



Respiratory protection



Sundström Safety AB

Protecting people from polluted air



The founder of Sundström Safety AB, Ivan Sundström, worked as a mining engineer in Falun, Sweden. Even in the early stages, he saw a need to protect the eyes and lungs of mineworkers, as a result, **Sundström Respirators** was founded. (The SR designation is derived from the original name).



The company and its products were further developed by Ivan's son, Per, who also studied at the Technical Academy (now Faculty of Art) where his studies included human anatomy. Per's understanding of the shape of the face later became the basis of the design and characteristics of Sundström protective masks. In 1962, focusing on the idea that good respiratory protection must be simple and easy to use, Per Sundström introduced the first anatomically shaped, modern, rubber protective mask. The first silicon mask was later launched in 1989. Production and product development are located in Lagan in Småland, and the head office is situated in Lidingö, Stockholm.



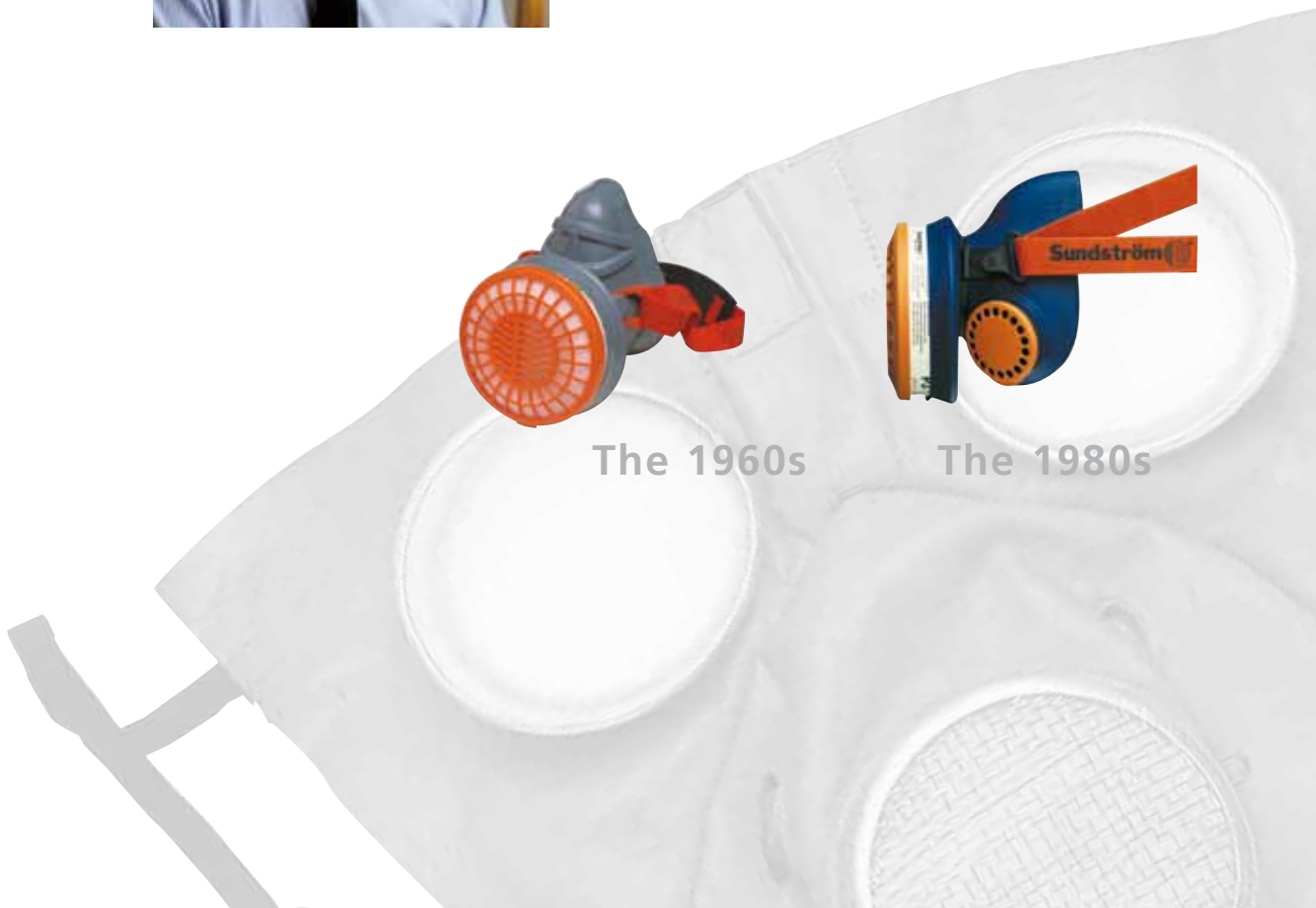
In 2001, Sundström Safety AB celebrated its 75th anniversary - The third generation of the Sundström family is now running the company.



