CLEANING AND MAINTENANCE OF SAFETY CABINETS AND ISOLATORS
Berner International GmbH

1 Cleaning and maintenance information

Aggressive cleaning agents and disinfectants, which can attack the surfaces of V2A-stainless steel, glass or powder-coated metal, basically may not be used. The general producer information has to be considered. Only material-specific recommended cleaning agents and disinfectants shall be applied.

The used disinfectants shall be selected depending on the existing or accepted biological agents. If necessary to achieve aseptic working conditions only special disinfectants and cleaning agents have to be used (e.g. sterile-filtered, gamma irradiated). Professional association rules for disinfection works in the health service must be considered!

No filter protection facilities (stainless steel laminators before the circulating air filter, protective grid in front of the main filter level) may be removed, because otherwise the filters could be slightly damaged! The cleaning and disinfection of these protective grids may only be carried out with suitable cleaning cloth which were soaked with cleaning or disinfection agent. Never directly spray on the agents!
The cleaning always has to be carried out at a device which is switched on.
Suitable personal protection equipment (PSA) has to be worn!

1.1 Cleaning agents and disinfectants

As a rule, CMR-substances and other hazardous materials, e.g. cytostatic, cannot sufficiently be removed by disinfection measures! For a targeted removal of cytostatic residues a 2-step protocol is re-commended. For this, first 0,05 – 0.1 M sodium hydroxide solution or comparable alkaline cleaning solutions (e.g. 2% Mucasol ®) is applied on a suitable cloth and the working surface is thoroughly processed by this. After that carry out the cleaning process correspondingly with alcoholic disinfection agents. Depending on the contamination level repeat this cleaning two or several times.

For disinfection the subsequently listed products cover a broad range of impact. The alcoholic agents serve as rapid disinfection and are bactericide, fungicide, virucidal, however, not sporocidal. The peroxide connections additionally are very efficient against spores. The products are especially suitable for wiping disinfection for clean room areas A and B in combination with sterile cloths. The cleaning agents and disinfectants can be used for V2A glass and powder-coated metal. In case of appropriate use and considering the producer information they are very compatible for human beings and the environment.

Table 1: recommended disinfection and/or cleaning agent

Disinfectants	**Active ingredient**	**Producer**
Bacillol® CR	Isopropanol	BODE Chemie GmbH
Ethisol®	Ethanol, Isopropanol, n-Propanol	Antiseptica chem.-pharm. Produkte GmbH
perform® sterile alcohol EP	Ethanol, n-Propanol	Schülke & Mayr GmbH
perform® sterile alcohol IPA	Isopropanol	Schülke & Mayr GmbH
Premier Klericide 70/30	Ethanol	Ecolab Deutschland GmbH
perform® sterile PAA	Peracetic acid, ready for use (0,07%)	Schülke & Mayr GmbH
Premier Klericide-CR Biozid C	Hydrogen peroxide, about 6 %	Ecolab Deutschland GmbH
Descogen® Liquid	Kaliumperoxymonosulfat, Caroat	Antiseptica chem.-pharm. Produkte GmbH
Cleaning agent	**Active ingredient**	**Producer**
Premier Klerclean	sterile neutral cleaning agent	Ecolab Deutschland GmbH
perform® sterile cleaner ND	Sterile neutral cleaning agent	Schülke & Mayr GmbH
Mucasol®	Alkaline cleaning agent (currently not available in sterile form)	Schülke & Mayr GmbH

The explosion limits (Ex) for vapours, particularly for alcoholic disinfection agents have to be considered (ethanol, 80%ig: Ex_{bottom} = 3,5 Vol.-%, Ex_{top} = 15 Vol.-%, Isopropanol, 70%ig: Ex_{bottom} = 2,0 Vol.-%, Ex_{Oben} = 12 Vol.-%)! Wiping disinfection shall always be preferred to spray disinfection. As a rule, the explosion limit is not achieved at an output of 50 ml stock solution per m² of space which is to be treated! The package information leaflet of the respective disinfection agent is to be read thoroughly before use with regard to a potential development of explosive mixtures.

Cleaning and disinfection agents, containing chlorine, are not recommended, because during the use over longer time periods it cannot be excluded that the V2A-metal surfaces in the working room of the safety cabinet could be attacked by residues. Disinfection agents on the basis of aldehydes, amines and quaternary ammonium compounds (QAC) are not listed in the table, because they are not harmless in terms of health (aldehydes) or in terms of ecology and partly show an only limited sporocidal impact (QAC, amines). For QAC it is also described that they can lead to stronger residue formation on the surfaces in case of longer use. In order to prevent this effect at least regular additional wiping with pure water is necessary. With these restrictions these disinfection agents can be used. In any case also here the package information leaflet of the producer should thoroughly be read and considered.

⇨ You can gather further information from the lists for admitted disinfection agents of the Robert- Koch-Institute (RKI) and the Association for Applied Hygiene e.V. (VAH):

+ www.rki.de
+ www.vah-online.de

⇨ The package information leaflets can be obtained from the producers of disinfection agents; e.g.:

- www.antiseptica.com
- www.bode-chemie.de
- www.ecolab.com
- www.schuelke-mayr.com

1.2 Cleaning and disinfection intervals

Depending on the type of activity and the utilization level of the safety cabinet the cleaning and disinfection intervals can vary. According to the valid risk analyses and hygiene plans shorter intervals may be necessary.

