



SAS-W

Mobile Water Purification Unit Usage and Configuration





Standardized Aid System (SAS)

The Standardized Aid System approach (SAS) provides the same physical framework for all deployable units. Therefore, the SAS units are standardized in size and transportability. All units are stackable and utilize the same media connectors. The frame is designed to absorb shock impulses for a controlled airdrop. Within the SAS framework, any unit can be provided fully autonomous with a combustion engine serving as the power source. The parts used are chosen purposefully for easy accessibility worldwide.

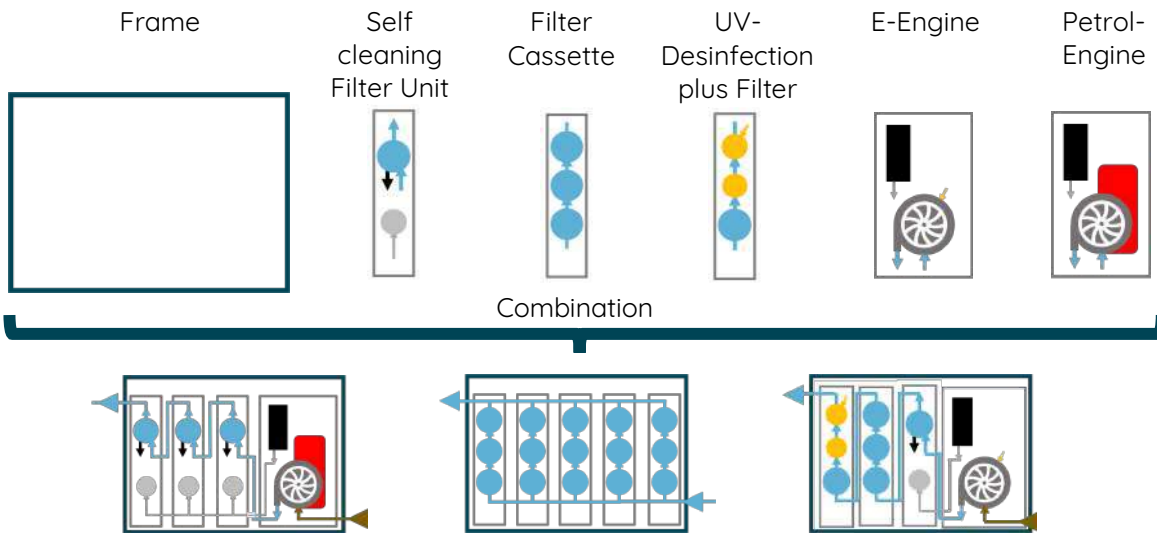
SAS-W



The SAS-W uses multi-stage filtration to filter a minimum of 2500 l/h. Three standardised filter cartridges can hold any kind of 20" DOE Filter. A newly developed pneumatic filter cleaning mechanism, which is able to work fully automatically, ensures long operating times (DE: 10 2022 104 857.8). The reliability and durability of the product are emphasized by having no electronic instruments in the gasoline-engine version. Five individually configurable slots allow you to configure the machine to your requirements. You can either configure a machine with a drive unit and three filter units for autonomous operation, or a machine with



five filter units and an external pump for very high capacities and long running times.



End Filtration Technology	Microfiltration or Ultrafiltration
Dimensions [l x w x h]	120 cm x 100 cm x 76 cm - [EPAL2, LD3]
Weight	135 kg
Handles	4 collapsible handles - one on each corner
Filtration Capacity	2,500-8,000 l/h (depending on the model)
Connectors	1" Camlock for 25 mm hose
Water Source	Any non-Saline Water Source
Filtration Depth	Basic Sequence: 10 µm, 1 µm, 0,1 µm - Possible up to 0,04 µm
Max. Water Pressure	4 bar
Max. Pneumatic Pressure	8 bar
Filter cleaning time	10 s
Suction Pipe	5 m expandable
Power	4.8 kW Gasoline Engine or 230 V Electric Engine
Start	12 V Battery supported starter for the Gasoline Engine or directly by pull-cord
Runtime	3 hours with full tank





Options

Humanitarian organizations and their operational approaches differ, therefore the SAS-W can be adapted to the respective use-cases.

