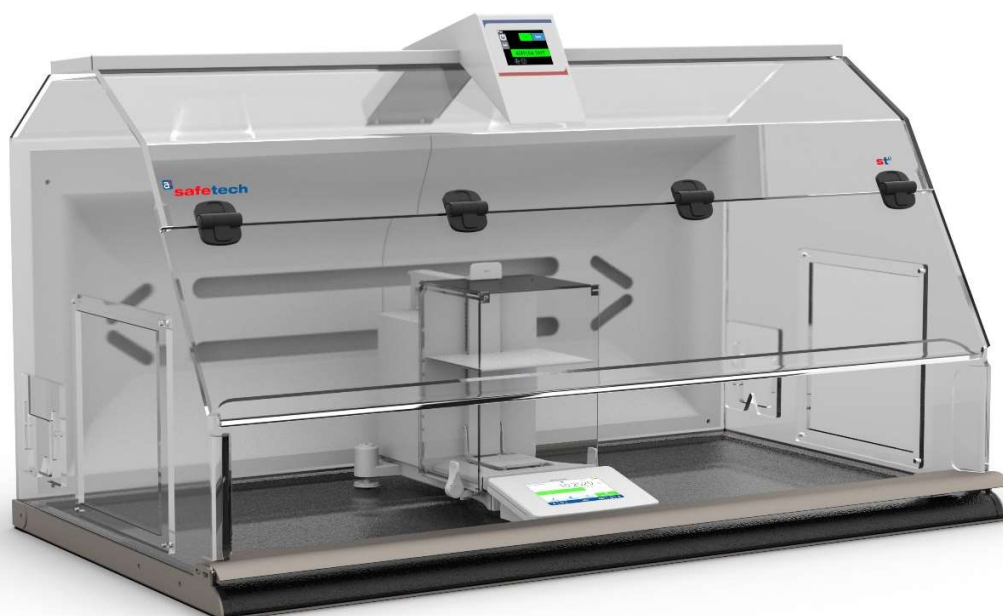


ST1 Safety Weighing Enclosure

Operating instructions



Imprint

These operating instructions are original operating instructions. The operating instructions should be read carefully and followed. The basic prerequisite for safe handling and trouble-free operation of the equipment is knowledge of the safety regulations and observance of danger and warning notices. If the safety weighing enclosure or installed accessories are to be used in a way not intended by the manufacturer, please contact us in advance so that we can assess the risks involved.

Manufacturer

a1-envirosciences GmbH
Eichsfelder Str. 1
40595 Düsseldorf
Phone: + 49 211 758483 -0
Fax: +49 211 758483-22
sales@a1-envirosciences.de
Internet: www.a1-envirosciences.de

Copyright

Copyright © a1-envirosciences GmbH, Düsseldorf

These instructions are protected by copyright and are intended exclusively for the operator's internal purposes. The instructions may not be handed over to third parties, reproduced in any form - including excerpts - and the contents may not be used and/or communicated without the written permission of the manufacturer, except for the operator's internal purposes. Violations will result in compensation. Further claims remain reserved.

Contents

Explanation of symbols.....	5
Warnings.....	5
General information on safety.....	6
Responsibilities of the staff.....	6
Information for safe operation	7
Safety instructions for installation, operation, modification and malfunctions	8
Instructions for safe maintenance, servicing, troubleshooting.....	11
Unpacking.....	14
Location selection	15
Installation by a1-envirosciences.....	16
Filter units - Notes on installation	16
Functional description.....	18
ST1 safety weighing enclosure structure	20
Options.....	21
System dimensions.....	21
System configurations and accessories	22
System with two-layer HEPA filter (option).....	22
Filter unit with silencer (option).....	23
System with additional solvent filter (option).....	23
Electrostatic discharge systems (options).....	24
Double bag waste system (option).....	24
Printer table (option).....	24
Connection to the building's ventilation system via draught diverter.....	25
Special safety instructions	26
Instructions for working with ST1 safety weighing enclosures	28
Filter units	29
Filter change (only by qualified personnel).....	30
HEPA filter.....	31
Carbon filter.....	31
Alarm system.....	32
Structure and function of the alarm system.....	32
Switching on the alarm system	35
Operating the alarm unit	35

Alarm state and safe operating state	38
Resetting the alarm	39
Manual testing of the sensor	40
LED lamp	40
Discharging the waste bags.....	46
Intended use of electrostatic discharge systems	48
Occupational and operational safety when working with electrostatic discharge systems	48
Installation and commissioning	51
Use of electrostatic discharge systems	52
Carrying out the cleaning.....	55
Suitable cleaning agents	56
Basic safety instructions for maintenance and repair work	57
Maintenance intervals	59
Troubleshooting	60
Customer service	61
Dismantling by a1-envirosciences	62
Dismantling on your own initiative	62
Technical data for ST1 series safety weighing enclosures.....	63
Information for delivery and packaging	63
Materials.....	63
Dimensions.....	64
Constand Air Volume (CAV).....	65
Consumption of complete System per hour	65
Technical data on peripheral devices	66
System dimensions - Filter unit with HEPA filter or activated carbon filter	69
HEPA filtration unit.....	69
Carbon filtration unit.....	69
Observed standards.....	70
Work regulations	70
Technical rules	71
Test procedure	71
Consumables for ST1 series safety weighing enclosures	72
Spare parts.....	72

Information for the user

Explanation of symbols

Warnings

Please read these operating instructions carefully. We want to ensure that you use our safety weighing enclosures effectively without suffering any damage to your health. Observing our warnings will also ensure that you can use this product for as long as possible.

Explanation of symbols of warnings concerning personal injury:



Danger

Indicates a dangerous situation where there is an immediate danger to life or serious injury if the respective warnings are not observed.



Warning

Indicates a hazardous situation where there is a possible risk of serious or fatal injuries if the respective warnings are not observed.



Caution

Indicates a hazardous situation where there may be a risk of minor injury if the respective warnings are not observed.

Explanation of symbols of warnings concerning damage to equipment or materials:



Attention

Indicates warnings that serve to prevent damage to equipment or materials.

Explanation of symbols for important information:



Note

Indicates particularly useful information.

General information on safety

The equipment complies with the fundamental health and safety requirements for laboratory equipment. These have been taken into account accordingly in the design and construction of the equipment. The equipment is built in accordance with the legal regulations, directives and recognised standards applicable at the time it is placed on the market. Nevertheless, hazards to people, materials and the environment may arise during use if the warnings in these operating instructions are not observed.

Responsibilities

Responsibilities of the operator

The operator should ensure that only persons work with the safety weighing enclosures who are trained and instructed in the handling of the device and

- who are familiar with the basic regulations on occupational safety and accident prevention;
- who can refresh the necessary knowledge of working with hazardous substances and the handling of safety weighing enclosures periodically through training;
- who have read and understood the operating instructions with the safety regulations and the warnings included in these operating instructions.

The operator should also ensure that maintenance work, especially on the electrical equipment, is only carried out by qualified and trained personnel.

Responsibilities of the staff

All persons assigned to work on the equipment should be trained and instructed accordingly. Before starting work, they should:

- know the basic regulations on occupational safety and accident prevention and observe them for their own safety;
- have read and understood the operating instructions with the safety regulations and the warnings in these operating instructions;
know and observe the work instructions of the operator.

Regulations for safe use

- Safety devices must not be switched off or overridden. The equipment must not be modified or converted without the written consent of the manufacturer.
- The equipment must only be used in enclosed rooms designed for this purpose.
- The equipment must only be operated in perfect condition without damage. Faults and damage must be rectified immediately; in the meantime, the equipment must be decommissioned.

Information for safe operation



Warning of misuse

Improper use may pose a serious risk to persons and property.



Warning of contamination

There is a risk of contamination if the safety weighing enclosures are handled incorrectly. The hazardous substances used can contaminate people in the vicinity of the equipment and the environment.

Please observe the following general safety instructions:

- The information in these instructions will help you to work in a safe and contamination-free manner.
- Please read these instructions with particular care before working in the safety weighing enclosure for the first time.
- Keep the instructions handy. When working on the ST1 weighing enclosure, ensure that the instructions are also available there. a1-envirosciences recommends creating an SOP for working on the ST1 weighing enclosure.
- These instructions assume that the user is familiar with all relevant directives, the regulations "Safe working in laboratories" and working on technical equipment.
- The ST1 weighing enclosure may only be operated by trained personnel with the necessary basic technical knowledge.
- Personnel must be properly instructed and trained before working with hazardous substances.
- The applicable safety regulations of your company have priority and must be complied with at all costs.
- Work according to the work regulations given in the operating instructions. For your own safety and for the protection of other employees, you must observe the additional safety instructions given in these instructions in addition to the safety regulations applicable to you.
- For any questions regarding the use of the ST1 safety weighing enclosure, always contact the person responsible for it or a1-envirosciences.

Safety instructions for installation, operation, modification and malfunctions



Danger to life due to electric current



There is an immediate danger to life in case of contact with live parts. If the insulation is damaged, switch off the power supply immediately and arrange for repair. Work on the electrical equipment should only be carried out by trained, authorised personnel. Keep moisture away from live parts. This could lead to a short circuit.

Basically, the discharge electrodes are safe to touch. This means that touching the metal tips of the discharge electrodes will not cause electric shock.



Warning of contamination risks

Substances as well as auxiliary and operating materials could cause damage to health or the environment in the event of contact.

- Before starting any work with the equipment, observe the relevant work instructions of the operator.
- Observe the safety data sheets of the substances used.
- Remember that the transfer of hazardous substances from the storage location to the equipment and the disposal of contaminated waste also involve risks.
- Wear required protective equipment (PPE = personal protective equipment).



Warning of explosion and fire hazards

Solvents can form explosive vapour/air mixtures. Dusts can form explosive dust/air mixtures. An explosive atmosphere in conjunction with an ignition source can lead to an explosion.



Solvents are highly flammable. Storage of flammable solvents in the equipment is therefore not permitted.

Explosions or fires can lead to serious or fatal injuries.



- The equipment must not be used when the filter unit is switched off.
- Flammable liquid or gaseous substances must not be introduced into the work area, except for the approved cleaning agents and solvents.
- Ignition sources must not be present in or brought into the work area during cleaning.
- Dust formation in explosive concentrations in the work area must be avoided.



Leave mains switch accessible

If mains switches are not accessible, the equipment cannot be switched off quickly and safely when needed. Damage to the equipment is possible, or other hazards may arise.

- Make sure that the mains switches are always freely accessible.



Damage due to condensation or overheating

Highly variable or excessive ambient temperatures can cause condensation of water in the filter unit or overheating.

- Operate the ST1 safety weighing enclosure at as constant an ambient temperature as possible in the range of 5 to 40 °C to avoid damage from condensing water or overheating.



Damage due to improper intervention

Improper maintenance, repair or modification work can lead to considerable damage.

- Cleaning, assembly, disassembly, maintenance, adjustment and repair may only be carried out by persons who are trained for these activities and who know the possible dangers.
- Unauthorised modifications and alterations to the ST1 safety weighing enclosure are not permitted for safety reasons.
- Only original parts and accessories specifically designed for the ST1 safety weighing enclosure may be used. Any liability for damage caused by the use of non-original parts or accessories is excluded.

Instructions for safe maintenance, servicing, troubleshooting

- Observe general occupational safety rules and accident prevention regulations.
- Wear suitable personal protective equipment.
- Carry out prescribed maintenance and inspection work in due time or have it carried out by our qualified and specially trained personnel.
- Before maintenance, servicing and repair work, the power supply must be switched off and secured against being switched on again.
- Check loosened screw connections for tightness.
- After completion of the maintenance work, safety devices must be checked for their function.

Main features



Figure 1 - ST1-1200 safety weighing enclosure

Division:

a¹ **safetech**

The ST1 safety weighing enclosures prevent aerosols and/or dust from escaping from the interior of the enclosure. People and the environment are effectively protected from contamination when the equipment is used as intended.

The ST1 safety weighing enclosures are to be understood as a system with an integrated extraction system as a closed design, as the leakage of hazardous substances into the air of the room outside the weighing enclosure is prevented. Leakage of airborne substances is prevented by convection and diffusion of the incoming air and the design of the working opening.

The ST1 safety weighing enclosures have been exemplarily tested according to the guidelines of the ISPE (Institute of Pharmaceutical Engineers) for their suitability for the safe weighing of smaller sample quantities of hazardous substances. The exposure control limit (ECL) tested for weighing and small-scale handling of hazardous substances in quantities of up to 1 g is less than 20 ng/m³.

