Quick Guide

ZEISS

Cleaning and Disinfecting the Microscope and its Optical Components

ZEISS

Original Manual

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Glossary

Disinfectants

Disinfectants are chemicals which can weaken or neutralize biological agents and are often used for surface disinfection. Disinfectants work by destroying living organisms (biological agents) by interfering with their metabolism, or by inactivating virus particles.

Disinfection

Disinfection is a procedure required to reduce the risk of infection or harm from the biological agents. Disinfection prevents staff exposure to harmful biological agents, transfer of biological agents outside the operation area (e.g. laboratory) and cross contamination.

Exposure time

Exposure time (also referred to as dwell or contact time) is the time needed for a disinfectant to be in contact with the biological agents to reduce them to a safe level. The exposure time of the same disinfectant may differ depending on the biological agent.

Infectious agents

Infectious agents can be classified as follows:
1. Permanent stages of bacteria (e.g. spores).
2. Vegetative stages of bacteria.
3. Enveloped virus particles.
4. Non-enveloped virus particles.
5. Fungi.
6. Protozoa.

Shelf life

Shelf life (or expiration date) is the length of time the disinfectant product may be stored before the active ingredients begin to break down, and thus the disinfectant will no longer be able to reduce the biological agents to a safe level. The shelf life is noted on the disinfectant container. The shelf life of the disinfectant may be reduced if it is not stored appropriately.

Specimen

A representative part or a single item from a larger whole or group especially when presented for inspection or shown as evidence of quality.

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ZEISS is an internationally leading technology enterprise operating in the fields of optics and optoelectronics. Further information about ZEISS can be found at www.zeiss.com.

ZEISS service representative

Specially trained service expert, either ZEISS staff or authorized service partner of ZEISS.

1 General Information

Microscope Systems are commonly shared by several users; therefore they bear the risk of being contaminated with microorganisms. In addition, microorganisms themselves can serve as specimens which are observed with the Microscope System. If a contamination is suspected, we recommend a disinfection of the Microscope System.

This document summarizes general decontamination and disinfecting methods and recommendations without being meant to replace a scientists expertise nor medical or professional advice. ZEISS shall not be held responsible for and makes no representation as to the suitability or effectiveness of any method and/or disinfectant mentioned in this document. ZEISS shall not be held responsible for any damage resulting from the disinfecting of the Microscope System outside of this document. The use of methods which deviate from the recommended ones is at the own risk and sole responsibility of the user and voids the warranty.

1.1 Further Applicable Documents

Please take also note of the following documents:

Local and National health and safety regulations	Local and national health and safety regulations should be adhered to for the site and the use of the system. Consider recommendations of specialized agencies and organizations such as the Robert Koch Institute (RKI) and the World Health Organization (WHO).
Safety data sheets	Observe the enclosed safety data sheets. The instructions and guidelines given in the respective safety data sheets must be complied with.
IT equipment	For all IT equipment, please also follow the instructions provided by your local IT department.
ZEISS brochure	Methods and Principles. The Clean Microscope. (Carl Zeiss Microscopy GmbH, 50-1-0025/e – printed 06.11 ISBN: 978-3-940885-03-6).
World Health Organization	Biosafety video series. Good Microbiological Practices and Procedures. https://www.who.int/ihr/publications/biosafety-video-series/en/.
Robert Koch-Institut	Robert Koch Institute's list of approved disinfectants (Bundesgesundheitsbl 2017, 60:1274–1297 © Springer-Verlag GmbH, Deutschland 2017) https://link.springer.com/content/pdf/10.1007/s00103-013-1863-6.pdf.
U.S. Department of Health & Human Services	Disinfection and Sterilization, https://www.cdc.gov/infectioncontrol/guidelines/disinfection/index.html.

2 Safety

This chapter contains general requirements for safe working practices. Observe all safety instructions in this document and in the associated material safety data sheets for the disinfectant which is used.

2.1 Prevention of Hazards

This section summarizes potential hazards and recommended safety precautions. Failure to follow the safety instructions may result in personal injury and property damage.

Biological hazards

Biological substances/agents may pose a risk to the health of humans and other living organisms.

- Keep a logbook of the known biological substances/agents used when working with Microscope System and show it to the ZEISS service representative before they perform any work on the Microscope System.

Contamination hazard

The Microscope System and other components can come into contact with various Specimens and substances that can be hazardous to humans and the environment.

- Make sure that the Microscope System was not in contact with hazardous substances (check the laboratory logbook); otherwise, the Microscope System must be cleaned/decontaminated/disinfected.
- Check the components also. If necessary, clean the components as meticulously as possible. Label contaminated/infected components that cannot be properly cleaned.