The 1960s



The 1980s



Respiratory protective devices

Many harmful substances, such as gases and particles, occur in our modern world. At work and during leisure activities, we may be exposed to serious threats.

Respiratory protective devices are classified:

Air Purifying Respirators (APR)	Supplied-Air Respirators (SAR)	Self Contained Breathing (SCBA)	Combined Respirators
Particulate removing Vapor & gas removing. Combination Gas mask. Powered Air Purifying Respirator (PAPR).	Continuous Flow. Pressure Demand.	Closed Circuit (Rebreather). Open Circuit.	SAR / SCBA. SAR / APR.



Fit factor applies only to quantitative fit testing

FIT factor is a measure of the efficiency of the respirator. For example, if the content of a substance on the inside of the respirator is one twentieth of what it is in the ambient air, the respirator is said to have a fit factor of 20.

Ex.

$$\frac{1000 \text{ particles/cm}^3 \text{ (outside the respirator)}}{50 \text{ particles/cm}^3 \text{ (inside the respirator)}} = \text{fit factor of } 20$$

Air Purifying Respirator (APR) half masks/accessories

There are air purifying half masks that enable the user to work strenuously during part, or the entire day. There are also air purifying half masks for light recreational work. All masks in Sundström's program use the same range of chemical cartridges and filters which can be combined for any working situation. In their design, Sundström Air Purifying half masks are known for having an excellent fit, high protection level and very low breathing resistance. Air Purifying Respirators (APR) should never be used in conditions that are Immediately Dangerous to Life and Health (IDLH).



The SR 100 half mask Air Purifying Respirator is made of silicone and is available in two sizes, S/M and M/L. The mask is equipped with two exhalation valves, which ensures very low exhalation resistance. Valve covers with baffles effectively protect the exhalation membrane against dust and paint mist. The easily adjustable elastic head harness is designed as a V-shaped loop and has a large, dished crown plate, which contributes to a comfortable and secure fit. The compressed air attachment SR 307 can be connected to the SR 100 half mask, this combination is called a Type C Continuous Flow Supplied Air Respirator.



The SR 90-3 half mask Air Purifying Respirator is made of thermoplastic elastomer (TPE) in two sizes, S/M and M/L. The mask is equipped with two exhalation valves which ensure very low breathing resistance. The easily adjustable elastic head harness is designed as a V-loop and has a large dished crown plate, which contributes to a comfortable and secure fit.



The SR 322 Test disc for daily fit check of Sundström Air Purifying Respirators



The SR 64 short duration protective hood is intended for use together with Sundström half masks with cartridges/filters or with the SR 307 compressed air attachment. It protects the head and hair against dust during grinding and work that causes splashing, such as in high-pressure washing or spray painting. It is made of Tyvek® and equipped with a PVC visor.



The SR 345 Protective hood is intended for use together with Sundström half masks with cartridges/filters or with the SR 307 compressed air attachment. Made of chemical resistant PVC coated fabric, it protects against the splashing and dripping of most substances. The hood is fitted so that the exhalation valves are outside which reduces the risk of condensation on the visor.