1. **FILTER** [high sediment vs. high biological load]
Select the filter based on the expected water source. Since the filter cartridges support a wide variety of 20“ surface or depth filters, the choice depends only if the filters shall be cleaned automatically within the pneumatic cleaning system. The pre-set air pressure for cleaning is 8 bar, which is applied backwards against the water pressure. A selected filter should be able to withstand a general differential pressure of 4 bar. The basic choice for medium muddy river water is 10 µm, 1 µm and 0,1 µm. 3 – 15 individually filter stages are possible.
2. **POWER** [gasoline vs electric]
Select the power source based on the operational scenario: If the unit shall be fully autonomous with an onboard gasoline engine or run on 230V electric engine.
3. **OPERATION** [stainless steel vs. polypropylene]
Decide whether the unit shall be used for multiple operations throughout the year or whether the unit will serve as a backup that is used only in the worst case. For the second case we suggest PP filter casing and filters as well as PP piping, which will decrease weight and cost.
4. **CLEANING** [semi vs. fully automatic]
A fully autonomous machine uses an INITIATOR which will activate the cleaning procedure if a certain water pressure is reached. The cleaning procedure in the semi-automatic version can be started by pushing the respective button on the control board.
5. **ADDONS** [UV, Charcoal, Chlorinator, Wheels, Impact Shield]
The SAS-W can be equipped with a variety of addons like a chlorinator or a charcoal filter. A 230V UV light module can be implemented in the electric version. Wheels support the transportation at airports. Impact shields protect the machine from transportation damage.



Usability Guideline SAS-W

Transportation

LD3

The SAS-W meets the LD3 requirements for the transport in commercial **airplanes**

EPAL2

Standardized in its size the SAS-W is easy to move by conventional logistics

max. 140 kg

Limited in weight, the SAS-W can be transported by foot using its four **handles**

Operation

Rapid Deployment

The onboard **gasoline engine** and **suction pipe** allow the immediate filtration of clean water without any source of electricity or further required equipment

Semantics

Designed to be operated by **untrained users**, the controlboard displays all required instructions

Manual

The water- and tearproof manual enables the user to quickly operate and maintain the SAS-W

Filter Tower

3-times **stackable** and equipped with an **electric engine** the SAS-W can be used as high performance filter tower, either parallel or operating **multiple different equipped** SAS-W In-Line

In-Line

To increase filtration grade the filter elements inside the SAS-W can be connected In-Line, for example mounting a self-cleaning sediment filter in position 1, a filter cassette with microfilter and charcoal-filter in position 2 and a UV-Element for sanitation in position 3

Parallel

To increase filtration output the filter elements inside the SAS-W can be connected parallel, for example mounting three UV-Elements to disinfect up to **12.000 l/h** in position 1 - 3

UV

The UV Disinfection complements the microfiltration by also sanitizing the water, killing other living organisms like **viruses**

Maintenance

Self-Cleaning

The SAS-W can be equipped with self-cleaning filter units, which use a electricity free pneumatic cleaning procedure enabling the SAS-W to **clean itself during operation** time

Restoration

To restore filter performance after operation the SAS-W can be backflushed easily or cleaned with oxidation chemicals.