  Contaminated parts shall not be returned to any ZEISS. Decontaminated parts can be sent to ZEISS accompanied by signed „Customer Declaration of Decontamination“.
- Wear gloves.

Infection hazard

Direct contact with the eyepieces can be a potential way of passing on bacterial and viral infections. The risk can be lowered by using personal eyepieces or eyecups. If eyepieces need to be disinfected frequently, ZEISS recommends to use the eyepieces without eyecups.

To avoid infections, the use of personal protective equipment (PPE) e.g. gloves for operation, cleaning, and decontamination is highly recommended. Disposable gloves can be decontaminated with, e.g., alcohol, if necessary, or should be changed frequently to minimize the risk of contamination.

Eye, skin, respiratory tract irritation

Exposure to chemicals and their aerosols can cause eye, skin and respiratory tract irritation. Use appropriate personal protective equipment (PPE).

Disinfectant hazards

Ensure adequate ventilation in closed rooms. In case of insufficient ventilation, wear respiratory protective equipment. Remove any harmful residue. Allow the device to dry off after disinfection, particularly after disinfection of eyepieces. Do not inhale vapors. When using disinfectants, do not eat, drink or smoke. Avoid contact with eyes and skin. Remove contaminated clothing and wash before reuse.

Generally, disinfectant products must be stored away from direct sunlight, in a clean, dry place. All disinfectants must be reconstituted, used and disposed in accordance with health and safety regulations. Observe all safety instructions in this document and in the associated material safety data sheets for the disinfectant which is used. Keep disinfectants cool, but frost-free and dry and keep out of the reach of children! Do not use after the expiration date.

3 Microscope Surfaces

The type of the contaminated surface and its condition affects the disinfection process:

- smooth and nonporous surfaces are easier to disinfect
- rough, scratched and damaged surfaces can trap biological agents and therefore require a longer contact time or higher concentration of disinfectant.

Surface	Cleaning and disinfecting method
Exterior casing and mechanical external surfaces	Wipe with a clean cloth that is dampened with a disinfectant. Refer to *Disinfecting a Surface [▸ 9]*.
Internal components and optical surfaces	Only ZEISS service representatives, who have specialized knowledge, are permitted to clean the internal components of the Microscope System.
Eyepieces	It is recommended to have personal eyepieces and to use safety goggles while operating a Microscope System. For disinfection, only wipe the external surface of the eyepiece with disinfectant. Frequent disinfection can cause deterioration of the optical coating of the eye lens and can effect the rubber parts (e.g. eyecups). If frequent disinfection is necessary, we recommend omitting the eyecups. **NOTICE** **Never immerse (dip) the entire eyepiece into disinfectant. This will damage the eyepiece and make it unusable.** The disinfectant leaves a chemical residue on the surface. To remove the residue, refer to *Cleaning an Optical Surface [▸ 10]*.
Objective front lens	Gently wipe the front lens using lens paper which is damped in ZEISS Optical Cleaning Solution L. Frequent cleaning can cause deterioration of the coating of the front lens. Refer to *Cleaning an Optical Surface [▸ 10]* and ZEISS brochure **The Clean Microscope**. **NOTICE** **The material of the objective front lens is sensitive to chemicals. Don't use disinfectant on the front lens.**
Soft plastic parts Rubber surfaces	Gently wipe the soft plastic parts and rubber surfaces with a clean cloth that is dampened with a disinfectant. Refer to *Disinfecting a Surface [▸ 9]*. Discoloration can occur if alcoholic or other disinfectants are used regularly on a rubber surface or soft plastic parts. If the surface is frequently contacted, it is strongly recommended to wear gloves as a preventive measure while operating the Microscope System.
IT equipment	For disinfection of IT equipment please consult the manufacturer. Medical technology providers supply hygienic keyboards and mice.
TFT	Wipe with a clean cloth that is slightly dampened with a disinfectant. Refer to *Disinfecting a Surface [▸ 9]*.

The surfaces mentioned above have been tested with the substances specified in this document. Keep in mind that not all components and materials of your Microscope System can resist chemicals. For example, rubbers, glues, plastic components or surface coatings of optical components could be adversely affected by certain disinfectants.

4 Recommended Disinfectants

The choice of disinfectant, its concentration, and exposure time varies depending on the biological agents you are handling.

Info

The safety data sheets and instructions for use of the respective manufacturers must be observed.

Disinfectants listed below were tested for compatibility with the Microscope System. Never use on optical surfaces or coatings, except eye lens of the eyepiece.

For disinfection against bacteria, use a 70% aqueous solution of isopropanol (IPA, isopropyl alcohol) or ethanol. Ensure that the solution was applied for at least 30 seconds.