The SR 230 storage box is used for storing Sundström half masks, cartridges and filters. The box protects the equipment against dirt and physical damage. A bar coded name tag is attached to the storage box.

The SR 339 storage bag is made of durable and pliable synthetic material and can be carried on the user's belt. It is designed to protect a Sundström half mask, cartridges and filters against dirt and water.



The service kit for the SR 100 contains harness, set of membranes, pre-filter holder and protective caps. Also available for the SR 90-2.

SR 280-3 adapter which attaches to the SR 200 full face mask Air Purifying Respirator.

SR 5226 cleaning wipes for daily mask cleaning.

The labeling system for Sundström masks simplifies their use. A durable label is applied to the mask, which enables the bar code to be read and the serial number to be recorded. Space is also provided for the user's name.



Air Purifying Respirator (APR) full face mask/accessories

With high concentrations of air pollutants, an air purifying full face mask is often recommended. The Sundström Air Purifying full face mask provides good protection in all situations in which filter protection is used. All masks in Sundström's program use the same range of chemical cartridges and filters, and can be combined efficiently and economically for any working situation. An Air Purifying Respirator (APR) should never be used in conditions that are Immediately Dangerous to Life and Health (IDLH).



The SR 200 full face mask Air Purifying Respirator is intended for use when maximum safety and breathing comfort are required. The full face mask is used with the same simple cartridge and filter system as our half masks. The material and pigment in the face piece are FDA and BGA approved for foods, and minimize the risk of contact allergies. All exposed plastic parts are made of polyamide. The mask has two exhalation valves that provide minimum exhalation resistance, and an easily adjustable fabric head harness. Some of the inhalation air is guided via the screen disc to prevent misting. The mask is very light, only 450 grams (16 ounce). The SR 307 compressed air attachment can be connected to the SR 200 full face mask and the combination is called a Type C Continuous Flow Supplied Air Respirator.

The SR 200 full face mask has a broad range of accessories and can be used in many different working situations.





Welding shield SR 84

There is a welding shield available for welders which can easily be mounted on the frame of the SR 200. Welding glass in size 110x60 mm or auto darkening filters can be used. In the flip-up position the shield can also be used for grinding etc. The construction of the shield and the welding-glass holder ensure reduced weight which is specially notable in the flip-up position.



SR 341 frames for glasses

For users of prescription lenses a steel frame is available which will last through many lens changes. Easy to securely mount and adjustable for perfect fit.



Laminated glass visor

Where the specially treated PC visor is not considered sufficiently resistant against e.g. chemicals, the SR 200 can be equipped with a laminated glass visor. Available either factory fitted or for replacement at a later stage.



Voice amplifier, Small Talk ST2-SR

The voice amplifier improves user communication while wearing a half mask SR 100 or full-face mask SR 200. The microphone is mounted onto the valve seat of the respirator. The loudspeaker can be clipped onto a breast pocket, waist belt or shoulder strap.



Protective film SR 343/SR 353

Can be easily changed for polycarbonate and glass visors respectively. The film provides excellent protection during work that results in misting up and a need to clean the original visor.



Storage box SR 344 is intended for storage of respiratory protection products. The lid is made of transparent polypropylene, making it possible to check the contents. The box is also suitable for wall mounting.

Particulate filter for Air Purifying Respirators (APR)



Particulate filter P100

SR 510 P100 particulate filter is a mechanical filter that protects against all types of particles (dust, fume, fog, spray, asbestos), even bacteria, viruses and radioactive dust. The filter separates 99.997% of the pollution in the air. That means that the air is 33,000 times cleaner on the backside of the filter media than in the front (the standard requires air 3.333 times cleaner). A new feature is the increase of the filter area to 201 square inch (1300 cm²) It provides the filter with extremely low breathing resistance and extended usage time. This filter can be used on all Sundström Air Purifying Respirators.