The special features of the ST1 safety weighing enclosures are:

- Low-turbulence, horizontal air flow over the entire work area
- Specially shaped edges to guide air in the edge sections to prevent contaminated air from escaping
- Ergonomically shaped arm bar
- Easy-to-clean cover of the air collection chamber
- Independent, separate filter housing to avoid vibrations in the weighing enclosure and to maintain the scale functionality
- HEPA filtration system for safe, low-contamination filter changes
- Alarm system with two flow sensors
- Chemical-resistant ceramic work surface
- Waste system with inner and outer waste bag for contamination-free waste disposal

Intended use

The ST1 safety weighing enclosures are used exclusively for weighing or other manipulations of hazardous substances that pose a risk to persons and the environment in the event of a release.

Observance of these operating instructions is part of the intended use. In the case of other manipulations, we as a manufacturer offer support with an appropriate risk analysis.

Through his own risk assessments and operating instructions, the operator must ensure that the equipment is only used within the limits of its technical specifications and that only work is carried out and substances processed with it for which the equipment is suitable.

The ST1 safety weighing enclosures may only be installed and operated in an area in which an explosive atmosphere is never present as a mixture of air and flammable gases, vapours or aerosols or in the form of a cloud of combustible dust contained in the air (non-ATEX zone according to EC Directive 94/9/EC).

The operator must ensure that no substances are processed in the work area in quantities that could lead to the formation of an explosive atmosphere.

This must also be observed when cleaning the ST1 weighing enclosure with flammable solvents that could lead to the formation of an explosive atmosphere.

During cleaning with these solvents, it is essential that the safety weighing enclosure and the filtration and ventilation systems are switched on!

The ST1 series complies with the protective measures required by TRGS 500 (Technical Rules for Hazardous Substances) and is to be regarded as a highly effective extraction system. It is suitable for personal protection in accordance with EN 14175-3 for fume cupboards and also complies with the ASHREA 110 standard.

The ST1 series has been tested according to EN 689 and ISPE guidelines with surrogate substances by InfraServ GmbH & Co. Höchst KG. (The test protocol can be found in appendix D).

The HEPA filtration system used is certified according to DIN/EN 1822.

Assembly and installation

Unpacking

All a1-envirosciences products undergo extensive quality control before leaving the factory and are carefully packed.

After delivery, check the packaging and contents immediately for signs of visible damage due to improper handling during transport.

Until commissioning by a1-envirosciences, you should keep all components in their packaging. During installation, all components are unpacked and set up by a1-envirosciences.

If you unpack the components yourself (not recommended), please ensure that all accessories are included. Keep the original packaging in any case as it offers optimum protection if the components have to be returned, for example.



Avoid damage to the equipment during handling

Always lift the ST1 weighing enclosure by grasping it under the base plate.

- Never lift it by the arm bar or the side openings.

Otherwise, the arm bar may be damaged or the base plate may detach from the enclosure.



Risk of Injury - Caution: heavy weight

The ST1 safety weighing enclosure weighs 30-90 kg. There is a risk of injury when lifting.

- It must be moved by two persons or by means of a lifting tool.

Location selection



Attention: location selection

The installation location of the ST1 safety weighing enclosure has a direct effect on the functionality of the safety weighing enclosure as well as on the application installed in it. Please note the information below when selecting a location.

- Little through traffic and draughts through ventilation systems, windows or corridors as otherwise transverse flows could develop in front of the work opening, obstructing the low-turbulence airflow into the enclosure. → Danger due to substance leakage!
- Even, stable and vibration-decoupled, vibration-free substructure to maintain the functionality of the analytical balances used (if one is used).
- Good visibility and lighting must be ensured at the installation site.
- Clean and, if necessary, decontaminated set-up area. The installation location must not be chemically, physically or biologically contaminated.
- The front of the ST1 weighing enclosure must be as close as possible to the weighing table so that the arm bar protrudes slightly to allow good airflow to the flow sensors (not required for IE series).
- A comfortable chair suitable for laboratory use with an upright backrest and height adjustment should be provided as an integral part of the work area.
a1-envirosciences recommends adjusting the seat height according to body size so that the forearms are approximately at a right angle to the upper arms in the working position.
- The scope of delivery of the ST1 safety weighing enclosure includes a ventilation kit that connects the weighing enclosure to the filter unit. The ventilation hoses contained in it must not be kinked and come in contact with the ST1 safety weighing enclosure and must be freely accessible.
- If the ST1 safety weighing enclosure is to be connected directly to the building's exhaust air system (not recommended), an adjustable valve must be installed in the system to regulate the air flow and to ensure the required inflow velocity (0.35-0.45 m/s).
- Special care must be taken with ST1 safety weighing enclosures that are connected to a building's exhaust air system if gases, aerosols and/or particles are released and exhausted into it. Here, special attention must be paid to the chemical compatibility of the substances in the various exhaust air system ducts.

Installation by a1-envirosciences



Avoid damage to the equipment during installation

The ST1 safety weighing enclosure must only be installed by a1-envirosciences service personnel or personnel specifically authorised for this purpose. Installation by a1-envirosciences is included in the delivery.

The a1-envirosciences technician checks the installation location, unpacks the ST1 safety weighing enclosure and sets it up. All supplied options will be installed properly. A power socket must be available and accessible near the installation location. (If an antistatic bar is used, a second mains connection must be available.)

This is followed by a functional check of the sensors, the alarm system and the HEPA filtration system. The HEPA filter's retention rate is tested by means of a DOP test (Dispersed Oil Particulate). After successful installation, the customer receives an IQ and OQ.

Finally, the users are instructed in the operation of the enclosure. Furthermore, a1-envirosciences recommends an optional detailed training by a specialised a1-envirosciences employee.

Filter units - Notes on installation

The filter unit must be positioned from the ST1 safety weighing enclosure in a vibration-decoupled manner. The installation location can be under or above the enclosure or on the side. The filter unit must not be installed upside down.

The hose connections to the filter unit should not come in contact with the ST1 safety weighing enclosure (vibration transmission and thus impairment of the scale functionality).

Installation by a1-envirosciences is included in the delivery. When the filter unit is installed by a1-envirosciences, the inflow velocity is set and recorded in the IQ/OQ.



Warning of contamination risks

A considerable risk of contamination arises if the filtration system is installed incorrectly or functioning improperly!

- The filtration system may only be installed by a1-envirosciences or specially authorised personnel. Installation by a1-envirosciences is included in the delivery.

- Improper installation may result in damage to the filter. Only a correct procedure ensures that the filter is installed properly and can be changed without contamination.
- Setting or adjustment of the inflow velocity may only be carried out by a1-envirosciences technicians or authorised personnel. There is a risk of contamination if the inflow velocities are not set correctly!
- After installation and after each change of the HEPA filter, the function (filter integrity) of the installed HEPA filter must be checked. For this purpose, a DOP test (Dispersed Oil Particulate) is carried out.
If a DOP test is not carried out, the functionality of the ST1 safety weighing enclosure cannot be guaranteed and there could be a significant risk of contamination.
- Once installed, a filter housing with a qualified HEPA filter must not be moved or opened.



Notes on maintenance and filter change

Easy access for regular maintenance and possible filter change must be ensured.

Annual maintenance of personal protection enclosures is required either by law or the operator, depending on the risk assessment of the hazardous substances used.

a1-envirosciences strongly recommends having the unit serviced annually and the HEPA filters replaced every 3 years.

System description



Figure 2 - ST1-1200 safety weighing enclosure on stainless steel table frame

Functional description

The ST1 series safety weighing enclosures protect the user from airborne hazardous substances during the weighing process or other dusty manipulations. This protection is ensured by:

- Alarm-supported monitoring of air flows;
- Low-turbulence air flow due to the ergonomic design;
- Work according to GLP regulations.

The aim is to virtually eliminate the user's exposure to hazards. The design of the ST1 series safety weighing enclosures guarantees highly effective extraction as the hazardous substances remain within the detection area. The leakage of hazardous substances into the ambient air of the ST1 safety weighing enclosure is virtually eliminated.

Division:

The ST1 safety weighing enclosures work with a low-turbulence air flow which enables optimum interaction between the scale and the enclosure. Extraction and filtration are done by a separate filter unit, separated from the enclosure to achieve good vibration decoupling and to isolate the contaminated filter.

The ST1 series is designed to create a horizontal, low-turbulence airflow over the entire work surface. The air flow transfers any exposures that may occur during weighing to the HEPA filtration system which retains them. The resulting exhaust air is thus free of pollutants and is fed back into the room. Alternatively, a connection to a house ventilation system (via draught diverter) is possible.

The motor-driven filter housing ensures a constant air flow through the working opening into the interior of the enclosure. Due to the constant air volume (CAV), no exposures can escape through the work opening and endanger the user.

The air requirement of the ST1 safety weighing enclosure is low and uniform compared to other exhaust systems. The constant volume requirement enables problem-free integration into existing exhaust air systems.

The ST1 safety weighing enclosure is equipped with an H14 HEPA filtration system (high-efficiency particulate air filter) which has a retention rate of at least 99.995%. It is suitable for an operating time of up to 3 years (manufacturer's recommendation).

A visual and acoustic alarm is triggered when the air flow falls below a limit value defined on the alarm system, for example when the front flap is opened.

Unique to the ST1 series safety weighing enclosures is the monitoring of the air flow with a separate sensor on the outside of the work opening. In contrast to other systems where the air flow is only measured in the exhaust air pipe, the ST1 safety weighing enclosure allows the current conditions to be measured at the working opening.

The special frame construction of the work surface provides protection against leaking liquids. In case of leakage of liquids in relatively small quantities, these are retained in the enclosure. The double bag waste system (optional) with inner and outer waste bag enables contamination-free discharge of waste from the inner area of the enclosure.

In addition, a special profile of the arm bar ensures optimisation of the air flow over the base plate of the ST1 safety weighing enclosure and enables the air flow not to be interrupted even under the arms. The area at the arm bar forms the transition between the safe and the hazardous, potentially contaminated area. The arms can be supported on the arm bar to allow ergonomic, relaxed working inside the ST1 safety weighing enclosure.

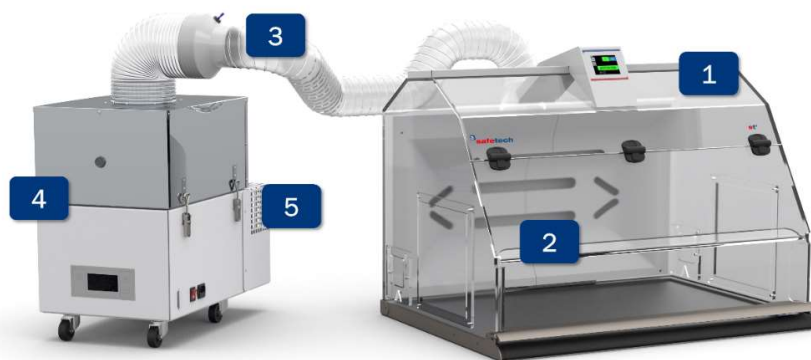
An ergonomic design is an important aspect, as the user can lean forward to the scale to weigh even the smallest sample quantities. The bevelled front of the ST1 safety weighing

enclosure allows an ergonomic sitting posture as well as an optimal view of the display of the analytical balance. Thanks to the high interior area, the user has more freedom of movement for pipetting and handling samples.

The performance of ST1 series safety weighing enclosures was tested with surrogate substances. Corresponding test results can be requested from the manufacturer if required. (see appendix E)

ST1 safety weighing enclosure structure

The standard system consists of the ST1 safety weighing enclosure, the ventilation kit and a filter unit with HEPA filter. The HEPA filter used allows the air to be returned to the room or the in-house exhaust system to be connected via a draught diverter.



- 1 ST1 safety weighing enclosure
- 2 Front flap for inserting larger containers or devices
- 3 Ventilation kit consisting of a flexible ventilation hose that connects the enclosure with the filtration system.
- 4 Filter unit with HEPA filter
- 5 Air outlet to the room

Options

- For higher hazard classes, a 2-layer HEPA filter can be used as an additional safety measure as redundancy.
- For special applications, a carbon filter can be inserted into the filter housing instead of or in addition to the HEPA filter.

Other possible system configurations are described in the following section "System configurations and accessories".

System dimensions



Figure 3 - ST1 safety weighing enclosure shown on a granite table (left), on a stainless steel table (middle) and as a stand-alone solution (right)

The ST1 series safety weighing enclosures are available in three different widths. The exact inner and outer dimensions can be found in the following tables. The dimensions of the filter unit housing are specified in the table below. The filter unit is connected to the safety weighing enclosure via a 2.5 m long ventilation hose. For detailed measurements please check the chapter Technical Data.

Division:

System configurations and accessories

The standard system consists of

- The ST1 weighing enclosure;
- The ventilation kit;
- A filter unit with HEPA filter.