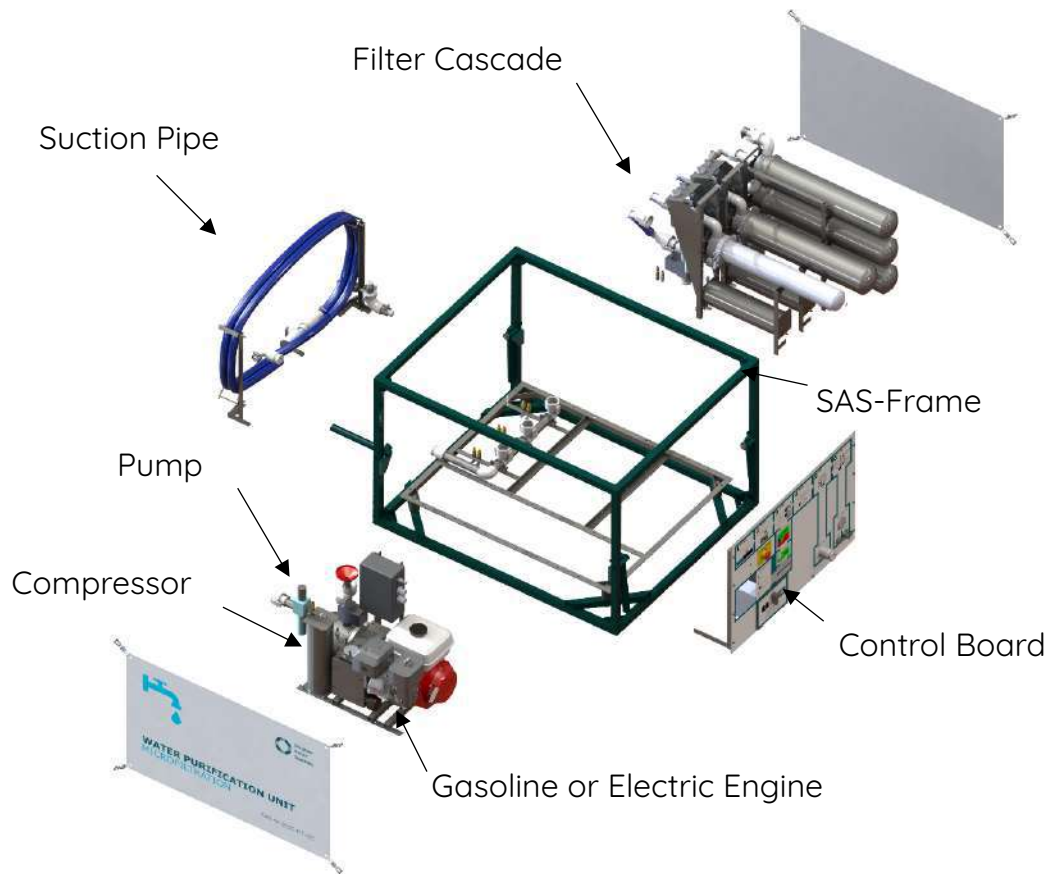
Reparability

The high durability of the machine is complemented by its reparability, underpinned through **modularity**, component accessibility and the use of pneumatic instead of electronic controls



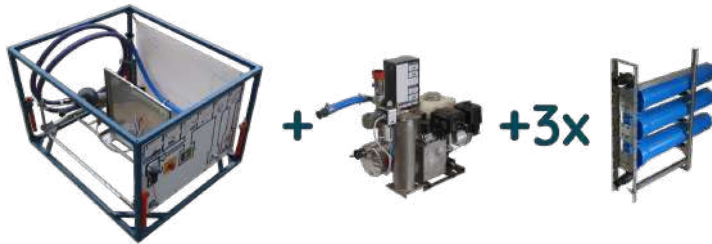
Example Setups

The setup shown includes a gasoline engine as drive with compressor and a corresponding control panel, an on-board suction hose with foot valve for immediate use, and a filter cascade consisting of two filter units (one polypropylene, one stainless steel) and a cassette (with stainless steel filter pots). The side panels are made of PVC and the frame is in the standard color palette.



Rapid Deployment Setup with gasoline engine

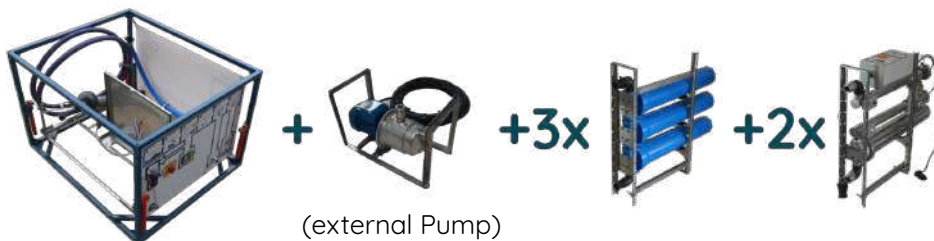
One possible application for the SAS-W is the use of the machine for the immediate treatment of drinking water without any additional equipment. For this purpose, the machine is equipped with a gasoline engine and a 5 m suction hose. The filter cascade consists of two parallel-connected cartridges with a 5 μm wound filter, a 1 μm melt-blown filter, and a 0.2 μm filter for coarse and fine sediments. This is followed by a cartridge with two activated carbon filters and a 0.1 μm membrane filter for biological contamination. This system runs completely autonomously without electricity and can be used from a trailer or the rear of a vehicle.



