

# Sustainable procurement quick guide

## Safer high-level instrument disinfection\*

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SUSTAINABLE PROCUREMENT QUICK GUIDE » INSTRUMENT DISINFECTION

### Definition of high-level disinfection

The U.S. Centers for Disease Control and Prevention defines [high-level disinfection](#) as the complete elimination of all microorganisms in or on an instrument, except for small numbers of bacterial spores. The U.S. Food and Drug Administration definition of high-level disinfection is a sterilant used for a shorter contact time to achieve a 6-log<sub>10</sub> kill of an appropriate mycobacterium species. Cleaning followed by high-level disinfection should eliminate enough pathogens to prevent transmission of infection.

High-level disinfection is used for items in contact with mucous membranes or non-intact skin, such as anaesthetic breathing circuits, surgical instruments, dental instruments, and flexible or rigid endoscopes or accessories.

### Evaluate proper procedures for disinfection

- Appropriate levels of disinfection (low, high) should be explained in the standard operating procedures for each instrument.
- An assessment should be conducted to determine the level of cleaning or disinfection required.
- Before disinfecting, all surfaces of the instrument must first be cleaned with water, soap (or a neutral detergent), and some form of mechanical action (brushing or scrubbing) to remove organic matter such as blood, secretions, and excretions, as they can prevent a disinfectant from reaching a surface and inactivate its germicidal properties.

### Disinfectants overuse promotes antimicrobial resistance (AMR)

- Antimicrobial resistance is a [global health threat](#).
- It has been observed that multi-drug-resistant pathogens [are growing resistant](#) to disinfectants commonly used to prevent them from spreading.

### Health Care Without Harm's position statement

Health Care Without Harm recommends health care facilities avoid instrument disinfectants containing ingredients that have sensitising, carcinogenic, mutagenic, reprotoxic, or chronic toxicity (CMR) properties or that are toxic to aquatic organisms.

Replace them with safer, effective alternatives.

### Health Care Without Harm's target goal

Health Care Without Harm aims to phase out the use of disinfectants that are harmful to human health and the environment, such as [formaldehyde](#), [glutaraldehyde](#), [amines](#), [N-C12-14-alkyltrimethylenedi](#), [ethylene oxide](#), and products containing ingredients classified as category A in the [WIDES database](#).

**\*This quick guide does not cover sterilisation of instruments. It also does not cover low-level or intermediate-level disinfection. It is solely focused on high-level disinfection.**

## WIDES database and hazard classification

The [WIDES database](#) is the most comprehensive database to help procurers choose the most suitable disinfectant product by comparing hazard profiles of frequently used disinfectants for specific applications.

### ABC categorisation\*\*

ABC categorisation substantially uses the [globally harmonised system \(GHS\) for classification](#) and labelling of ingredient hazards, a globally accepted standard for describing the nature and severity of chemical hazards. ABC categorisation lists the hazards of biocidal substances and product ingredients according to presumed concern.

**Category A:** High concern due to proven mutagenic, carcinogenic, repro-toxic, chronically toxic, sensitising, or highly environmentally toxic properties. Such substances may harm humans or aquatic organisms even in low concentrations. The hazards are difficult to control and could be irreversible.

**Category B:** Significant adverse impact on health and the aquatic environment. Category B also includes data uncertainties about the hazard potential (data gaps) in relation to certain endpoints.

**Category C:** Manageable hazard with low concern is assumed. This is only the case if accidents and improper treatments may be excluded.

## Procurement criteria

In line with the precautionary principle and provided that other selection criteria such as antimicrobial efficacy or material compatibility allow it, products shall not contain:

- [Formaldehyde](#) (50-00-0)
- [Glutaraldehyde](#) (111-30-8)
- [Amines, N-C12-14-alkyltrimethylenedi](#) (90640-43-0)
- [Ethylene oxide](#) (75-21-8)
- Ingredients classified as category A in the WIDES database

### Where possible, eliminate:

- [Phthalaldehyde](#) (OPA) (643-79-8)
- [Quaternary ammonium compounds](#) that are not readily biodegradable according to current [OECD guidelines 301 A-F or 310](#) or any other equivalent test method, and replace them with safer alternatives per [EU Biocides Product Regulation](#) (BPR)

### Case studies

- [U.S. EPA fact sheet on ETO and glutaraldehyde with case studies](#)
- [Hospital Nuestra Señora del Carmen, Colombia, chemical substitution case studies](#) (p. 32)

When procuring devices manufacturers may impose limitations on the chemicals that can be used to disinfect them. Seek to procure devices that can be autoclaved or require less toxic disinfectants such as **category C ingredients** like [hydrogen peroxide](#) (7722-84-1).

## Benefits of safer disinfection

### Avoiding chemicals of concern reduces health hazards and protects water systems

- The most common **occupational health** impacts caused by disinfectants are [respiratory issues](#) (sensitisation/asthma or irritation), [chronic obstructive pulmonary disease](#) (COPD), skin problems, [eye irritation](#), migraine, or other neurologic symptoms.
- Some common ingredients are [allergenic](#) or have been identified as [CMR](#) (carcinogenic, mutagenic, and repro-toxic) or [endocrine disruptors](#).
- Some **disinfectants in wastewater** from hospital discharges can disturb the wastewater treatment process due to [high aquatic toxicity](#), bioaccumulation, or [low biodegradability](#).

A majority of instrument disinfectants contain either aldehydes (category A) or [peracetic acid](#) (category B). For example, [glutaraldehyde](#) can cause allergic skin reactions and asthma symptoms, and [formaldehyde](#) can cause cancer.

### \*\*Limitations of ABC categorisation

- Proper handling and disposal of disinfectants (such as adequate personal protective equipment use) is assumed.
- The effects of mixtures (product formulations) are not taken into account.
- Substance concentrations are not taken into account.

However, the most prominent alternative, [peracetic acid](#) and products that combine [peracetic acid](#) and [hydrogen peroxide](#), carry a risk of acute toxicity via inhalation and are also hazardous to the aquatic environment.

Disinfectant ingredients that can have adverse effects on aquatic systems include benzalkonium chloride, peracetic acid, glucoprotamin, and didecyldimethylammonium chloride.

Workplace controls and safe disposal are critical when using these alternatives, including adequate ventilation when applying these chemicals in closed systems and personal protective equipment to reduce exposure.

### Additional information

- Health Care Without Harm Global: [Chemicals of concern to health and environment](#).
- Health Care Without Harm Europe: [SAICM 2.0](#).
- Health Care Without Harm Europe: [\(Man-made\) antimicrobial resistance in hospitals](#).
- Health Care Without Harm US: [10 Reasons to eliminate glutaraldehyde](#).
- Health Care Without Harm Latin America [ES]: [Guide for the substitution of dangerous chemicals in health care](#).