respiratory protection is 20.

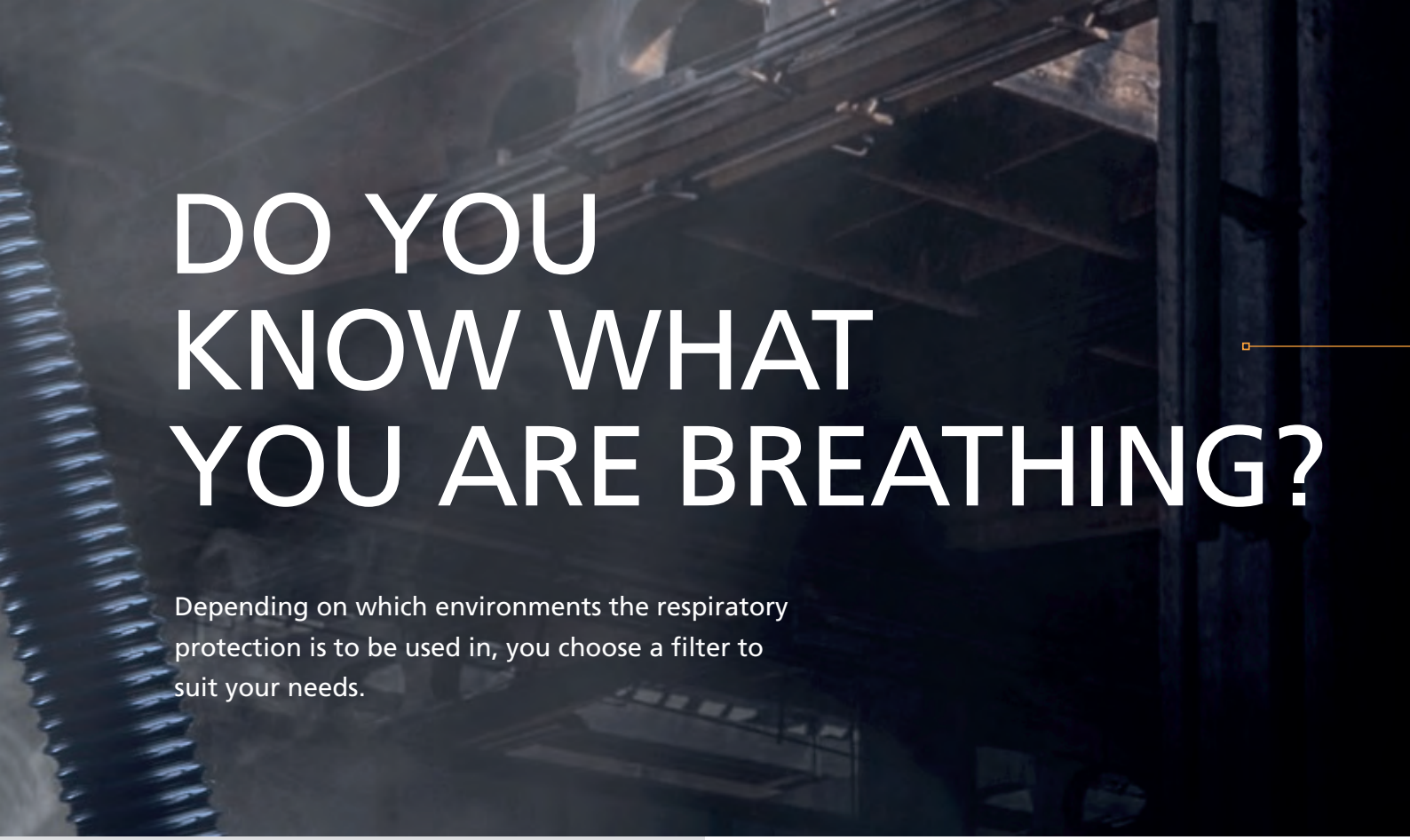
$$\frac{\textbf{1,000}\ \text{particles/cm}^3\ \text{(outside respiratory protection)}}{\textbf{50}\ \text{particles/cm}^3\ \text{(inside respiratory protection)}} = \textbf{Protection factor 20}$$

ASSIGNED PROTECTION FACTOR - APF

The Assigned Protection Factor (APF) is based on measurements made in actual workplaces on actual people at work. This factor is somewhat lower than the Nominal Protection Factor, but the APF corresponds more closely to reality, as it is measured in actual working situations.

NOMINAL PROTECTION FACTOR

The Nominal Protection Factor (NPF) is based on measurements made in the laboratory.



DO YOU KNOW WHAT YOU ARE BREATHING?

Depending on which environments the respiratory protection is to be used in, you choose a filter to suit your needs.

SR 221
PRE FILTER

SR 221 must be used together with particle, gas and combination filters at all times.

The pre-filter protects the main filter against premature clogging by larger particles. The pre-filter holder fixes the filter in place and protects it against handling damage.

SR 336
STEEL NET DISC

SR 336, consists of a disc punched out of stainless steel mesh.

The disc is fitted at the bottom of the pre-filter holder of the mask and protects the filters against sparks and spatter that occurs during welding, flame cutting, grinding and similar work.