- SAS-W-F0-0S3P0-E0S (explained on site 10)

Long Term Electric Setup with UV-Disinfection

For long-term use of the system, an electrical system with an external pump is recommended. This setup consists of five filter units and an external water pump. Three filter cartridges are connected in parallel, which then feed two UV units. The two cartridges contain a 5 µm wound filter, a 1 µm melt-blown filter, and an activated carbon filter. A 0.2 µm fold element-filter is installed upstream of each UV unit.



- SAS-W-F0-0S3P2-EBS + AD-W-BOOS (explained on site 10)

First Aid Water Kit Unit

If large volumes of water need to be filtered very quickly and without long running times, the machine can be used as a kind of first aid kit. In this configuration, an electric pump, a filter cascade with two filter cassettes, and a UV unit are installed. The Cassette units contain a 1 µm melt-blown filter, an activated carbon filter, and a 0.2 µm pleated element filter for coarse and fine sediments. The UV unit contains an activated carbon filter followed by UV disinfection.



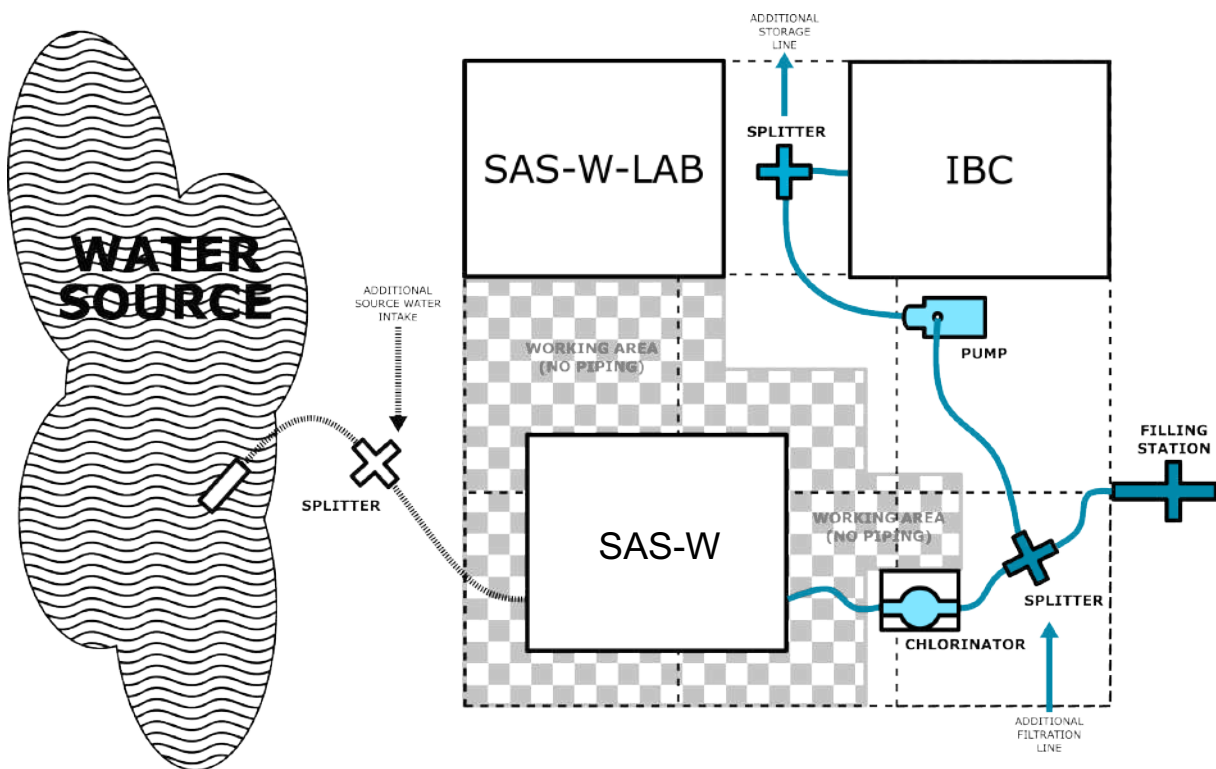
- SAS-W-F0-0P2P1-E0S (explained on site 10)