The SR 221 Pre-filter should always be used for particle, chemical cartridge and combined filters. The pre-filter protects the main filter against premature clogging by larger particles, for example dirt and dust

The SR 5153 Pre-filter holder secures and protects the pre-filter against handling damage. Also used for face-fit tests together with test disc SR 322.

Change the filter if it has been damaged or if you feel increased breathing resistance.
Particulate filter protects only against particles.

Chemical cartridges for Air Purifying Respirators



Chemical cartridge OV

The SR 218-6 OV chemical cartridge is used with Sundström Safety Air Purifying Respirators to provide protection from certain levels of organic vapor. This chemical cartridge is approved for independent use or can be combined with the Sundström P100 particulate filter SR 510.

Chemical cartridge CL/HC/SD/FM

The SR 231 CL/HC/SD/FM chemical cartridge is used with Sundström Safety Air Purifying Respirators to provide protection from certain levels of chlorine, hydrogen chloride, sulfur dioxide and formaldehyde. This chemical cartridge is approved for independent use or can be combined with the Sundström P100 particulate filter SR 510.

Chemical cartridge OV/SD/CL/HC/HF

The SR 232 OV/SD/CL/HC/HF chemical cartridge is used with Sundström Safety Air Purifying Respirators to provide protection from certain levels of organic vapor, sulfur dioxide, chlorine, hydrogen chloride and hydrogen fluoride. This chemical cartridge is approved for independent use or can be combined with the Sundström P100 particulate filter SR 510.

Chemical cartridge AM/MA

The SR 229 AM/MA chemical cartridge is used with Sundström Safety Air Purifying Respirators to provide protection from certain levels of ammonia and methylamine. The cartridge is approved for use alone or can be combined with Sundström P100 particulate filter SR 510.

Combined filters

Combinations of filters can be used if gases/vapors and particles occur at the same condensation. Select a suitable chemical cartridge and combine it with the P100 particulate filter SR 510 simply by pressing them together. Note that the P100 particulate filter must **always** be placed in front of the chemical cartridge.










After saturation, leakage will occur at an accelerating rate. The chemical cartridge should be changed well before saturation. Use only filters from unopened packages.

Chemical cartridges protect only against gas/vapor.

For more information call Sundstrom Safety Inc. at 877-SUNDSTROM

Work situations



Work situation	Type of pollutant	Type of protective device	Type of filter/color code
Painting/roller application of solvent-based paint. Degreasing/washing. Work with adhesives and jointing compounds.	Solvent vapors.	Half mask or full face mask (if the eyes are irritated).	Chemical cartridge OV + pre-filter. 
Spray painting with water-based paint/solvent-based paint in open, ventilated areas. Spraying with weed killers, insecticides, etc. High-pressure washing with additives.	Liquid aerosols (spray) and vapors/solvent vapors. Liquid aerosols (spray), vapors from organic weed killers, insecticides, etc. and solvent vapors (degreasing).	Half mask or full face mask (if the eyes are irritated).	Chemical cartridge OV + P100 particulate filter + pre-filter.  
Grinding work (if no gas is emitted). Rock drilling. Chimney-sweeping. Drilling of metals. Turning. Mould spores and other microorganisms.	Particles.	Half mask or full face mask (if the eyes are irritated).	P100 Particulate + pre-filter. 
Welding in ventilated areas.	Fumes and gas.	Half mask.	Chemical cartridge CL/HC/SD/FM + P100 particulate filter + pre-filter.  
Painting/washing with products containing Ammonia. Work on refrigeration systems. Using ammonia as the refrigerant.	Ammonia.	Half mask or full face mask (if the eyes are irritated).	Chemical cartridge AM/MA. 
Work in sewage treatment plants, public baths, etc. Work on acids, such as in etching, pickling, ensilage.	Inorganic gases/vapors and acid gases (chlorine, sulphur dioxide, sulphuric acid, nitric acid, formic acid).	Half mask or full face mask (if the eyes are irritated).	Chemical cartridge CL/HC/SD/FM + P100 particulate filter + pre-filter.  