The use of the following disinfectants against viruses are recommended:

Name	Base	Manufacturer	Ingredients (per 100 g)	approx. Exposure time
Korsolex® extra (4,0%)	alcohol	BODE Chemie GmbH	15.3 g (Ethylendioxy)-dimethanol 7.5 g Glutaraldehyde 1.0 g Benzyl-C12-18-alkyldimethammonium chloride 1.0 g Didecyldimethylammonium chloride Surfactants Solvents Corrosion inhibitors Foam regulators	15 min
antifect® N liquid	alcohol	Schülke & Mayer GmbH	25 g Ethanol (94%) 35 g Propan-1-ol	1 min
Perform (0,5%)	non-alcoholic	Schülke & Mayer GmbH	45 g Pentakalium-bis(peroxymonosulfat-) bis(sulphate)	5 min
Lysoformin® (6,0%)	non-alcoholic	Lysoform Dr. Hans Rosemann GmbH	6.0 g Formaldehyde 1.8 g Glutaraldehyde Sodium alkyl ether sulphate	60 min
Meliseptol® Product family	alcohol	B.Braun Melsungen AG	50 g Propan-1-ol	1 - 10 min

Tab. 1: Recommended Disinfectants

5 Cleaning and Disinfecting Methods

The following items are recommended for cleaning and disinfecting methods:

Tool/spare part required	Pcs.	Order number
Cleaning cloths (e.g. cotton, micro fibre, optical, lint-free)	1	-
Cotton swabs	1	-
Disinfectant	1	*Recommended Disinfectants [▶ 8]*
Personal protective equipment (such as: gloves, respiratory protection)	1	-
Lens cleaning paper	1	-
ZEISS Optical Cleaning Solution L	1	-

Info

Further information on cleaning the Microscope System and its components can be found in the ZEISS brochure **The Clean Microscope**.

Instead of cleaning the Microscope System itself, there is also the option to cover all points of contact, which are prone to contamination by using a plastic film before usage. After usage, these plastic films should be decontaminated or exchanged with clean ones.

5.1 Disinfecting a Surface

NOTICE

Scratched surfaces due to abrasive compounds

Abrasive compounds can scratch surfaces and thus, have a negative effect on the protective coatings of the Microscope System parts.

- Never use abrasive compounds or cleaners.

Prerequisite

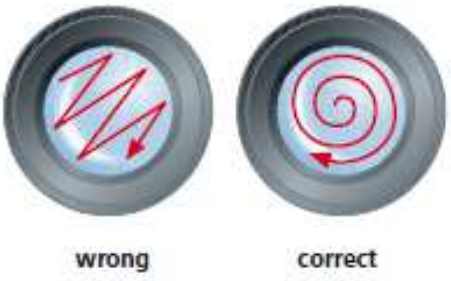
- ✓ Always read the disinfectant label, safety data sheets and product information before use.
- ✓ Check surfaces for resistance to the active ingredient solution before disinfection.
- ✓ Make sure that the surface is clean before disinfection. If necessary, use warm soapy water to clean it before disinfection.
- ✓ The disinfectant is within its shelf life.
- ✓ Put on appropriate personal protective equipment (such as: gloves, respiratory protection) necessary to handle contamination and disinfectant.
- ✓ The Microscope System is switched off and all components have cooled down.

1. Moisten the clean cloth with disinfectant. Do not use excessive amounts of disinfectant liquids.
2. Wipe surfaces so that they are completely wetted with the active ingredient solution.
3. Leave the disinfectant on the surface for the required exposure time. **Info** **Some disinfectant products may evaporate before the full exposure time passes. If this happens, the disinfectant must be reapplied on the surface and left for the remaining time to ensure that full exposure time is achieved.**

4. Let the surface dry.
   → Surfaces must not be rubbed dry.
5. If the disinfectant leaves any chemical residue that could harm skin, damage the surface, or impede proper functionality of the Microscope System, this residue must be removed.
6. Dispose any material used during disinfection according to local health and safety regulations.
7. Wash hands after each disinfection procedure.

5.2 Cleaning an Optical Surface

1. Wipe the area with a cotton swab or a clean cloth.
   → Use an optical cleaning solution of 85% n-hexan and 15 vol% isopropyl alcohol (IPA).
2. Wipe optical surfaces in a circular motion towards the edge of the optics with slight pressure.



3. Dry with a lint-free cloth.

5.3 Removing Water-soluble Contamination

1. Moisten a clean cloth with water.
   → A mild detergent may be added to the water (no solvent!).
2. Wipe off the area with the cloth.
3. Dry with a lint-free cloth.

6 Decontamination

A decontamination statement must be submitted before returning any used objects to the ZEISS location.

If reliable decontamination cannot be guaranteed, the hazard must be marked according to applicable regulations. In general, a well-visible warning sign must be affixed to the article itself and to the outside of the packaging, together with detailed information on the type of contamination.

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