RFS - Recommended Field Setup

Single Machine Setup

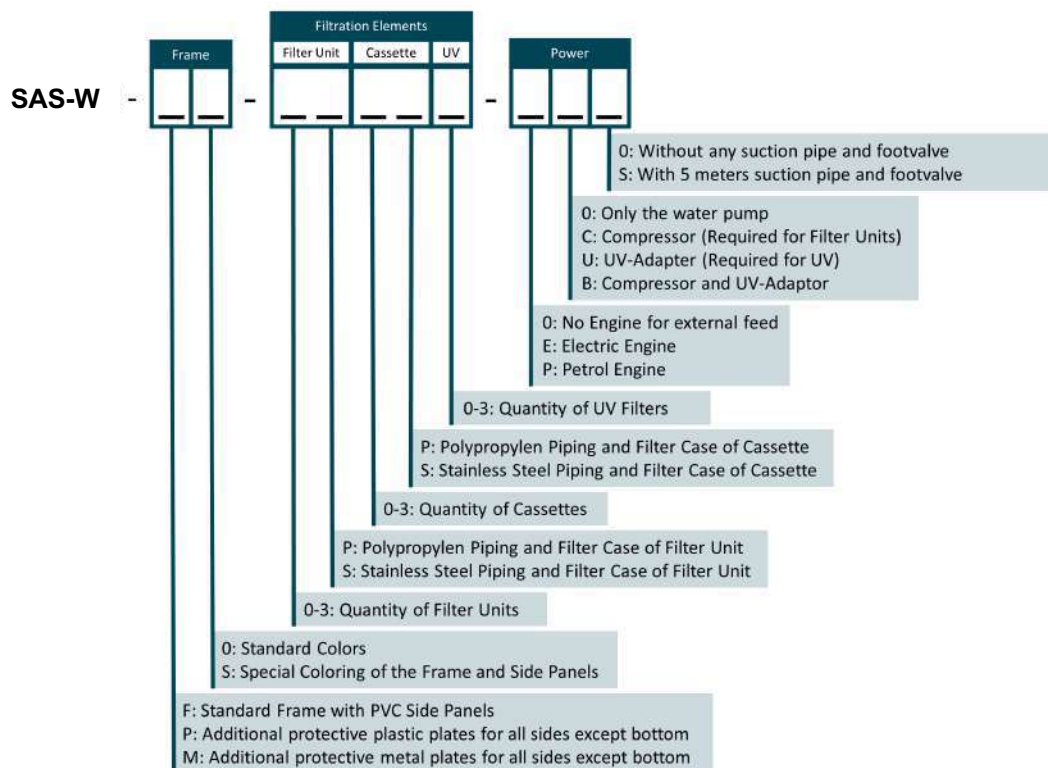
The SAS-W can be operated in different scenarios. The main difference between the scenarios is whether the system is to be operated as a mobile system on a vehicle or as a stationary system. For stationary use, a recommended field setup on 3x3 m² is shown below. Here, the SAS-W feeds a filling station and a water tank (IBC container) with a subsequent inline chlorinator after the machine. With an area of 1.2 m x 1 m, an additional laboratory setup is suggested so the personnel is able to evaluate the various water samples on site. An additional pump is required to feed the filling station from the water tank directly. This 3x3 m² setup is usable for a small camp. For proper use there is a working area needed which is shown in the setup.