Optionally, the system can be supplemented with further components.

System with two-layer HEPA filter (option)

A filter housing with a two-layer HEPA filter can also be used as a redundancy when handling hazardous substances that require critical evaluation.



Filter unit with silencer (option)

If necessary, a silencer can be connected to the outlet of the filter unit to reduce noise. There are two possibilities: (other solutions on request from a1-envirosciences)

1. Silencer box
2. In-line silencer with air ducting to the building's exhaust air (incl. draught diverter with wall mounting -> for safety reasons, this is the responsibility of the customer's building services department)



Figure 4 - Filtration unit with silencer box



Figure 5 - Connected to the in-line silencer

System with additional solvent filter (option)

For adsorption of solvent vapours, an additional filter housing with carbon filter can be used. It also serves as sound absorption. The filter has a retention capacity of approx. 0.5 kg of solvent vapours. The connection is made at the air outlet of the filter unit with HEPA filter.

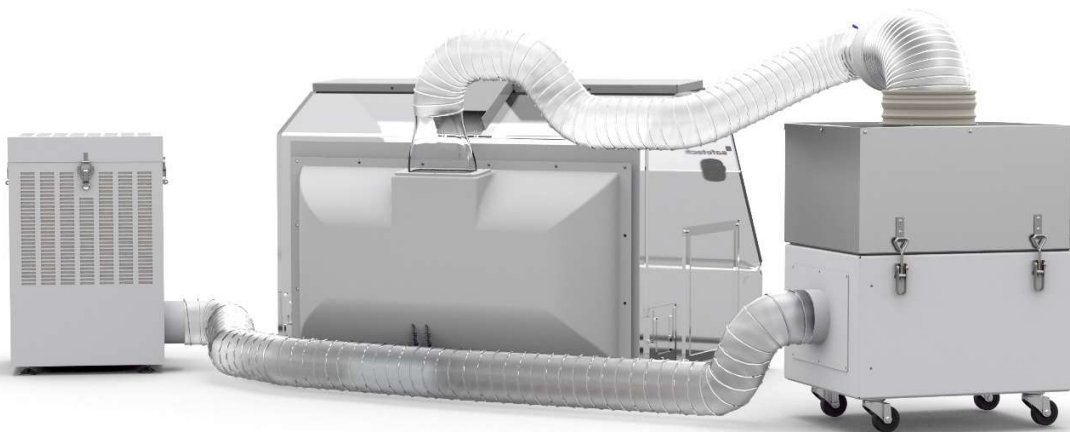


Figure 6 - ST1-0900 with filtration unit (right) and carbon filter (left)

Division:

Electrostatic discharge systems (options)

Electrostatic discharge systems are used to discharge electrostatic charges that adhere to surfaces of laboratory equipment, gloves and powders. These devices consist of discharge electrodes and high-voltage power supply units.

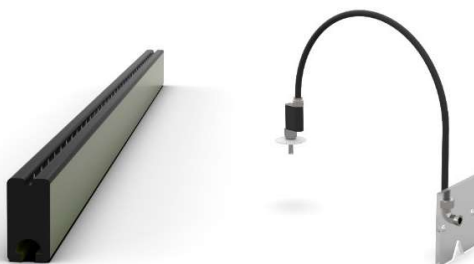


Figure 7 - Antistatic bar

Figure 8 - Point electrode

Double bag waste system (option)

The double bag waste system is used for contamination-free disposal of waste and materials.



Printer table (option)

An additional storage surface, e.g. for a scale printer, can optionally be attached to the ST1 safety weighing enclosure. It can be attached to either the left or right side wall of the safety weighing enclosure. The printer table can be combined with the safetech waste bag system on both sides.



Division:

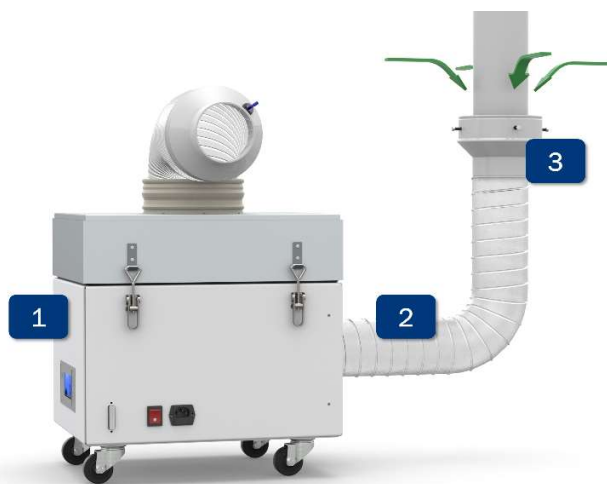
Connection to the building's ventilation system via draught diverter



Warning of contamination risks

Connecting the ST1 weighing enclosure directly to the building's ventilation system could possibly lead to destabilisation of the scale and contamination due to fluctuating exhaust air flows. Any back pressure that may occur, for example due to closing fire dampers in the building's ventilation system, could lead to significant contamination.

With an optionally available draught diverter, the system can be connected to the building's ventilation system. To avoid back pressure from the building's ventilation system, a draught diverter must be used (installation between HEPA filter and building's ventilation system). The building's ventilation system must have a sufficient exhaust air volume. The air volume of the building's ventilation system should be 5-10% larger than the exhaust air volume of the filter unit. Constant air volume (CAV) for all sizes: in chapter Technical Data.



The data in the table corresponds to an assumed inflow velocity of 0.4 m/sec (standard setting).

The air flowing into the filter unit (1) from the enclosure is discharged into the environment through the air vent. Here, a transfer to the building's internal ventilation system can be installed by means of a draught diverter (3) mounted on the exhaust air hose (2), if required.

Figure 9 - Filtration unit with connected draught diverter

Operation

Special safety instructions



Limits of product and personal protection

The ST1 safety weighing enclosure is designed for personal protection. A hazard assessment and risk analysis are necessary to ensure the suitability of the safety weighing enclosure for personal protection. We are happy to support you in this. Product protection is only ensured if the room air is appropriately conditioned.



Protection against contamination - Personal protective equipment

The ST1 safety weighing enclosure does not invalidate the generally applicable laboratory regulations and the safety regulations in the user's laboratory.

- When operating the ST1 safety weighing enclosure, suitable personal protective equipment (PPE), such as safety goggles, protective gowns, protective gloves and perhaps protective sleeves, must be worn.
- To ensure optimum personal protection, a1-envirosciences recommends wearing double protective gloves and sleeves in addition to the usual protective measures.



Only work with the front flap closed

- During work, the front flap must not be opened under any circumstances. Otherwise, the inflow velocity will fall below the permissible value, substances may escape and safety is no longer ensured.
- The front flap must remain closed during operation and may only be opened after cleaning has been completed.
- Before opening the front flap, it must be decontaminated on the inside and especially in the bend.



Warning of hazardous substances in the filtration system

Hazardous substances and other substances deposited in the filters or exhaust air hoses can lead to hazards for people and the environment.

- Exhaust air hoses may only be opened by authorised specialists.
- Filter may only be changed by authorised specialists.



Warning of use of defective equipment

Serious contamination may occur if the ST1 safety weighing enclosure is operated in a defective state.

- In case of malfunctions, please observe the instructions in the chapter "Behaviour in case of malfunction".
- Do not continue to use the ST1 safety weighing enclosure and disconnect the mains cable from the equipment until the repair has been carried out by qualified service personnel to prevent possible danger to persons from accidental use.



Risk of contamination during modification

After installation and testing, do not open or remove the ventilation hoses and the filter unit. Otherwise, there is a considerable risk of contamination.

Modifications to these units may only be carried out by a1-envirosciences in order to exclude possible hazards to persons.

Instructions for working with ST1 safety weighing enclosures

a) Work must only be carried out with the system running

Work on the ST1 safety weighing enclosure must only be carried out when the filter housing ventilation is active. After approx. 3 minutes, a safe working condition is achieved and it is possible to work with hazardous substances. Please also ensure sufficient acclimatisation time for the scale.

b) Alarm

If the visual or audible alarm is triggered continuously, the safety of the ST1 safety weighing enclosure is no longer guaranteed and the user must withdraw in a controlled manner.

c) Contamination

Equipment and objects that have been brought into the ST1 safety weighing enclosure and operated or used there are to be considered contaminated and handled accordingly.

d) Work regulations

The company's internal directives and regulations have priority in any case.

Filter units

The filter units are used to retain solid exposures and aerosols (HEPA filters) or other substances, such as solvent vapours (carbon filters).



Risk of contamination when opening the filtration system

The filtration system must not be opened by unauthorised personnel. The risk of contamination of the environment and the people in it is very high!

The filter units consist of a box-shaped housing containing a filter cube and a radial fan. The air is sucked in at the top via the connection pipe, passed through the HEPA filter (high-efficiency particulate air filter) and blown out again at the side of the outlet.

The air flow velocity can only be adjusted by an a1-envirosciences service technician. During the calibration process, the service technician sets an operating speed of 0.4 m/s at the opening of the enclosure. The calibration is controlled on the display (1) connected to the filter unit (3) through the e-box (2). Once set, this ensures that the required inflow velocity is maintained (CAV = Constant Air Volume).

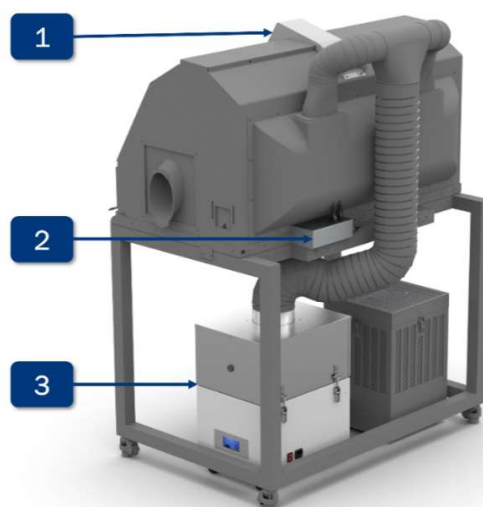


Figure 10 - Schematic representation of the installed peripheral equipment on an ST1 safety weighing enclosure

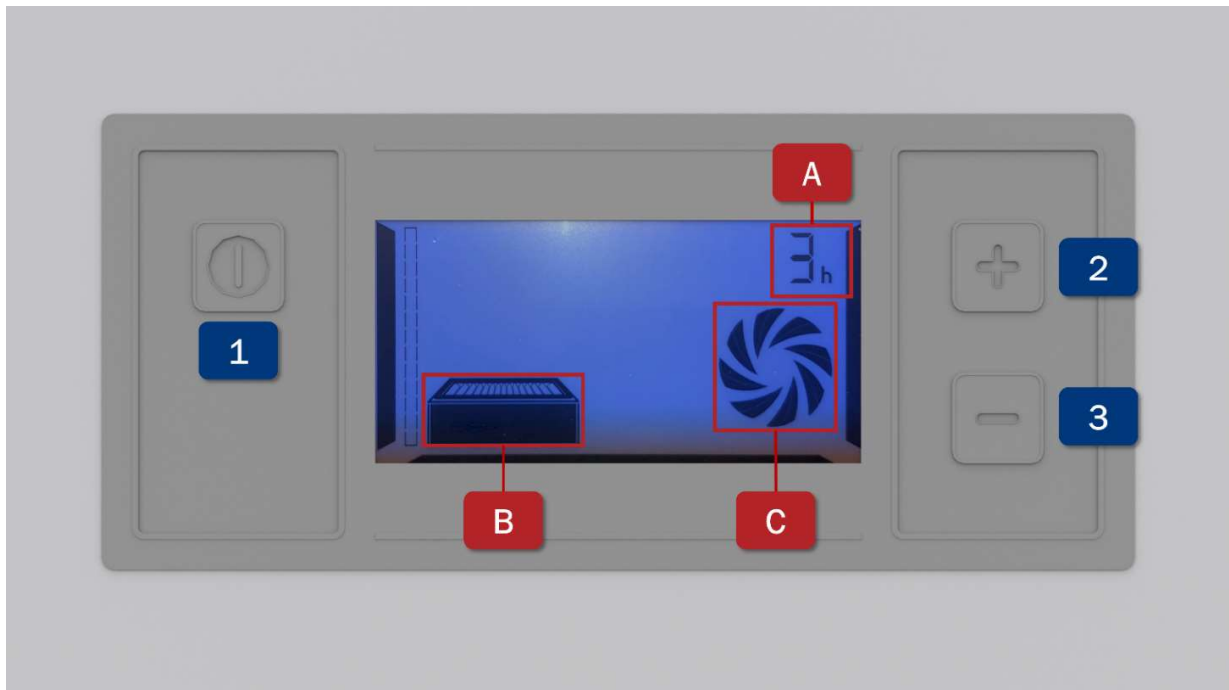


Figure 11 - Display on the filtration unit

The keypads (1), (2) and (3) are locked in normal operation and are only to be used under certain conditions.