Supplied Air Respirators (SAR)

Supplied Air Respirators can be used in all environments where filtering devices can be used. Supplied Air respirators are particularly well suited if the user is performing hard or sustained work and if the pollutants have poor warning properties or are particularly toxic.

Air consumption

The quantity of air consumed by a user depends on work intensity. There are also differences between people. If a particular user has a certain average air consumption, the air flow supplied must be at least 3 - 5 times higher during the inhalation phase to ensure that no negative pressure will occur in the respirator. Typical values of air consumption and flows in various situations are given below:

Work situation	Average air consumption	Min. air flow rate during inhalation
Seated work	approx. 0.36 CFM	approx. 1.1 CFM
Walking/talking at the same time	approx. 1.8-2.1 CFM	approx. 5.4- 6.3 CFM
Moderately heavy work	approx. 1.8 – 2.1 CFM	approx. 5.4 – 6.3 CFM
Fireman AT work	approx. 5.4 CFM	approx. 16.2 CFM

N.B. If a loose- fitting respirator is used, such as a hood, make certain that the actual air flow available for that particular work situation is sufficient. A tight-fitting respirator, such as a full face mask or half mask, is not equally sensitive to a partial vacuum.



The SR 99 compressed air filter unit is used to convert ordinary compressed air into pure breathable air. The unit consists of a regulator, pre-collector and main filter which are mounted on an enclosed steel sheet chassis. The filter can be placed on the floor or hung on a wall. The pre-collector, which has pressure controlled/manual drainage, separates out coarse particles, water and oil. The main filter has an exchangeable filter kit, SR 292. Inlet air pressure, 60 - 150 PSI / 0,35 - 1,0 MPa.



Filter cartridge SR 292

For SR 49, SR 79 and SR 99. Consists of two particulate filters and approximately 1.0 lbs / 450 gram activated carbon. If the air quality is normal, the useful life of the filter is 6-12 months.

Supplied Air Respirators (SAR)



SR 200 Airline full face mask, is a Type C Continuous Flow Supplied Air Respirator with filter backup. It is particularly well suited if the user is performing hard or sustained work, and if the pollutants have poor warning properties or are particularly toxic. The breathing hose can be detached from both mask and regulator. The flow rate can be set between 5.3 CFM to 12 CFM / 150 lpm to 340 lpm. Working pressure, 60 - 100 PSI / 0,4 - 0,7 MPa. The SR 200 Airline is delivered with CEJN 10 342 series connectors.



SR 307 compressed air attachment combined with **SR 200 full face mask**, **SR 100 half mask** or **SR 90-2 half mask**, is a Type C Continuous Flow Supplied Air Respirator. The SR 307 is an attachment that enables a half or full face mask to be converted from an Air Purifying Respirator to a Supplied Air Respirator. It is particularly well suited if the user is doing hard or sustained work, and if the pollutants have poor warning properties or are particularly toxic. The flow rate can be set between 5.3 CFM to 12 CFM / 150 lpm to 340 lpm. Working pressure, 60 - 100 PSI / 0,4 - 0,7 MPa. The SR 307 is delivered with CEJN 10 342 series connectors.



Compressed air supply hose SR 358 Plastic hose made of PVC-reinforced polyester. Inner diameter/outer diameter 0.374/0.590 inch (9.5/15 mm) Length 16 feet, 33 feet, 49 feet, 66 feet, 82 feet and 99 feet (5 m, 10 m, 15 m, 20 m, 25 m and 30 m). Is delivered with CEJN 10 342 series connectors.



Compressed air supply hose SR 359 Rubber hose made of EPDM/polyester. Antistatic and heat resistant. Inner diameter/outer diameter 0.590/0.709 inch (9.5/18 mm) Length 16 feet, 33 feet, 49 feet, 66 feet, 82 feet and 99 feet (5 m, 10 m, 15 m, 20 m, 25 m and 30 m). Is delivered with CEJN 10 342 series connectors.



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