Cleaning and maintenance of safety cabinets and isolators

Berner International GmbH

1 Cleaning and care

Never use aggressive cleaning and disinfecting agents that may attack the surfaces of stainless steel, powder coated metal, glass or the polymeric material of the power sockets and other connections under any circumstances. Observe the general manufacturer specifications. Only material-specific cleaning and disinfecting agents should be used.

The disinfectants used are to be selected according to the existing or assumed biological agents. Where necessary, only specified disinfecting and cleaning agents (e.g. sterile-filtered or gamma-irradiated products) should be used to achieve optimal aseptic working conditions. Professional association regulations for disinfection activities in health care must be observed!

The removal of any filter protection devices (stainless steel laminate sheet in front of the recirculating air filter, protective grille in front of the main filter stage) is not permitted for otherwise the filters may easily be damaged! The cleaning and disinfecting of these protective grilles may only be carried out with suitable cleaning cloths impregnated with detergents or disinfectants. Never spray directly onto the surfaces and materials! The same code of practice applies for power sockets, Interfaces and other connections of the safety cabinet. Here, liquids can lead to damages to the material and to the function, including short circuits. Apply liquid agents always sparingly with a clean wipe and only onto the outer covering!

Carry out cleaning always with the unit switched on!

Appropriate personal safety equipment (PSE) must be worn!

1.1 Cleaning agents and disinfectants

CMR substances and other hazardous substances, e.g. cytostatics, often cannot be adequately removed using traditional disinfection measures! A 2-stage protocol is recommended for the specific removal of cytostatic residues. For this purpose, 0.05 - 0.1 M sodium hydroxide solution or comparable alkaline cleaning solutions (for example, 2% Mucasol®) are first applied to a suitable cleaning cloth and then used to treat the working surface thoroughly. After that the same procedure is carried out using alcoholic disinfectants. Depending on the assumed degree of contamination, this cleaning process is repeat two or more times.

For disinfection, the numerous products available on market below cover a differently broad range of efficacy. The alcoholic agents are used for simple and rapid disinfection and are bactericidal, fungicidal, virucidal, but are only limited effective against spores. Peroxide compounds are additionally effective against spores, e.g. based on hydrogen peroxide or peracetic acid. Some products are particularly suitable for clean room areas as well as suitable for wipe-down disinfection with sterile wipes. Recommended cleaning agents are preferably sterile and neutral cleaner. The cleaning and disinfecting agents can be used for stainless steel, glass and powder coated metal. They are generally well-tolerated when used appropriately, observing the manufacturer's instructions for humans and the environment.

Recommended active agents for disinfectants and cleaning agents:

+ Isopropanol
+ Ethanol
+ n-Propanol
+ Peroxide compounds:

  - Peracetic acid
  - Hydrogen peroxide, approx. 6%
- Potassium peroxymonosulphate, Caroat

Because of the many different products on market and the frequent changes on names and formulation, explicit product recommendations are not given by Berner international GmbH. Direct user and product information are available through the manufacturer of cleaner and disinfectants, for example at:

- Antiseptica Dr. Hans-Joachim Molitor GmbH
  http://www.antiseptica.com
- Bode Chemie GmbH
  http://www.bode-chemie.de
- Diversey Deutschland GmbH & Co. ohG
  http://www.diverseysolutions.com/de
- Ecolab Deutschland GmbH
  http://www.ecolab.com
- Schülke & Mayr GmbH
  http://www.schuelke.com
- or on www.berner-safety.de under products, disinfection & hygiene

Further manufacturer and trader can also be found in the list of approved disinfectants from the Robert Koch Institute (RKI) and the Association for Applied Hygiene (VAH).

Explosion limits (Ex) for vapours, in particular with alcohol-based disinfectants, must be observed (ethanol, 80%: Ex_{lower} = 3.5 Vol.-%, Ex_{upper} = 15 vol %, isopropanol, 70%: Ex_{lower} = 2.0 Vol.-%, Ex_{upper} = 12 vol %)! Wipe-on disinfection is always preferable over spray-on disinfection. The explosion limit is normally not reached when up to 50 ml ready to use solution per m² of treated surface are applied! The user information of the disinfectant in question should be read carefully before use, in particular with regard to the possible formation of explosive mixtures.

Chlorine-containing cleaning and disinfecting agents are not recommended, because it cannot be ruled out that the stainless-steel metal surfaces in the work area of the safety cabinet can be affected by residues over extended periods. Disinfectants based on aldehydes, amines and quaternary ammonium compounds (QAV) are not listed in the table as they are not harmless to health (aldehydes), ecologically damaging and only of limited sporocidal activity (QAV, amines). For QAV, potentially strong residue formation on the surfaces during long-term use is also described. To prevent this effect, regular re-wiping of the surfaces with pure water is necessary, preferably after each use. With these restrictions, the mentioned types of disinfectants are useful for cleaning and disinfection. In any case, the manufacturer's instructions for use must also be carefully read and observed.

Larger quantities of spilled liquids, in particular saline buffer solutions, should be removed completely by suitable means prior to disinfection. The contaminated areas of the safety cabinet should be wiped and dried with sterile water, especially prior to rapid disinfection with alcoholic cleaners. Failure to do so can lead to the formation of residues with corrosive properties that may damage the surfaces in the long term

Further information can also be found in the list of approved disinfectants from the Robert Koch Institute (RKI) and the Association for Applied Hygiene (VAH):

www.rki.de

www.vah-online.de

Information on usage is available from the manufacturers of the disinfectants.

1.2 Cleaning and disinfection intervals

The cleaning and disinfection intervals can vary depending on the type of activity and the degree of utilisation of the SC. Shorter intervals may be necessary according to the applicable hazard assessment and hygiene plans.