The display (A) shows the total running time of the filtration unit so far. Under certain circumstances, the volumetric flow rate is briefly displayed here in percent, e.g. when lowering the power to standby mode. (B) visualises the filter cube, (C) the fan in operation.

In case of a blockage of the filter, the necessary inflow velocity can no longer be ensured and the alarm signal sounds. In addition, a visual alarm is shown on the display on top of the enclosure. For further information on how to behave in the event of malfunction, please refer to the chapter "Behaviour in case of malfunction".

Filter change (only by qualified personnel)

Opening and changing the filters must only be carried out by appropriately qualified personnel (e.g. a1-envirosciences). A DOP test (Dispersed Oil Particulate) must be carried out after changing the filter.

HEPA filter

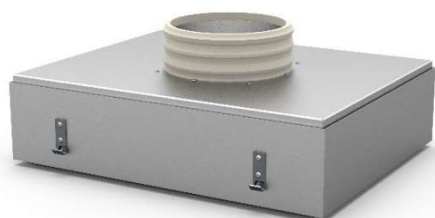


Figure 12 - HEPA filter (one layer)



Figure 13 - HEPA filter (two layers)

The HEPA filter (high-efficiency particulate air filter) is used to retain solid exposures and aerosols. The H14 HEPA filters used have a retention rate of 99.995%. They are factory certified according to ISO ISO/EN 1822 and come with individual certificates.

Carbon filter

For adsorption of solvent vapours, an additional filter housing with carbon filter can be used. The carbon filters used by a1-envirosciences have a retention capacity of 0.5 kg of solvent vapours. Carbon filters are mainly used to remove solvent vapours and to reduce odours. The activated carbon used, e.g. made from the shells of coconuts, has a filter surface area of up to 1050 m²/g. Filtration takes place through the physical adsorption of molecules in the pores of the activated carbon.

Fields of application:

- Separation of gaseous air contaminants
- Odour reduction
- Adsorption of harmful gases

The carbon filters are only suitable to a limited extent for the adsorption of carcinogenic or toxic solvent vapours. Exhaust air polluted to such an extent should be discharged into the building's system via a draught diverter. Our service department will be happy to advise you. Due to the limited adsorption capacity, it is recommended to change the carbon filter at least once a year!

There is no capacity display! A table of the effectiveness of carbon filters can be found in appendix C.



Figure 14 - Carbon filter incl. housing

Alarm system



Risk of contamination when the alarm system is switched off

If the alarm system is switched off, the inflow velocity is not monitored and there is a risk of contamination.

- The ST1 safety weighing enclosure must not be used if the alarm system is switched off.



Risk of contamination in case of malfunction of the alarm system

Improper installation, modifications, calibration and adjustment of the inflow velocity will cause the system to operate incorrectly, which may lead to contamination.

- The alarm system may only be installed by a1-envirosciences qualified personnel or personnel specifically authorised for this purpose. Installation by a1-envirosciences is included in the delivery.
- The settings of the flow velocities or the calibration of the sensors must only be changed by the technical service of a1-envirosciences.

Structure and function of the alarm system

The alarm system monitors the incoming air velocity at the enclosure opening via a pressure difference sensor. By permanently displaying a safe operating state as well as an audio-visual warning in case the alarm threshold being undershot, the user is guaranteed safe working conditions in the safety weighing enclosure.

The alarm system detects low flow velocities in the range of 0.1 m/s to 0.6 m/s. The operating speed at the access opening of the safety weighing enclosure is 0.4 m/s and is set exclusively by qualified a1-envirosciences service technicians.

In total, the alarm system consists of the following components:

1. Display
2. Electronics box
3. Sensor



Figure 15 - Individual presentation of the alarm system components for ST1 safety weighing enclosures

The display (A) is centred on the top of the safety weighing enclosure (B). In the standard version, the electronics box (C) is mounted at the rear of the stainless steel frame of the enclosure. Optionally, it can also be mounted under the table or next to the system.

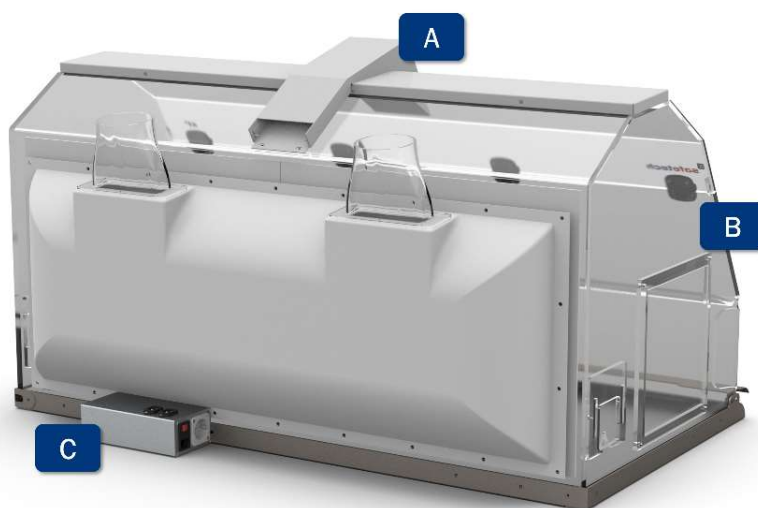


Figure 16 - Position of the alarm components on ST1-1200

The supplied sensor (a) is mounted on the right side below the arm bar (b) and can measure and monitor the incoming air velocity directly at the opening of the enclosure.

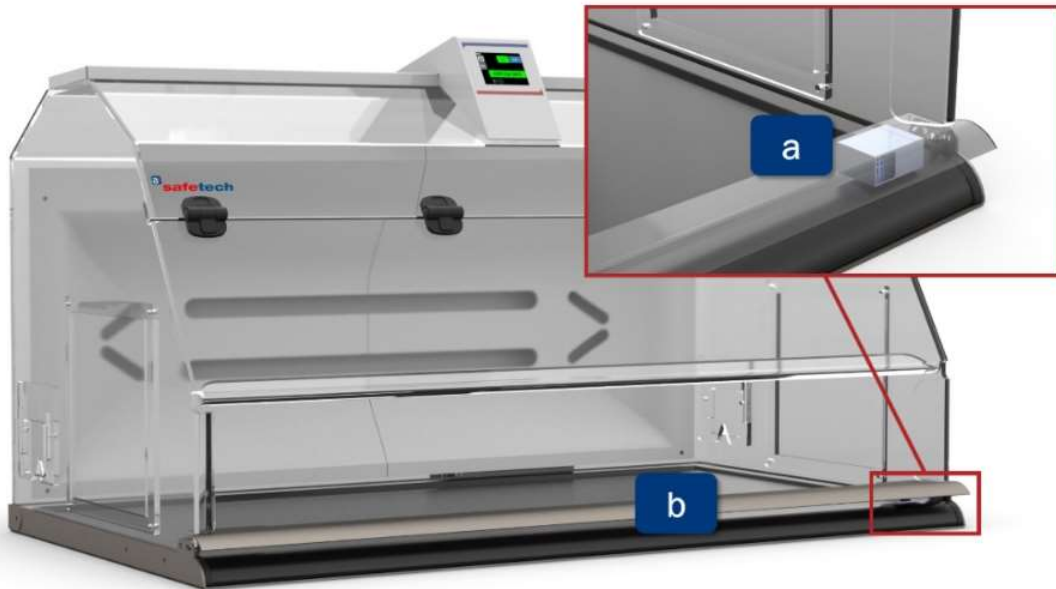


Figure 17 - Position of the sensor for monitoring the flow at ST1 safety weighing enclosures

The following additional components are operated via the alarm system:

- LED lamp
- VOC sensor
- Antistatic system
- Two filtration units in total
- Emergency power generator

Switching on the alarm system

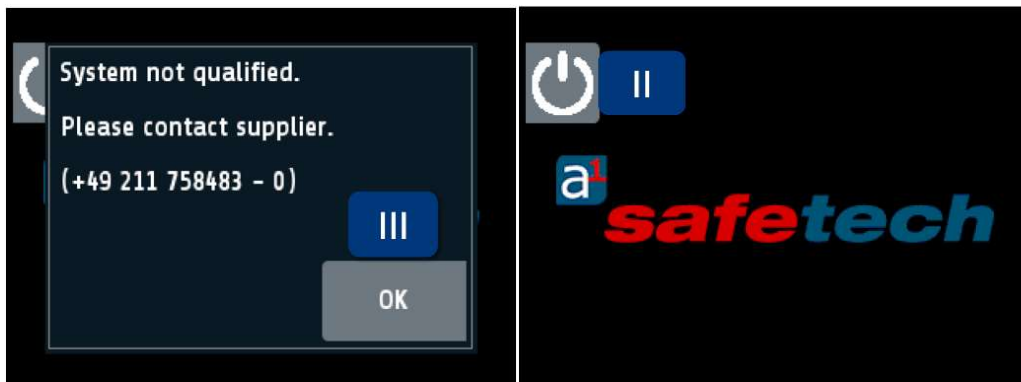
The alarm system is switched on at the main switch (I) of the electronics box. It is located at the rear of the safety weighing enclosure (standard design), as described above. This makes all third-party devices connected to the electronics box (lamp, filter unit, etc.) ready for operation.



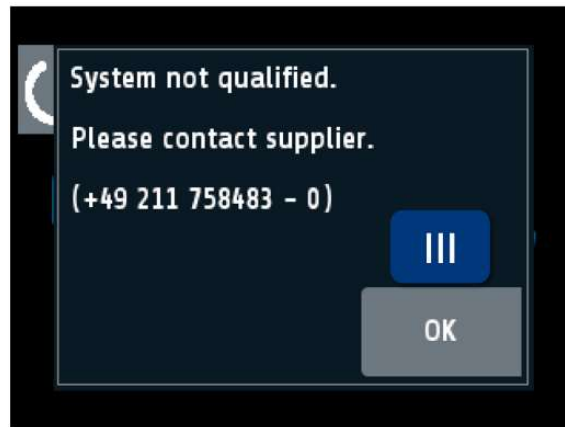
Figure 18 - Electronics box of the alarm unit; front surface

Operating the alarm unit

After pressing the main switch, the standby screen is shown in the display on the top of the enclosure. By tapping the "ON/OFF" button (II), the alarm system including all connected peripheral devices is started.

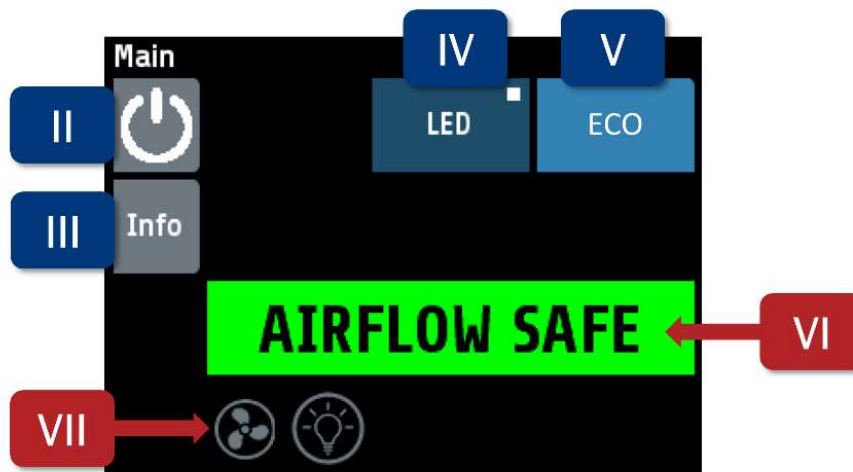


As long as this screen is displayed, connected third-party devices such as the filter unit or the LED lamp are switched off.



In the delivery state, the note shown above appears when tapping the "ON/OFF" button. This means that the alarm unit incl. the supplied safety weighing enclosure has not yet been officially qualified by an a1-safetech service technician. In this case, please follow the instructions on the display and contact a1-envirosciences GmbH at the indicated service hotline. Return to the standby screen by tapping the "OK" button (III).

After successful qualification by an a1-safetech service technician, the alarm system can be switched on by tapping the "ON/OFF" button.



Via the main screen, the user can use all features of the containment system and monitor the operating states via the capacitive touch display. When the main screen is displayed, the qualified system is in normal operating mode.

Via the "Info" button (III), the user can obtain further information about the enclosure and the alarm system.