Order Code

The high modularity of the SAS-W is reflected in the ordering code and is divided into three areas: The frame and associated options, various filtration elements with their associated options as well as the drive with its associated and filtration element dependent options. The filter cascade consists of three filter slots. A self-cleaning filter unit, a filter cassette or a UV filter can be installed in each filter slot. The ordering code is composed as follows:



A SAS-W with metal protection plates and a paint finish in the colors of the respective organization should be able to be equipped in the field with a number of filter units and cassettes, depending on the water outlet situation. An electric drive, including compressor and the adapters for UV filters, allows the operation with the generators of the organization. An additional gasoline engine with compressor allows the SAS-W to operate without the presence of a power source. The ordering codes would be as follows:

- [SAS-W-MS-4S4S1-EBS](#) + [AD-W-PCU0](#)

An SAS-W2500 in its **First Aid Water Kit** variant with three manually backwashable cassettes and a gasoline engine without compressor and suction hose would result in the following ordering code:

- [SAS-W-F0-0P3P0-POS](#)



Accessories /ADDONS

Name	Description	Order Code
X-way parallel adapter	The 3-way parallel adapter enables the parallel connection of filter units or cassettes each to increase the filter throughput. This includes one adapter for connecting the three inputs and one for connecting the three outputs. The adapter can be connected directly to the pump.	AD-W-[X]PAD <i>[X] is to be specified in the amount of Filter Units which are to be connected in parallel</i>
External Booster-pump	The booster pump allows a SAS-W to be operated without a built-in drive unit or to distribute drinking water further after a SAS-W. It can be operated directly via the SAS-W control panel.	AD-W-BOOS
Camlock-Storz-C-Adapter	This includes a female and a male 1" Camlock on a Storz-C coupling each. Aluminium and stainless-steel finish.	AD-W-1KSC
Inline chlorinator	The inline chlorinator is a purely mechanical chlorine addition device with its own tank to be connected to the SAS-W2500.	AD-W-ICLO
Hose 25mm Suction (Black)	The dimensionally stable 25 mm drinking water hose is equipped with a female and a male 1" Camlock. The length is freely selectable between 1 - 25 meters and to be specified in the order key. The hose is dimensionally stable and suitable for suction priming.	AD-W-S100-[XX] <i>[XX] is to be specified in meters: 7 Meter = AD-W-SS07</i>
Hose 25mm Pressure (Blue)	The dimensionally stable 25 mm drinking water hose is equipped with a female and a male 1" Camlock. The length is freely selectable between 1 - 25 meters and to be specified in the order key.	AD-W-D100-[XX] <i>[XX] is to be specified in meters: 7 Meter = AD-W-SS07</i>
SAS-Wheels	The SAS frame can be equipped with 125 mm solid rubber wheels. Two rigid wheels and two articulated wheels with brake.	AD-S-R125
Protective cover	For storage of the SAS it is recommended to use a cover, which protects the device from dust and slight damage.	AD-S-SHFI
Splitter	The splitter can be used to divide an incoming water stream to three outgoing water streams. Each outgoing stream can be closed separately with a water valve.	AD-W-SPLT
Drinking Water Distributor	The Drinking Water Distributor consists of a stainless-steel splitter with two taps, a camlock input and a camlock output with a water valve. You can connect several distributors in series to increase the number of taps. Every Distributor has a separate mounting.	AD-W-DWDI
SAS-W 5-Meter Suction Pipe	The 5 m suction hose with hose suspension in the SAS-W, float ball and sediment filter at the foot valve allows the unit to be used without a backing pump or supply line. The suction hose can be inserted directly into the raw water source, the pumps on the drive are each capable of up to 5 m suction height.	AD-W-HR00