The following cleaning and disinfection intervals should be observed:

+ At the beginning and end of activities: Rapid disinfection with alcoholic products.
+ Every day: Cleaning and disinfection of the work area, i.e. rear and side walls, front window, work surface(s). Removal of cleaning and disinfection agent residues, if necessary using sterile water.
+ Every week: Complete cleaning and disinfection of the internal working area, including the collecting basin below the work surface(s) and the outside surfaces. Removal of cleaning and disinfection agent residues, if necessary using sterile water.

1.3 UVC radiation

Optionally, safety cabinets can be equipped with a UVC disinfection system. A high irradiation intensity at a wavelength of 254 nm ensures rapid killing of microorganisms and the destruction of nucleic acids. This makes the system useful mainly for microbiological and molecular biology applications. It can also be used as a supplementary method to achieve aseptic working conditions.

Typically, relatively rapid surface disinfection can be achieved for most microorganisms using this method. Kill-off and inactivation rates for bacterial, bacteria spores, yeast, fungi and viral infections generally vary between 2 and 10 min with a few exceptions (LD90 values, 90% kill-off/inactivation). With UVC, the surfaces in the work area of the safety cabinet can be effectively and easily disinfected with high efficiency. Recommended is the treatment of the work area before the start of the activity and after completing all activities, including cleaning and disinfection with 30-60 minutes irradiation time.

After 16,000 operating hours, a loss of up to 25% of the radiation intensity is to be expected and the UVC light source should be replaced.

UVC irradiation is to be considered a supplement to other disinfection measures. It is not intended to replace the daily cleaning and disinfection of the cabinet. Comparable with simple rapid disinfection where only disinfectant is applied to the surface, the killed microorganisms remain on the surface. It is only possible to remove residues from the surface by wiping and scouring and using suitable agents.

1.4 Room fumigation

Room fumigation with formaldehyde:

Disinfection via room fumigation (e.g. before replacing a filter) should be carried out in accordance with EN 12469 Appendix J. 2. In Germany, TRGS 522 must be observed. The room fumigation is performed as follows:

+ Minimum airborne formaldehyde concentration of 50 mg/m³
+ Volume to be fumigated, according to the SC width: V130 = 1.6 m³; V160 = 1.9 m³; V190 = 2.2 m³
+ Use an evaporator with 60 ml formalin and 60 ml water per m³ SC volume
+ Neutralisation using ammonia
+ Temperature > 20°C and a relative humidity of min. 65%
+ Exposure time min. 6 hours
+ Place the evaporator in the working space, insert the plug
+ Seal openings using caps and seal gas-tight with tape if necessary
+ Equalise pressure if necessary
+ Seal off the laboratory and mark the fumigation area
+ Observe occupational health and safety rules(see TRGS 522)

+ Take control measurements for approval of the safety cabinet and laboratory
+ Following fumigation, clean and ventilate the SC and lab adequately
+ Document the fumigation process

Room fumigation with hydrogen peroxide:

Alternatively, we recommend disinfection using H_2O_2 (e.g. before a filter change) in accordance with EN 12469 Appendix J. 2. The Berner Claire® devices are all designed for decontamination with H_2O_2. One protocol uses for example SKAN Air DECOSIS for fumigation. The working space fumigation should be carried out as follows:

+ Seal the openings gastight using a sealing cover and tape where required
+ Connect the DECOSIS to the incoming and exhaust air systems
+ Add 1ml of 35% H2O2 per centimetre of device width.
+ 10ml addition for 3 filter systems, a further 10ml for heavily contaminated systems
+ Temperature > 20°C and a relative humidity of min. 65%
+ Seal off laboratory and mark the fumigation area
+ Observe occupational health and safety rules!
+ Approve the device and lab using test measurements
+ Following fumigation, clean and ventilate the SC and lab adequately
+ Document the fumigation process

Further information can also be found in the lists for approved disinfectants from the Robert- Koch-Institute (RKI) and Association for Applied Hygiene e.V. (VAH):

www.rki.de

www.vah-online.de

1.5 Stainless steel treatment

In everyday use, stainless steel surfaces can become contaminated or damaged. This can reduce the corrosion resistance or cause corrosion.

In addition, fingerprints, coatings, deposits, scratches and similar can give the stainless steel a neglected appearance. Stainless steel should also be maintained regularly (at least every 3 months) in addition to daily disinfection. The regular maintenance of brushed and polished stainless-steel products should be performed as follows:

Minor effects (fingerprints, light coatings, deposits, disinfectant residues):

+ Rub with a soft cloth with some liquid scouring agent and water.
+ Rub in the polishing direction of the material.
+ If necessary, spray the surface with stainless steel cleaner, rub it in, wait for a little while and rub down with a soft, dry cloth. The last treatment gives the stainless steel a thin protective coating.

Strong contamination (minor areas of damage, heavy coatings, heavy deposits, initial signs of corrosion, minor scratches):

In addition, before treating with stainless steel cleaner, clean the affected areas with a scouring sponge using a small amount of liquid scouring agent and water.
Carry out this rubbing movement in the polishing direction of the material.

Very heavy soiling (corrosion, deep scratches):

+ Treat the damaged area with a sanding block.

+ Carry out the rubbing movement in the polishing direction of the material.
+ If necessary, use a scrubbing sponge and treat with a stainless-steel cleaner as described above.

Note:

After treating heavy and very heavy soiling, a change in the surface appearance of the stainless steel may occur.

1.6 Safety instructions

Note the following in particular with cleaning and disinfection measures:

+ Observe professional association regulations for disinfection work
+ Use appropriate personal safety equipment
+ CMR pharmaceuticals normally cannot be decontaminated
+ Only use cleaning and disinfection agents appropriate for the material
+ Remove all traces in full
+ Do not remove filter safety devices
+ Observe explosion limits