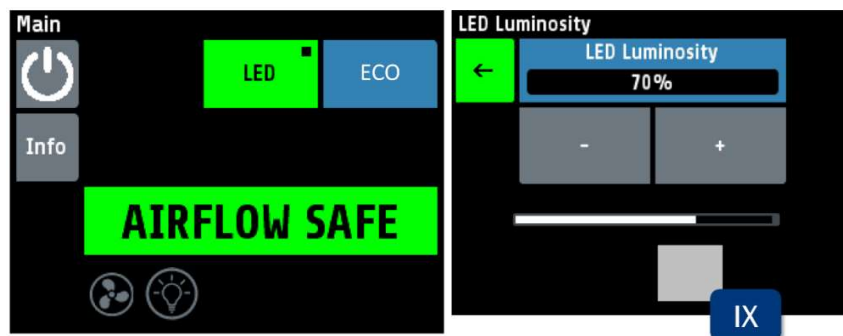
The following information is displayed via the enclosure as well as the alarm system:

- Serial number
- Firmware
- Date of the last maintenance by an a1-safetech service technician
- Date of the next maintenance by an a1-safetech service technician
- Contact information

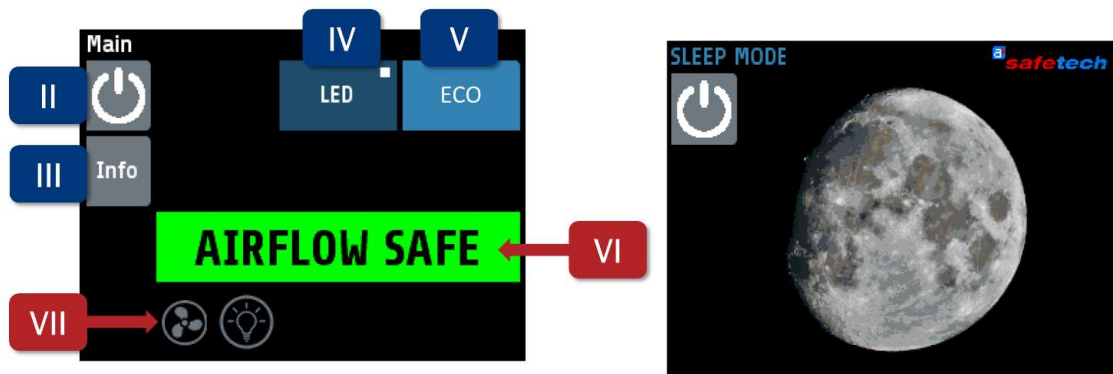


The "Back" button (VIII) takes the user back to the main screen.

The enclosure lighting can be switched on and off via the "LED" button (IV). When the lighting is switched on, this button is coloured green. By keeping the button pressed, the user can adjust the brightness of the lamp from 0-100 % through a submenu. The brightness can be changed in steps of 1% via the "Plus" and "Minus" buttons. With the grey slider at the bottom (IX), the user can increase or decrease the brightness in steps of 10% by sliding it to the right or left.



The standard version of the alarm system includes a power-reduced ECO mode. It can be started via the "ECO" button (V). This reduces the power of the connected filter units and thus the velocity of the air flowing into the enclosure to approx. 0.2 m/s. The parameters for the ECO mode must only be set by a qualified a1-safetech service technician.



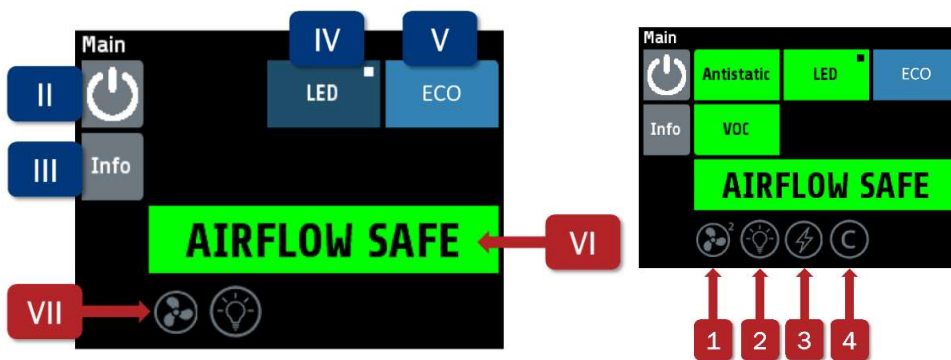
Alarm state and safe operating state



In the event of a drop in flow velocity in the opening, an acoustic and visual alarm signal is displayed (left). By tapping the "back" button, the user can deactivate the overlapping alarm screen and return to the main screen. In the event of a dangerous situation, "AIRFLOW FAIL" is still displayed and the repetitive audio signal is output.



The operating state of the alarm system is permanently displayed below the buttons that can be operated by the user. "AIRFLOW SAFE" indicates that the user can work safely in and with the safety weighing enclosure.



The display line (VII) shows all peripheral devices that are operated with the system. In the standard version, a filtration unit and the enclosure lighting are shown here. These components are mandatory for commissioning the safety weighing enclosure. Possible connection components are:

1. Filtration unit (the number 2 indicates two filter units connected and ready for operation)
2. LED lamp
3. Antistatic device (optional)
4. Carbon filter measuring device (optional)

Resetting the alarm

An alarm is automatically reset if the mean values of the flow velocity at the sensor are above the set alarm point during a certain time period. If the sensor is defective or missing, the alarm will remain until the sensor has been replaced.

Manual testing of the sensor

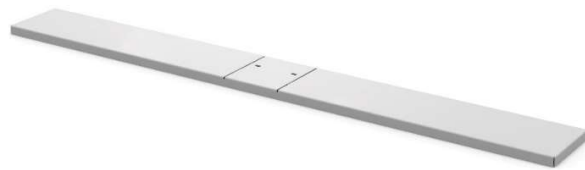
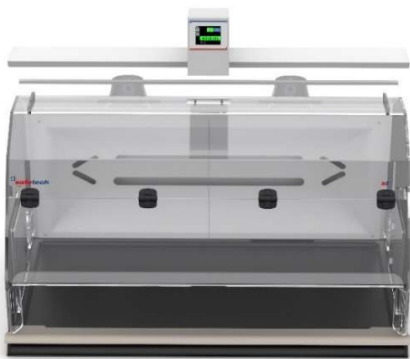
The function of the sensor can be checked in the following ways:

- Blocking the sensor in the arm bar
- Opening the front flap

For all actions, the display changes to a visual alarm state (AIRFLOW FAIL). In addition, an acoustic signal sounds.

LED lamp

The LED lamp is mounted above the safety weighing enclosure. It is equipped with a white light LED strip.



Working in the ST1 safety weighing enclosure

The aim of using an ST1 safety weighing enclosure is to virtually eliminate the risk of exposure to laboratory staff. But it is not the ST1 safety weighing enclosure alone that provides this protection. Only the combination of ST1 safety weighing enclosure, personal protective equipment, thorough training and the additional protective measures recommended by a1-envirosciences ensures optimal protection against contamination.



Ensuring safe operation

Only the combination of ST1 safety weighing enclosure, personal protective equipment, thorough training and the additional protective measures recommended by a1-envirosciences ensures optimal protection against contamination.

- Appropriate personal protective equipment (PPE) must be worn when operating the ST1 safety weighing enclosure. This includes safety goggles, protective gowns, protective gloves and perhaps protective sleeves.
- To ensure optimum personal protection, a1-envirosciences recommends wearing double protective gloves and sleeves in addition to routine protective measures.

Ensure a safe environment during operation as well:

- As little draught as possible in the vicinity of the ST1 safety weighing enclosure
- As little through traffic (windows or doors) as possible in the vicinity of the ST1 safety weighing enclosure
- Good lighting conditions
- Adjustable workstation height that ensures comfortable work
- Legroom for seated workstations

Planning and work preparation



Danger from a contaminated interior

The entire interior of the ST1 safety weighing enclosure should always be considered contaminated. This means that all equipment and materials as well as the employee's gloved hands should only leave this area after appropriate decontamination measures have been carried out. For this reason, careful and forward planning of the materials needed is important.

Generally, the following applies to the contents of the ST1 safety weighing enclosure: Leave as much as necessary and as little as possible in the enclosure.

In addition to the individually required equipment and materials, the following materials should be present in the ST1 safety weighing enclosure (they must be labelled accordingly as they are contaminated after use):

- **Scale**
Always place the printer outside the ST1 safety weighing enclosure as contamination can very easily be released to the outside via the printer paper.
When selecting the scale, make sure that it has a protection of the weighing chamber that can be opened without touching it by hand, if possible, so that the outside of the scale is not contaminated. It is optimal if substances can be weighed directly in the desired vessel (e.g. volumetric flask). All elements of the scale should be easy to clean.
- **Pens (marked)**
The pens needed for labelling vessels or for recording measurement data should be available and remain in the ST1 safety weighing enclosure.
- **Cleaning cloths in a container if possible (marked)**
The scale and the work surface in the ST1 safety weighing enclosure should be cleaned after each weighing process. The required cleaning cloths must be deposited in the ST1 safety weighing enclosure.
- **Sealable storage container filled with liquid (water) for used measuring spatulas (marked)**
The measuring spatulas required for the weighing process are placed directly in the container filled with solvent to prevent further dusting.

You should clearly define the workflow before starting work. By doing so, you can ensure that you do not have to pull out your hands from the enclosure during the workflow.

a1-envirosciences recommends creating your own SOP.

Create a material list so that you can ensure that everything you need for this process (e.g. vessels and reagents) is available in the ST1 safety weighing enclosure before starting work.



Planning - Concentration - Ease of mind

Remember to plan enough time for your work processes! Precise and accurate weighing requires concentration and calmness. It takes 2-3 times as much working time as weighing without a safety weighing enclosure. Product protection is only ensured if the room air is appropriately conditioned.

If there is a draught when opening the laboratory doors, mark these doors so that they are not opened during the weighing process if possible. For safety reasons, you should not be alone in the laboratory during the weighing process.

Check your protective equipment for completeness. Pull the arm sleeves over the first protective glove and the sleeve of your gown. Then, put on the second protective glove. The glove should be long enough so that you can still comfortably pull it over the lower edge of the arm sleeves.

- If at all possible, dissolve substances already in the ST1 safety weighing enclosure.
- Remove material and waste from the ST1 safety weighing enclosure through:
 - The waste system on the side
 - The front opening; it must be noted that everything must be thoroughly cleaned first
- Leave the workplace clean and dispose of waste appropriately, see chapter "Safe disposal of waste"

For more information or in-depth training in safe weighing practice, please contact a1-envirosciences or attend a workshop offered by a1-envirosciences.

Safe disposal of waste



Warning of contamination risks

All materials used in the ST1 safety weighing enclosure are to be considered contaminated.

- Hands may only be pulled out of the work opening of the ST1 safety weighing enclosure after they have been thoroughly cleaned and decontaminated.
- Materials that cannot be cleaned can either be disposed of via the waste system or must be bagged contamination-free and thus isolated before removal.

Please dispose of waste and materials that cannot be cleaned via the double bag waste system on the right or left side of the enclosure.



The materials are transferred to the inner waste bag through the side opening. Make sure to push the materials as deep as possible into the waste bag. This makes it easier to change the waste bag.



Warning of contamination risks

Improper discharge of waste bags can lead to contamination.

- Always wear two pairs of gloves and arm sleeves to discharge the waste bags.
- Follow the instructions carefully.



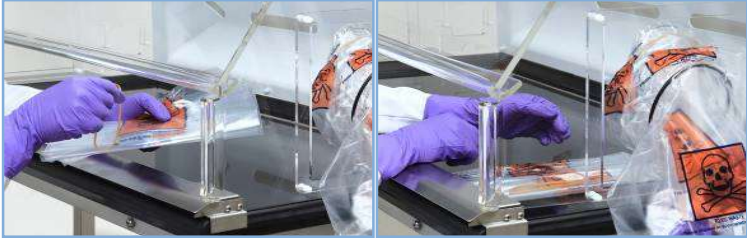




Working with the waste bag system

Before removing the waste bag, have the following materials ready inside the ST1 safety weighing enclosure:







- Spare bag
- Rubber band for fastening

Discharging the waste bags

For contamination-free discharge of the waste bags, follow the 11 steps below:

<p>1</p>	<p>Prepare the required work equipment</p> <ul style="list-style-type: none"> - Waste bag (1x) - Rubber band (1x) 	
<p>2</p>	<p>Remove the rubber band that secures the inner bag and close it tightly without touching the edges of the waste system.</p>	
<p>3</p>	<p>Press the sealed bag into the outer bag.</p>	
<p>4</p>	<p>Fasten the new waste bag to the inner edge of the waste system using the rubber band.</p>	
<p>5</p>	<p>The entire waste bag should be in the interior of the ST1 weighing enclosure.</p>	

Division:

<p>6</p>	<p>Remove the gloves and place them near the waste bag inside the ST1 weighing enclosure.</p>	
<p>7</p>	<p>Pull off the outer black rubber band.</p>	
<p>8</p>	<p>Squeeze the outer waste bag tightly with one hand and pull it off. Close the top of the waste bag with your free hand, fold it over and seal it tightly with tape.</p>	
<p>9</p>	<p>Reach into the inner bag, grab the contaminated glove and pull it outwards with the waste bag.</p>	
<p>10</p>	<p>Pull the black rubber ring over a waste bag.</p>	
<p>11</p>	<p>Pull this bag over the inner bag and secure it to the ST1 weighing enclosure using the black rubber ring.</p>	

Discharging electrostatically charged surfaces - Discharge systems (options)

Intended use of electrostatic discharge systems

Electrostatic discharge systems are used to discharge electrostatic charges that adhere to surfaces of laboratory equipment, gloves and powders. These devices consist of discharge electrodes and high-voltage power supply units.