SR 510 P3 R
PARTICLE FILTER

SR 510 P3 R is a mechanical particle filter with extremely low breathing resistance. SR 510 offers protection against all types of particles (dust, smoke, mist, spray, asbestos), as well as bacteria, viruses and radioactive fallout. Filtering efficiency more than 99.997%. SR 510 is used for all protective filters in Sundström Safety's programme. If gas/vapour and particles occur simultaneous-ly, a particle filter is combined with a suitable gas filter.

SR 710 P3 R
PARTICLE FILTER

SR 710 particle filter P3 R is a mechanical particle filter of class P3 R with an extremely high efficiency (> 99.997%) and an active area of 13 dm^2.

The filter offers protection against all types of particles, both solids and liquids. SR 710 cannot be combined with gas filters.

SR 218 A2
GAS FILTER

SR 218 A2 offer protection against organic compounds with a boiling point above 65 °C.

SR 518 A2
GAS FILTER

SR 518 gas filter A2 is a filter for protection against organic compounds with a boiling point above +65 °C, i.e. most solvents.

Class 2 means high capacity and thus a long operating time. Gas filters for fan SR 500 must be used in combination with particle filter SR 510 P3 R at all times.

SR 315 ABE1
GAS FILTER

SR 315 ABE1 offer protection against organic compounds with a boiling point above 65 °C, inorganic compounds and acidic gases/vapours.

SR 515 ABE1
GAS FILTER

SR 515 ABE1 protects against organic compounds with a boiling point above 65 °C, inorganic and acid gases/vapours.

SR 500 och SR 500 EX fan units gas filters must always be used in combination with particle filter SR 510 P3 R.

FILTER RECOMMENDATIONS

The table below shows which substances are formed in the welding of different working material, which type of electrode or which welding method.

Substance formed	Working material, electrode or welding method	Filter	Other
ACROLEIN	Paint, glue, plastic, fat, oil.	SR 510 P3 R + SR 315 ABE1/ SR 515 ABE1**	Full mask should be used.
CADMIUM, CADMIUM OXIDE	Certain red and yellow paints, some alloys, cadmium-plated material.	SR 510 P3 R	Carcinogenic.
CALCIUM OXIDE	Basic electrodes.	SR 510 P3 R	
CARBON MONOXIDE, CARBON DIOXIDE	Paint, glue, plastic, fat, oil, MAG welding with carbon monoxide as shielding gas.	Compressed air or filter protection.	
CHROMIUM, CHROMIUM TRIOXIDE	Stainless steel.	SR 510 P3 R	
COPPER, COPPER OXIDE	Copper and copper alloys. Certain electrodes.	SR 510 P3 R	
FLUORIDES	Basic electrodes, polytetrafluoroethylene.	SR 510 P3 R	
FORMALDEHYDE	Paint, glue, plastic, fat, oil.	SR 510 P3 R + SR 315 ABE1/ SR 515 ABE1**	Carcinogenic, absorbed by skin, allergenic.
HYDROGEN CHLORIDE	Chlorinated rubber, vinyl paints	SR 315 ABE1	
HYDROGEN CYANIDE	Polyurethane paints and polyurethane plastic.	SR 510 P3 R + SR 315 ABE1/ SR 515 ABE1**	Full mask should be used, absorbed by skin.
HYDROGEN FLUORIDE	Basic electrodes, polytetrafluoroethylene.	SR 510 P3 R + SR 315 ABE1/ SR 515 ABE1**	
IRON, IRON OXIDE	Cast steel and ironwork.	SR 510 P3 R	
ISOCYANATES*	Polyurethane paints and polyurethane plastic.	Compressed air or filter protection.	
LEAD, LEAD OXIDE	Paints, principally minium.	SR 510 P3 R	
MANGANESE, MANGANESE DIOXIDE	Most types of steel, especially abrasion-resistant special steel. Certain electrodes.	SR 510 P3 R	
NICKEL, NICKEL OXIDE	Stainless steel.	SR 510 P3 R	Carcinogenic, allergenic.
NITROUS GASES	Primarily gas welding.	Compressed air.	
OIL MIST	Paint, glue, plastic, fat, oil.	SR 218 A2	
OZONE	TIG, MIG and MAG welding, especially in aluminium.	SR 510 P3 R + SR 315 ABE1/ SR 515 ABE1**	
PHOSGENE	When there are fumes from tri- or other chlorocarbons in the workplace.	SR 510 P3 R + SR 315 ABE1/ SR 515 ABE1**	Compressed air recommended.
QUARTZ	Acidic electrodes.	SR 510 P3 R	Carcinogenic.
ZINC OXIDE	Galvanised sheet metal. Zinc-bearing paints, e.g. shop primer.	SR 510 P3 R	

* Isocyanates - used, for example, as a hardener in polyurethane – PU. Exposure to isocyanates may occur during work with glues, lacquers and sealants based on polyurethane. Isocyanates are formed when PU is heated, for example in welding and grinding PU-lacquered car sheet metal.

Full mask SR 200 with gas filter SR 315 (ABE1) + SR 510 (P3). Max. 40 hours per week.

Fan SR 500 with gas filter SR 515 (ABE1) + SR 510 (P3). Max. 16 hours per 2 days.

** SR 315 ABE1 is used with full mask SR 200
SR 515 ABE1 is used with fan SR 500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