Name	Description	Order Code
 <p>SAS-W gasoline engine</p>	<p>A gasoline engine with water pump and optional compressor and pneumatic circuit [C] (necessary for the operation of filter units) and optional adapter for UV filters [U] (necessary for the operation of UV filters).</p>	<p>AD-W-P[C][U]0 <i>[C] = With compressor and pneumatic circuit</i> <i>[U] = with UV-Adapter</i> <i>[0] = each without:</i> AD-W-P000</p>
 <p>SAS-W electric motor</p>	<p>An electric drive with water pump and optional compressor [C] (necessary for operation of filter units) and connection for UV filter [U] (necessary for operation of UV filters).</p>	<p>AD-W-E[C]U0 <i>[C] = With compressor and pneumatic circuit</i> <i>[0] = without:</i> AD-W-E0U0</p>
 <p>SAS-W Filter Unit</p>	<p>A Filter Unit consists of a filter housing for 20" DOE filters suitable for pneumatic backwashing, an air tank and valves to control the backwashing. The Filter Unit allows immediate pneumatically assisted backwashing of a filter during operation, to minimize downtime when the raw water has a high particle load. The FU can be made of polypropylene [PP] or stainless steel [SS]. For the operation of a filter unit, the pneumatic supply and thus a compressor, air tank and the pneumatic control on the respective drive are necessary (order code: [C]).</p>	<p>AD-W-FU[XX] <i>[PP] = Polypropylene</i> <i>[SS] = Stainless Steel</i> <i>Example: AD-W-FUSS</i></p>
 <p>SAS-W Cassette</p>	<p>A cassette consists of three filter housings connected in series. The cassette can be made of polypropylene [PP] or stainless steel [SS].</p>	<p>AD-W-CA[XX] <i>[PP] = Polypropylen</i> <i>[SS] = Stainless Steel</i> <i>Example: AD-W-CAPP</i></p>
 <p>SAS-W UV-Filter</p>	<p>One UV filter contains two 48 W lamps with a combined sterilization capacity of 4,000 l/h. An additional filter pot allows the use of a 20" DOE pre-filter. To operate the UV filter, the UV adapter is required on the respective drive (order code: [U]).</p>	<p>AD-W-UV00</p>



Filter

Due to standardization, a great variety of 20" DOE filters are available worldwide in different designs and qualities. In the following table, we offer only those filters and filter variants that are of high quality and have been tested by us for their properties and retention effect.



Filter Type	Filter grade in μm	Pneumatic backwash (Filter unit suitable)	Range of application	~ l/m at 4bar	Order Code
Wound Filter	200 – 1	yes	High sediment load	100	FI-W-W[XXX] [XXX] to be specified with the filter grade in XXX 50 μm = FI-W-W050
Melt Blown	50 – 0,5	yes	Sediment load High biomass load	80	FI-W-B[XXX] [XXX] to be specified with the filter degree in XX,X 25 μm = FI-W-W250
Fold Element	50 – 0,2	yes	Light sediment load Light biomass load Bacterial load	70	FI-W-F[XXX] [XXX] to be specified with the filter grade in XX,X 15 μm = FI-W-W150
Membrane	1 – 0,04	no	Bacterial load Viral load	40	FI-W-M[XXX] [XXX] to be specified with the filter grade in X,XX 0,1 μm = FI-W-W010
Charcoal	~ 10	limited	Flavors Free Chlorine	100	FI-W-C000



About us

The operational scope of Disaster Relief Systems is to develop partnerships with organisations and international institutions in the humanitarian sector. We analyse their demands, environments, and technological gaps with the goal of developing solutions for resilience building and technical equipment for humanitarian first aid. Therefore, our team initiated the project Disaster Relief Systems and developed the Standardized Aid Systems (SAS). With reliable, easy to use and cost-efficient technical solutions combined with a standardized environment, we want to improve the response time and the impact of humanitarian aid.

The team behind Disaster Relief Systems aims to improve humanitarian aid through the development of extensive knowledge in the field of natural disasters and their management. To achieve this, we analyse the needs and standards of humanitarian aid organizations and prioritize where we can support and improve their work. All of which is done by placing the well-being of people and their environment at the centre of our operations.

Given the rise of the world's population, combined with an increasing number of natural disasters, well thought through solutions with the involvement of all stakeholders are key for civil protection in the 21st century and a big step towards global disaster resilience.





Legend

CH	Charcoal
DOE	Double Open End
FE	Fold-Element
kw	Kilo Watts
l/h	Liter per Hour
MB	Meltblown
MM	Membrane
PP	Polypropylen
SAS	Standardized Aid System
UV	Ultraviolett
V	Volt
WF	Wrapped-Filter
m	meter
µm	Mikrometer

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