To achieve an optimal discharge effect, the discharge electrode connected to a high-voltage power supply unit must be brought as close as possible to the object to be discharged. However, direct contact with the electrode tips should be avoided.

We restrict the use of the discharge systems to the following safety enclosures

- ST1 safety weighing enclosures
- IE instrument enclosure
- SB type SafetyBox/Glovebox
- LEV type safety enclosure

Occupational and operational safety when working with electrostatic discharge systems



Danger to life due to electric current



There is an immediate danger to life in case of contact with live parts. In case of damage to the insulation (visible damage to cables), switch off the power supply immediately and have repair carried out by qualified personnel. Please note the following points:

- As long as the mains plug is not disconnected, parts of the unit's electrical equipment could be live. Disconnect the mains plug before carrying out maintenance work on the equipment.
- Always pull the power cable out of the socket by the plug only.
- Check the electrical equipment of the unit regularly. Eliminate any damage immediately. Replace defective cables and plugs immediately.
- Do not bridge any fuses or put them out of operation. When replacing fuses, observe the correct trigger values.
- Keep moisture away from live parts. This can lead to a short circuit.

Generally, the discharge electrodes are safe to touch. This means that touching the metal tips of the discharge electrodes will not cause electric shock.



Ozone warning

Ozone may be generated during operation of the electrodes. The ozone concentration generated in the vicinity of the electrodes depends on a variety of boundary conditions such as installation location, electrode current and voltage, air circulation, etc. However, valid workplace limit values should not be exceeded while the safety enclosure is being extracted. In case of doubt, workplace measurements must be arranged by the system operator.



Warning: risk of contamination

Discharge electrodes and cables located in the safety enclosure can become contaminated when working with powdery hazardous substances. These components should not be removed from the safety enclosure without thorough cleaning. In this way, contamination of people and the environment can be avoided.

Please observe the cleaning instructions listed below.



Warning: explosion and fire hazard

Solvents can form explosive vapour/air mixtures. Dusts can form explosive dust/air mixtures. An explosive atmosphere in conjunction with an ignition source can lead to an explosion.

Electrostatic discharge systems are a source of ignition!

Explosions or fires can lead to serious or fatal injuries. To avoid this, please observe the following measures:

- The equipment must not be used when the filter unit is switched off.
- No flammable liquid or gaseous substances may be stored in the work area.
- Ignition sources must not be present in or brought into the work area during cleaning. The high-voltage power supply unit must therefore be switched off before cleaning!



Warning of electromagnetic fields

Special hazard information on the risk to persons with pacemakers:



Bringing the chest closer than 3.5 cm to the emission tips of the discharge electrode or touching several emission tips (one tip alone is not critical) over a large area by hand can cause the pacemaker to temporarily switch to fault mode. Bringing the chest closer to the emission tips or touching them permanently can cause problems.



Warning of injuries caused by sharp objects



The electrode tips are sharp. This is absolutely essential for their function. The tips have a touch protection to prevent injuries such as puncture wounds. If the tip is pressed hard, the skin may still be injured. Pay particular attention to this when cleaning.



Special hazard warnings for cleaning the SPE

Generally, the discharge electrodes are safe to touch. This means that touching the metal tips of the discharge electrodes will not cause an electric shock.



There must be no ignition sources in the work area while cleaning the discharge electrodes with solvents. Always switch off the high-voltage power supply unit and interrupt the supply voltage before cleaning.

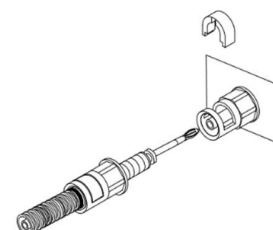


Explosions or fires can lead to serious or fatal injuries. If a liquid that can form flammable or explosive gas mixtures is used for cleaning, the ventilation system of the safety enclosure must be in ON operating mode when cleaning the discharge electrode.



Operational safety - Prevention of damage

During operation, with the high-voltage power supply unit switched on, the connecting cable must not be removed from the power supply unit. This generally results in damage to the power supply unit. Before dismantling a discharge bar, switch off the high-voltage power supply unit and interrupt the supply voltage. To prevent accidental removal of the high-voltage plug, the cable should always be secured with the appropriate locking device.



When removing or inserting the plug, never touch it by the metal contacts or the red insulation on the cable. Otherwise, the discharge electrode and/or high-voltage power supply unit may be damaged permanently.

Installation and commissioning

The installation and initial commissioning of the discharge electrode and high-voltage power supply units is carried out by or under the guidance of the manufacturer's qualified personnel. For this purpose, the manufacturer will provide installation instructions on request.

The discharge system consists of the following components:

1. Bar-shaped discharge electrodes with a larger number of electrode tips for large-scale discharge in the safety weighing enclosures.
2. Spot discharge electrodes with a discharge tip for the targeted discharge of statically charged powders or vessels, spatulas and other surfaces.
3. High-voltage power supply unit for generating the necessary high voltage



Figure 19 - Unloading bar mounted above the front flap of an ST1-900



Figure 20 - Point electrode mounted on the right side wall of an ST1-900

Division:

The bar-shaped discharge electrode (1) mounted above the front flap ionises the air on a large scale in the interior of the safety enclosure with the aid of an electric field. The necessary high voltage in the range of 4-6 kV is generated by the high-voltage grid (2).

The ionised air molecules can neutralise charges adhering to surfaces. The spot discharge electrode (3) is attached to the opening of the cable gland on the left or right side of the safety weighing enclosure.

Depending on the customer's specification, the high-voltage power supply unit is put into operation via the main switch of the safety enclosure or the ON/OFF switch of the high-voltage power supply unit. Then, the discharge electrodes are immediately ready for use. With its flexible, adjustable gooseneck, the discharge electrode can be installed in a position suitable for working in the safety enclosure.

Use of electrostatic discharge systems

Bar-shaped discharge electrodes are intended to neutralise static charges on the surfaces inside the safety weighing enclosure. Due to the greater distances to the discharge electrode, these are processes that take place over a longer period of time. If strongly charged surfaces such as spatulas, vessels or powder in vessels are to be discharged, they must be brought close to the discharge electrode: The unloading process takes a few seconds.

For discharging powders or small surfaces, the spot discharge electrode is more suitable for ergonomic reasons. You can shape the gooseneck so that the electrode tip is in a position suitable for your application. For discharging statically charged powders, the opened vessel is passed under the spot discharge electrode. The silicone plate may touch the vessel; however, a small distance avoids contamination with powder. The tip should not be immersed in the powder. The duration of the discharge process depends on many factors: Empirical values are 3-20 seconds.

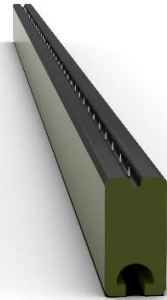


Cleaning - Prevention of damage

Always switch off the high-voltage power supply unit before cleaning the discharge electrodes!

Do not damage the discharge tips during cleaning. Cleaning with moistened cloths is not recommended as on the one hand there is a risk of injury, and on the other hand fibre residues of the cloths get stuck on the electrode tips.

Brushes with polyamide bristles, such as toothbrushes, are well suited for cleaning. For better cleaning, the brushes can be moistened. Water and solutions with ethanol, isopropanol or methanol are well suited for this purpose.



Cleaning



Warning of explosion and fire hazards

Solvents can form explosive vapour/air mixtures. Dust can form explosive dust/air mixtures. An explosive atmosphere in conjunction with an ignition source can lead to an explosion.



Solvents are highly flammable. Storage of flammable solvents in the equipment is therefore not permitted.

Explosions or fires can lead to serious or fatal injuries.



- Do not carry out cleaning work with solvents when the ventilation is switched off. (Vapour/air mixtures are extracted from the work area via the ventilation system and the formation of an explosive atmosphere is prevented)
- Only introduce the approved types and quantities of solvents into the work area.
- Do not spray or apply cleaning agents over large areas.
- During cleaning work, no ignition sources may be present or introduced into the work area.
- Immediately collect and wipe up any spilled or accidentally released solvent.
- If solvents have been released in the work area when the ventilation system was not in operation, ventilate the work area thoroughly before switching on the ventilation system.



Health hazard due to solvents

Contact with solvents may cause damage to health.

- Wear suitable personal protective equipment if necessary.
- Observe the safety data sheets of the substances used.
- Avoid emission of hazardous substances.



Observe the suitability of solvents

Before removing the waste bag, have the following materials ready inside the ST1 safety weighing enclosure:

- Only approved cleaning agents may be used.
- Cleaning must be carried out in accordance with the operator's work instructions according to the properties of the hazardous substances used.
- Acetone or other strong solvents must not be used for cleaning the enclosure walls (incompatibility with acrylic (PMMA)).

Carrying out the cleaning

The ST1 safety weighing enclosure must always be kept clean. The work surface must be cleaned after each use and decontaminated, if necessary, to avoid cross-contamination and substance leaks due to transverse flows.

Contaminants must be absorbed and disposed of in a safe manner. Also observe your operational cleaning instructions!

As a rule of thumb, follow these 4 steps:

- 1 Mechanical absorption of the hazardous substance using cloths or possibly a special vacuum cleaner for active substances
- 2 Precleaning
Carry out the initial cleaning step with a cleaning cloth moistened with water. The liquid should not dissolve the processed substance. Then, dispose of the cleaning cloth via the waste system.
- 3 Cleaning
Carry out the second cleaning step with a cleaning cloth moistened with solvent. The liquid should dissolve the processed substance. Then, dispose of the cleaning cloth via the waste system.
- 4 Subsequent cleaning
Subsequent cleaning is done with a dry cloth. Then, dispose of the cleaning cloth via the waste system.

Suitable cleaning agents

The base plate of the enclosure is usually made of ceramic. All materials are resistant to conventional cleaning agents (see also appendix B: Chemical resistance for ceramics).

The acrylic parts, incl. the back wall, are to be cleaned with an aqueous or ethanol-containing solution (up to 30%). Other solvents may cause turbidity and material damage.

A cleaning agent that cleans both acrylic and TRESPA® is available from Schülke & Mayr: Buraton 10F as 5% solution or Perform 0.5% solution.

Commercially available window cleaner can also be used for acrylic. a1-envirosciences also offers solvent-free cleaning cloths (DECONWIPE) as accessories.

Behaviour in case of malfunction



Notes on the malfunction

- In the event of a malfunction, it is important to keep calm!
- Be sure to keep your hands inside the ST1 safety weighing enclosure to prevent contamination from entering the environment of the ST1 safety weighing enclosure. Cleaning must be carried out in accordance with the operator's work instructions according to the properties of the hazardous substances used.

A malfunction is indicated by one or more of the following indications:

- Failure of one or more fans
- The display of the alarm unit shows "Airflow Fail"
- The backlight of the alarm unit is red and a permanent alarm tone (more than 1 minute without interruption) sounds

In these cases, proceed as follows:

- 1 Keep your hands inside the ST1 safety weighing enclosure.
- 2 Check if there is a power failure. If this is the case, proceed with point 4.
- 3 Check whether the air flow is disturbed at one or both sensors located on the left and right under the arm bar (there may be an object in front of the sensor so that the air cannot flow freely through the sensor). If so, remove the blockage. If the alarm goes off, you can continue working. If this is not the case, proceed with point 4.