The following cleaning and disinfection intervals should be observed:

- **At the beginning and end of activities:** rapid disinfection with alcoholic agents
- **Daily:** cleaning and disinfection of the working interior room, which means back and side walls, front window, working surface(s)
- **Weekly:** complete cleaning and disinfection of the working interior room, including the collecting basin below the working surface(s) and the outside areas

1.3 UV-C-irradiation

Optionally safety cabinets can be equipped with the UV-C disinfection system QuickDecon. High irradiation strength at a wavelength of 254 nm guarantees a fast killing of microorganisms and the destruction of nucleic acids. Therefore, this system is mainly interesting for microbiological and molecular-biological applications. It can also be used as supplement method to achieve aseptic work conditions.

Typically for most of the microorganisms area disinfection can be achieved relatively fast. Killing or inactivating rates for bacteria, bacteria spores, yeasts, fungi and viruses vary with few exceptions basically between 2 and 10 min (LD_{90}-values, 90% killing/inactivation).

By means of UV-C the surfaces in the working room of the safety cabinet can be effectively and comfortably disinfected with a high level of impact. For example, the treatment of the working sector before the beginning and after termination of all activities including cleaning and disinfection with an irradiation time of 30-60 minutes can be recommended.

UV-C-irradiation has to be regarded as supplement to all other disinfection measures. It should not replace the daily cleaning and disinfection of the cabinet. Comparable to simple spray disinfection, at which only disinfection agents are applied on the surface, killed microorganisms remain on the surface. Only by means of wiping and scrubbing treatments with suitable agents the material will be removed from the surface.

1.4 Room gassing

Room gassing with formaldehyde:

A disinfection by means of **room gassing** (e. g. before a change of filter) should be carried out in accordance with EN 12469 enclosure J. 2. In Germany the TRGS 522 shall be noted. The room gassing shall be carried out as follows:

- Airborne formaldehyde minimum concentration of 50 mg/m³
- Volume which is to be gassed, according to the width of the safety cabinet: V130 = 1.6 m³; V160 = 1.9 m³; V190 = 2.2 m³

+ Use evaporator with 60 ml formalin and 60 ml water per m³ safety cabinet
+ Neutralisation by means of ammonia
+ Temperature > 20°C and rel. air humidity of 65%, at minimum
+ Exposure time 6 h, at minimum
+ Integrate evaporator in the working room plug in power plug
+ Close openings by means of cover plate and, if necessary, tape in a gas-tight manner
+ Establish pressure equalisation, if necessary
+ Block laboratory and label gassing
+ Note labour protection (s. TRGS 522)!
+ Release safety cabinet and laboratory by means of control measurements
+ Sufficiently clean and ventilate safety cabinet after gassing
+ Document gassing

Room gassing with hydrogene peroxide:

Alternatively we recommend a disinfection by means of room gassing (e. g. before a change of filter) with H2O2 according to EN 12469 enclosure J. 2. The devices of the BERNER CLAIRE series are all designed for a decontamination with H2O2. We recommend for gassing the SKAN Air Decosis. The working room gas sing is to be carried out as follows:

+ Close openings by means of cover plate and, if necessary, tape in a gas-tight manner
+ Connect Decosis to supply and exhaust air
+ Add 1ml 35%iges H2O2 per each centimetre of device width
+ 10ml surcharge for 3 filter systems, further 10ml for strongly contaminated systems
+ Temperature > 20°C and rel. air humidity of at least 65%
+ Block laboratory and label gassing
+ Note labour protection
+ Release safety cabinet and laboratory by means of control measurements
+ Sufficiently clean and ventilate safety cabinet after gassing
+ Document gassing

⇨ You **can gather** further information from the lists for admitted disinfection agents of the Robert- Koch-Institute (RKI) and the Association for Applied Hygiene e.V. (VAH):

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1.5 Stainless steel treatment

In the daily use stainless steel surfaces can be contaminated or damaged. By this, the corrosion resistance can be reduced or corrosion can be caused.
Additionally finger prints, deposits, sediments, scratches and similar things can cause neglected appearance of the stainless steel. In addition to the daily disinfection the stainless steel needs to be maintained regularly (at least every 3 months). The regular maintenance of brushed and polished stainless steel products should be carried out as follows:

Light contaminations (finger prints, light deposits, sediments, disinfection agents residues):

+ Rub off with a soft cloth with liquid scrubbing cleanser and water. Carry out the scrubbing movement into the polishing direction of the material.
+ If necessary, spray surface with stainless steel cleaner, rub in, wait a few minutes and distribute with a soft dry cloth. The last treatment gives the stainless steel a thin protection layer.

Strong contaminations (light damages, strong deposits, strong sediments, beginning corrosion, light scratches):

+ Additionally before the treatment with stainless steel cleaner clean the affected places with a scrub sponge with liquid scrubbing cleanser and water. Carry out the scrubbing movement into the polishing direction of the material.

Very strong contaminations (corrosion, deep scratches):

+ Treat damaged spot with sanding block. Carry out the scrubbing movement into the polishing direction of the material.
+ Possibly reprocess with a scrub sponge and after that treat like above with stainless steel cleaner.

Comment:
After treating strong contaminations there can be a change of in surface appearance of the stainless steel.

1.6 Safety guidelines

Particularly note for the cleaning and disinfection measures.

+ Observe BG-rules for disinfection works
+ Use suitable PSA
+ As a rule CMR-medicinal products cannot be decontaminated
+ Only use cleaning and disinfection agents which are suitable for the material
+ Do not remove filter protection facilities
+ Bear in mind explosion limits