- 4 Check if the filter unit has been switched off by mistake. If this is the case, have someone else switch on the filter unit or the power supply again. If the alarm stops, you can continue working. If this is not the case, proceed with point 5.
- 5 Slowly close all opened reagents and sample containers and clean them from the outside with the decontamination wipes.
- 6 In the ST1 safety weighing enclosure, take off the first pair of gloves and possibly the arm sleeves and dispose of them via the waste system. Now, you can take your hands out of the safety weighing enclosure and proceed with point 7.
- 7 Switch off the system and close the opening of the ST1 safety weighing enclosure with foil to prevent particles from escaping (the foil cannot be applied while the ventilation is still in operation).
- 8 Analyse the cause of the error and contact the a1-envirosciences service.

Maintenance and repair

Basic safety instructions for maintenance and repair work



Danger to life due to electric current

There is an immediate danger to life in case of contact with live parts. In case of damage to the insulation (visible damage to cables), switch off the power supply immediately and have repair carried out by qualified personnel.



Please note the following points:

- Only use earthed cables (power cable).
- Always pull the power cable out of the socket by the plug only.
- Have power connections established properly by qualified electricians.
- As long as the mains plug is not disconnected, parts of the unit's electrical equipment could be live. Disconnect the mains plug before carrying out maintenance work on the equipment.
- Check the electrical equipment of the unit regularly. Eliminate any damage immediately. Replace defective cables and plugs immediately.
- Do not bridge any fuses or put them out of operation. When replacing fuses, observe the correct trigger values.
- Keep moisture away from live parts. This can lead to a short circuit.

- Work on the electrical equipment must only be carried out by trained, authorised personnel.



Risk of contamination when opening the filtration system

The filtration system must not be opened by unauthorised personnel. The risk of contamination of the environment and the people in it is very high!

- Never disconnect ventilation hoses from the filtration system or the safety weighing enclosure.
- Filter may only be changed by authorised specialists.

Maintenance intervals

Interval	Action	Carried out by
Daily before starting work	Visual inspection for: <ul style="list-style-type: none"> • Damage to the casing • Damage to the base plate • Damage to the ventilation hoses • Checking the arm bar • Operating display on the filter housing 	User
Daily after completion of work	Cleaning or decontamination of at least the front third of the base plate as well as the inside of the front flap.	User
Monthly	Visual inspection of the: <ul style="list-style-type: none"> • Electrical connections on the alarm system • Connections of the ventilation hose on the ST1 safety weighing enclosure and filter housing • Cable cover plates • Screws on the air-collecting chamber • Fastening of the waste system Functional test <ul style="list-style-type: none"> • Alarm function (sensor test) • Smoke test (flow visualisation) on the ST1 safety weighing enclosure and in the environment Basic cleaning <ul style="list-style-type: none"> • Basic cleaning of the interior of the ST1 safety weighing enclosure excluding the rear wall 	User
Annually	Basic cleaning before annual maintenance <ul style="list-style-type: none"> • Basic cleaning of the interior of the ST1 safety weighing enclosure including rear wall 	User
	Functional tests according to SOP: Q ST1XSOPG <ul style="list-style-type: none"> • Checking the inflow velocity • Checking and calibrating the alarm system • Checking the retention rate of the filter (DOP test) 	Service a1-envirosciences

Troubleshooting

Fault	Action	Carried out by
Alarm lights do not go on	Check the voltage connections, plug in the mains plug if necessary.	User
Display on the filter unit does not light up	Check the voltage connections, plug in the mains plug if necessary.	User
Failure of the fans in the filter unit	Stop work immediately. See "Behaviour in case of malfunction".	User
Alarm system sounds continuously (alarm sound does not stop)	Check that the filter unit is switched on. Check that there is free air circulation in the area of the sensor. Check airflow with smoke test kit to visualise the flow.	User
	Check connections to sensors. Check air flow with an anemometer.	Service a1- envirosciences
Alarm system sounds briefly (alarm tone stops by itself)	Check that there is free air circulation in the area of the sensor. Check whether there are disturbing air flows near the enclosure due to draughts (air conditioners, doors or similar). Check the room pressure in relation to the corridor (in case the enclosure is connected to the building's ventilation system).	User
	Measure air flow (check set limit value).	Service a1- envirosciences
Inflow velocity below limit value	Check that the filter housing is switched on. Check that there is free air circulation in the area of the extraction/filter housing. Check that the ventilation hose is connected correctly. Check that the collar is attached correctly. Readjust the motor control of the filter housing .	Service a1- envirosciences

Customer service

Our customer service is available to answer any questions you may have about the system.

Please have the following information ready:

- Type/model and serial number of the system
- Short description of the error

Germany, Austria and Benelux	Phone: +49 (0) 211 75 84 83 112 Email: service@a1-envirosciences.de
France	Phone: +49 (0) 211 75 84 83 0 Email: sales@ a1-envirosciences.de
Switzerland	Phone: +41 (0) 61 461 99 11 Email: info@a1-safetech.ch
International	Phone: +49 (0) 211 75 84 83 112 Email: service@a1-envirosciences.de

Decommissioning and disposal

If you no longer need a safety weighing enclosure and wish to disassemble it, you should observe the following points to avoid any risk of contamination.



Risk of contamination due to improper disposal

Improper disassembly and disposal of contaminated safety weighing enclosures and installed accessories may result in significant contamination hazards during disassembly or subsequent storage. This can result in contamination of employees and emissions of hazardous substances into the environment.

Be sure to disassemble and dispose of the unit properly. We are happy to support you.

Dismantling by a1-envirosciences

Preferably commission a1-envirosciences GmbH with the dismantling. We can also help you with proper disposal.

a1-envirosciences GmbH has very well trained service technicians who are very familiar with the hazards and the increased risk of contamination.

Dismantling on your own initiative

If dismantling by a1-envirosciences GmbH is not possible, it is essential that you observe the following:

- The enclosure must be completely decontaminated on the inside and the outside! In doing so, also clarify whether the substances used in the enclosure can be completely dissolved with the decontamination agent you are using (e.g. alcohol-based solvents).
- Do not remove the hoses from the enclosure!
- Hermetically pack the complete enclosure incl. the filter unit and dispose of it. Find out from the local waste disposal company responsible for you how this enclosure unit could be disposed of and what costs arise for disposal. Ideally, they will provide you with an appropriately large container to put the entire enclosure in without dismantling.

a1-envirosciences GmbH will be happy to advise you in such a case of disposal.

Technical specifications

Technical data for ST1 series safety weighing enclosures

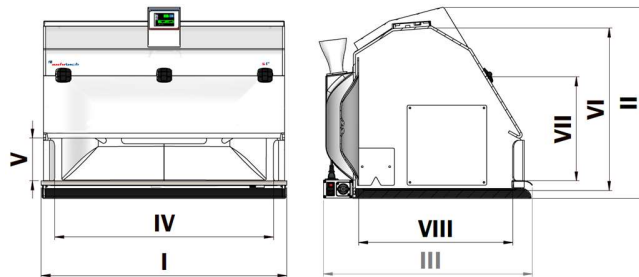
Information for delivery and packaging

Size	Weight (without packaging) [kg]	Measurement [mm]
900	61	900 x 763 x 694
1200	81	1200 x 763 x 694
1500	101	1500 x 763 x 694

Materials

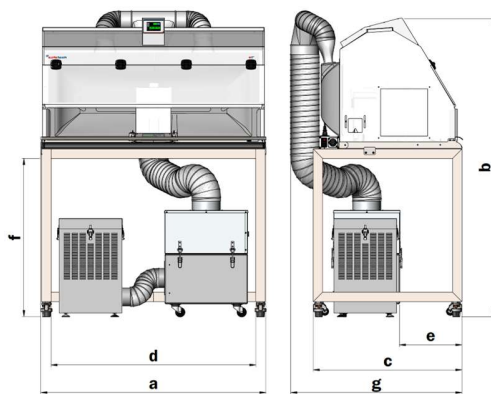
Component	Material	Colour
Base plate	Ceramic	Black
PROFILE front	1.4301, <0.6 µm ground	N/A
PROFILE back	1.4301, <0.6 µm ground	N/A
PROFILE LEFT	1.4301, <0.6 µm ground	N/A
PROFILE RIGHT	1.4301, <0.6 µm ground	N/A
Arm bar	1.4301, <0.6 µm ground	N/A
SUPPORT BLOCK	1.4301, <0.6 µm ground	N/A
Spacer	Polyoxymethylene	Black
FRAME CORNER	1.4301, <0.6 µm ground	N/A
FRAME CORNER WITH CUT	1.4301, <0.6 µm ground	N/A
Side wall left	PMMA	Colourless
Side wall right	PMMA	Colourless
Cover	PMMA	Colourless
Flap	PMMA	Colourless
Baffle	Polystyrene	White
Plenum	Polystyrene	White
Spigot	PMMA and polystyrene	Colourless
ST-BPLATE	PMMA	Colourless
ST-CBPLATE	PMMA	Colourless
Hinge	Polyoxymethylene	Black
Other	Stainless steel, silicone, foam rubber, polyamide, brass	N/A

Dimensions



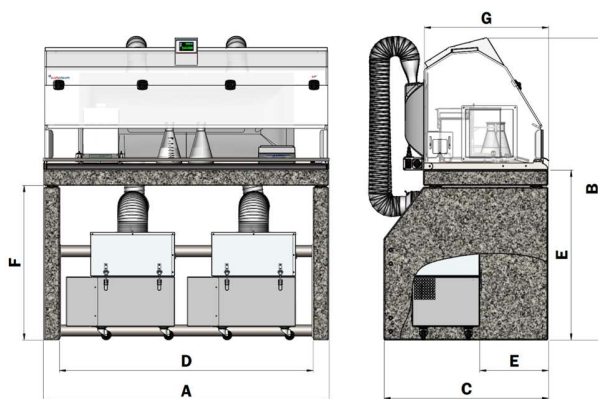
Weighing enclosure dimensions

Size	900	1200	1500
I	896	1196	1496
II	694	694	694
III	763	763	763
IV	805	1105	1405
V	155	155	155
VI	590	590	590
VII	378	378	378
VIII	659	659	659



Stainless steel table installation dimensions

Size	900	1200	1500
a	896	1196	1496
b	1582	1582	1582
c	789	789	789
d	788	1088	1388
e	330	330	330
f	838	838	838
g	<900	<900	<900



Granite table installation dimensions

Size	900	1200	1500
A	896	1196	1496
B	1583	1583	1583
C	860	860	860
D	728	1028	1328
E	360	360	360
F	809	809	809
G	653	653	653

Division:

Constant Air Volume (CAV)


Enclosure width	Volume flow at the outlet of the filtration unit [m ³ /h]	+10% of draught diverter [m ³ /h]
900	177	194.7
1200	243	267.3
1500	310	341

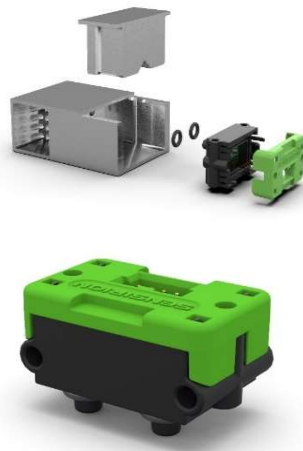
Consumption of complete System per hour

ST1-900	ST1-1200	ST1-1500
0,38 kWh	0,5 kWh	0,63 kWh

Division:

Technical data on peripheral devices

Alarm system		
	Article number	ST-ALARM-V3/DSPLY ST-ALARM-V3/EBX
	Dimensions [mm]	410x160x120
	Material	DC01, powder-coated (display); EN-AW 6061 (electronics box)
	Colour	RAL9003, glossy (display); aluminium anodised (electronics box)
	Weight [g]	1500 (display) + 1100 (electronics box)
	Power consumption [W]	100
	Voltage [V]	110-230
	Frequency range [Hz]	50/60

Sensor		
	Article number	ST-SENS-V3
	Dimensions [mm]	53x39x23
	Material	Aluminium, POM, NBR, stainless steel
	Colour	Black, green, aluminium
	Weight [g]	300
	Power consumption [W]	N/A
	Voltage [V]	N/A
	Frequency range [Hz]	N/A

Lamp



Article number	ACC-LAMP-V3/SM; ACC-LAMP-V3/LRG; ACC-LAMP-V3/XL
Dimensions [mm]	880x135x18; 1180x135x18; 1480x135x18
Material	DC01, powder coated
Colour	RAL9003, glossy
Weight [g]	2000; 2600; 3300
Power consumption [W]	24
Voltage [V]	24V DC
Colour temperature [K]	4000

Fan unit



Article number	FAN-300-V3
Dimensions [mm]	440x350x315
Material	DC01, powder coated
Colour	RAL9016
Weight [g]	22350
Power consumption [W]	600
Voltage [V]	110-230
Frequency range [Hz]	50/60

Division:

HEPA filter



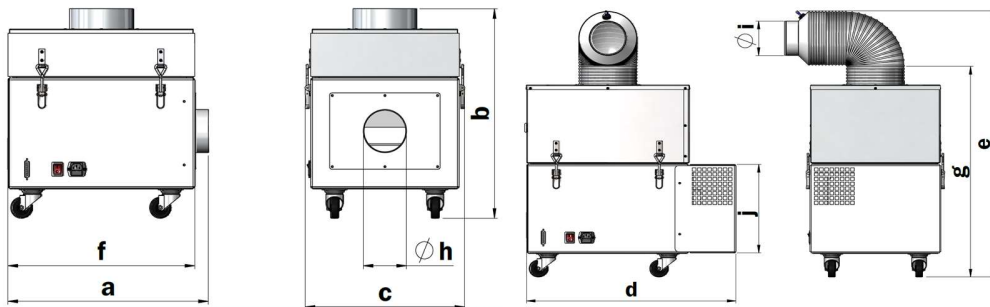
Article number	FILT-S-HEPA/V3 (one layer); FILT-D-HEPA/V3 (two layers)
Dimensions [mm]	440x350x112 (one layer); 440x350x230 (two layers)
Material	Aluminium (housing); STAMOID LIGHT (collar)
Colour	Aluminium, polished
Weight [g]	4500 (one layer); 9100 (two layers)
Power consumption [W]	N/A
Voltage [V]	N/A
Filter class	H14 (one layer); H14+ (two layers)

Division:

System dimensions - Filter unit with HEPA filter or activated carbon filter

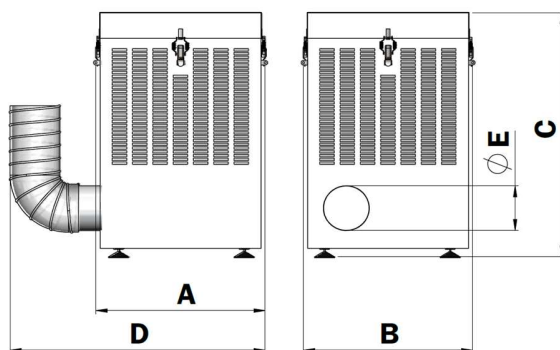


HEPA filtration unit



	a	b	c	d	e	f	g	h	i	j
HEPA filter, 1 layer	472	495	376	567	-	440	-	100	100	260
HEPA filter, 2 layers	472	-	376	567	773	440	612	100	100	260

Carbon filtration unit



A	B	C	D	E
350	350	520	<520	100

Division:

Standards, technical rules and test procedures

Observed standards

- DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast).
- EN ISO 12100:2010 Safety of machinery – General principles for design – Risk assessment and risk reduction (ISO 12100:2010)
- EN 60204-1:2006 Safety of machinery – Electrical equipment of machines – Part 1: General requirements (IEC 60204-1:2005, modified)

The ST1 series complies with the protective measures required by TRGS 500 (Technical Rules for Hazardous Substances) and is to be regarded as a highly effective extraction system. It is suitable for personal protection in accordance with EN 14175-3 for fume cupboards and also complies with the ASHREA 110 standard.

The ST1 series has been tested according to EN 689 and ISPE guidelines with surrogate substances by the independent German institute InfraServ. The test protocol can be found in appendix D.

The HEPA filtration system used is certified according to DIN/EN 1822.

The aforementioned standards have been applied in the design and construction and, where applicable, are referred to in the applicable declarations of conformity.

Work regulations

The following regulations and directives must generally be observed when working in the laboratory and with equipment from a1-envirosciences:

For Germany:

- Occupational Safety and Health Act
- Ordinance on Hazardous Substances
- Technical Rules for Hazardous Substances
"Safe Working In Laboratories BGI/GUV-I 850-0"
- Waste regulations

Technical rules

When working with ST1 series safety weighing enclosures, enclosures and similar products from a1-envirosciences, the following regulations must be observed or the following standards apply:

For Germany:

- Technical rules for hazardous substances TRGS 526
- EN 14175, part 3

Test procedure

Our products are tested according to the following standards:

- ST1 series safety weighing enclosures, enclosures and similar products according to EN 14175 and ASHRAE 110
- HEPA filtration system according to EN 1822
- Breakout test with surrogate substances carried out by InfraServ GmbH & Co. Höchst KG

Appendix A - Consumables

Consumables for ST1 series safety weighing enclosures

Article number	Description
ACC-BAG/WST	Waste bags, 50 pieces/package
GAS500	Smoke test kit
GAS501	Test tubes for smoke test kit
ACC-DECON/WIPE	Decontamination wipes

Accessories (optional)

Article number	Description
BENCH-9	Stainless steel table for ST1-0900
BENCH-12	Stainless steel table for ST1-1200
BENCH-15	Stainless steel table for ST1-1500
ST-WASTE/V2	Waste system
ST-PRT	Printer table
ST-SIL/DS-V3	Silencer

Spare parts

Article number	Description
FILT-S-HEPA/300-V3	HEPA filter, single layer
FILT-D-HEPA/300-V3	HEPA filter, two layers
FILT-SOLV-DS/300	Carbon filter

Appendix B - Chemical resistance

Chemical resistance of ceramic tiles

The ceramic plates used originate from chemical apparatus construction, have been subject to practical testing for more than 40 years and have proven their durability in laboratories all over the world. Outstanding properties of the ceramic material used are the excellent chemical resistance, the hardness and the temperature resistance of up to 800 °C.

The technical ceramic is characterised by very good chemical resistance to most laboratory chemicals, without staining or loss of gloss. The following table gives an overview of the resistance to aggressive media:

Acids	Lyes	Aggressive	Solvent
48% hydrochloric acid	Sodium hydroxide	Hydrogen peroxide	Ethanol
70% nitric acid			Methyl ethyl ketone
98% sulphuric acid			Acetone

A method that classifies the scratch resistance of different materials very clearly is the Mohs test. In this scale, the diamond is the hardest material with a Mohs hardness of 10 and scratches all materials with lower hardness values. Common knife steel, for example, has a Mohs hardness of 6 and cannot scratch the ceramic plate. The hardness of the plates used is between 6 and 7.

The hardness and associated scratch resistance of the ceramics used also allows coarser cleaning processes. The work surface remains unchanged.

Hygienic conditions are ensured by the even, impermeable surface. Bacteria or other microorganisms do not have the possibility to penetrate or grow. The optimal cleanability avoids sources of nutrition on the surface.

Appendix C - Table of efficacy for activated carbon

4 = very good adsorption

3 = good adsorption

2 = low adsorption

1 = very low adsorption

Acetone	3	Butyric acid	4	Turpentine	4
Acetaldehyde	4	Chlorine	1	Solvent	4
Acrolein	1	Chloroform	4	Menthol	4
Alcohol	4	Diesel oil vapour	3	Methane	1
Anaesthetics	3	Acetic acid	4	Methyl alcohol	3
Ether	3	Disinfectant	4	Mercaptans	2
Essential oils	4	Formaldehyde	2	Phenol	4
Ethane	1	Iodine	4	Phosgene	3
Ethylene	1	Isopropyl alcohol	4	Propane	2
Ethyl acetate	4	Amines	2	Petrol	4
Benzene	4	Toluene	4	Butane	2

Appendix D - Declarations of conformity



Declaration of Conformity

Manufacturer: a1-envirosciences GmbH
Eichsfelder Straße 1

Product: Balance Enclosure Systems

Models: ST1-900, ST1-1200, ST1-1500, IE-1200, IE-1500, IE-1800 including accessories

We declare under our sole responsibility that the above-named products conform to the requirements of the following European Directives:

2014/35/EU low voltage directive (LVD)
2014/30/EU electromagnetic compatibility (EMC)

Conformity with the requirements of the above directives is testified by adherence to the following harmonized standards:

EN 60598 1:2015-10 Luminaires - General requirements and tests
EN 61000-3-2:2014-08 Electromagnetic compatibility (EMC) - Limits - Limits for harmonic current emissions
EN 61000-3-3:2013-08 voltage fluctuations and flicker
EN 61000-6-2:2011-06 Immunity
EN 61000-6-4:2011-09 Emission
EN 61010-1:2011-07 Safety requirements for electrical equipment for measurement control and laboratory use
EN 61326-1:2013-07 Electrical equipment for measurement control and laboratory use - ESD requirements
EN 61547:2009 equipment for general lighting purpose - EMC immunity requirements

Düsseldorf, the 27th of April 2022.

Dr. Olaf Wolf-Kunz
Managing Director



a1-envirosciences GmbH
Eichsfelder Straße 1 | 40585 Düsseldorf
Tel. +49 211 751451-0 | Fax +49 211 751451-22
sales@a1-envirosciences.de | www.a1-envirosciences.de



Central Office
RD 01076 Management Düsseldorf
WGB: DR 81510311
Geschäftsführer: Dr. Olaf Wolf-Kunz
Zertifiziert nach ISO 9001:2015

Business Account: Commerzbank AG
BIC: COBA33HAN33
IBAN: DE33 8115 0000 0150 0150 0150
BIC: DRESDE33HAN

Division:



RoHS-REACH Declaration of conformity

Declaration of conformity – RoHS

This is to declare that all materials and/or components used in the manufacture of all products comply without exemption with the EU Directive 2011/65/EU (as amended by Commission Delegated Directive (EU) 2015/863 of 31 March 2015) for Restrictions of Hazardous Substances (RoHS) from dates indicated. This statement is based on information provided by a1-envirosciences GmbH suppliers and is accurate to the best of our knowledge.

Declaration of conformity – REACH

Article 33 of EU REACH Regulation No. 1907/2006 requires that a1-envirosciences GmbH notify our customers in the case that any of the REACH Candidate List SVHC is present above 0.1% (weight by weight) in articles that we supply. Article 3(3) of the REACH regulation defines an article as "an object which during production is given a special shape, surface or design which determines its function to a greater degree than its chemical composition."

This is to declare that all products are in compliance with the EU Reach regulation and do not contain any substances on the Candidate List of Substances of Very High Concern (SVHC).

These declarations are based on the knowledge and experiences we have today. Changes to the directives are monitored on a regular basis.

Düsseldorf, the 9th of May 2022

Dr. Olaf Wolf-Kunz (Managing Director)



Appendix E - Certificates

Certificate

Suitability of the ST1-V3 safety weighing cabinets for the use of hazardous substances

The safety weighing cabinets of the ST1-V3 series were tested for suitability for hazardous substances in hazardous substance classes G1 to G4 and correspond to OEB1 to OEB 5 by measuring dust exposure with the surrogate naproxen sodium.

Approval for workplace exposure limits up to: 15 ng/m³

Test execution with safety weighing cabinets ST1-9V3, ST1-12V3 and ST1-15V3

The test was carried out in September 2021 on all sizes of this series. For this purpose, 15 g of surrogate were filled from a source container into various target containers for each test. Carrying out the experiment lasted between 35 and 45 minutes and included filling into target vessels, weighing on an analytical balance, cleaning of all surfaces and disposal of the waste in the double-bag waste system. INFRASERV carried out the measurements and evaluations. In each individual test, the exposure was measured directly at the work opening on the left and right edge of the safety cabin using 4 air collectors. In addition, an air collector was attached to the operator's lab coat at chest level. A fourth air collector was installed alternately in the containment and outside in the area of the waste bag system. was based on the SMEPAC guideline and the ISPE Good Practice Guide "Assessing the Particulate Containment Performance of Pharmaceutical Equipment".



Image: Testing setup

Sampling

Robustness of the test execution and measurement results

The test procedure was deliberately not carried out under optimized conditions in order to ensure the robustness of the retention capacity of the ST1-V3 in the front opening:

- 1) A user with no chemical background or hands-on experience handling hazardous materials and a chemist with experience handling hazardous materials
- 2) The target vessels had opening sizes between 10 and 25 mm. Due to the properties of naproxen sodium, contamination of the work surface and scales occurred regularly.

The table shows the maximum dust exposure values measured from 35 individual measurements. The measured values outside the ST1-V3 are in the range of the limit of quantification (7-10 ng/m³).

Measuring location	Exposure
Inside the ST1-V3	11200 ng/m ³
Left of the front opening	0,8ng/m ³
Right of the front opening	0,8ng/m ³
Operator lab coat	0,8ng/m ³
Garbage disposal system	0,9ng/m ³

Two decades of experience in development, consulting, sales and service show that optimal equipment, regular service and good and regular employee training offer the best prerequisites for minimizing the risk of exposure and to achieve very low workplace limit values in the range of only a few ng/m³.

Peter von Hollen

Dr. Peter von Hollen, Product Manager at a1-envirosciences GmbH, 19th of May 2022

Division:

a¹ **safetech**