Recommendations by the Quality Task Group (49): Decontamination of Plastic Sterilisation Containers and Plastic Supports

For the past 30 years or more sterilisation containers have proved their merit worldwide as reliable and economic sterile barriers which are available in different sizes and designs. Depending on the design, they are used for delivery of sterile supplies and/or for enclosed collection of used instruments. Instrument supports are used to secure the instruments during transportation, storage and delivery.

In the past sterilisation containers and sterilisation mesh trays were made primarily from aluminium and stainless steel, but at present in addition to these materials ➜ **CERTAIN PLASTIC MATERIALS** are being used for specific container components and plastic instrument supports. The plastics that are suitable for this purpose are characterised, in particular, by their ➜ **HIGH THERMAL STABILITY AND CHEMICAL RESISTANCE**. The synthetic materials PPSU (polyphenylsulphone) and PEEK (polyether ether ketone) have proved suitable for this application. As for all materials, ➜ **CERTAIN PROPERTIES** must be borne in mind when reprocessing plastics.

The aim of this recommendation is to give the user information for proper manual and automated decontamination of these plastic components.

➜ **PLASTIC MATERIALS** are being used for specific container components and plastic instrument supports.

➜ **HIGH THERMAL STABILITY AND CHEMICAL RESISTANCE** are characteristic of suitable plastics.

➜ **CERTAIN PROPERTIES** must be observed when reprocessing plastics.

Advantages and disadvantages of different materials

Material	Advantages	Disadvantages
Aluminium	– Light – High thermal capacity and thermal conductivity ensure good drying results	– Deformation if dropped or subjected to excessive impact – Surface (decorative anodised ∑ finish) is vulnerable to inappropriate decontamination processes and mechanical scratching – Coloured anodised layers lose their colour in the course of time
Stainless steel	– All conventional decontamination processes can be used in the hospital (just like for surgical instruments)	– Heavy weight – Low thermal capacity and thermal conductivity can have a negative effect on drying – Colour coding not possible
Kunststoff	– Light – Impact resistant – Colour-fast – Scratch-proof – Rigid	– Low thermal capacity and thermal conductivity can have a negative effect on drying – Unsuitable chemicals can result in destruction of plastics

Table 1: Materials – Advantages and disadvantages

Decontamination methods for sterilisation containers with plastic components and plastic supports

Decontamination methods

Cleaning/disinfection is carried out in the usual manner using one of the four following processes:

1. Automated decontamination in washer-disinfector (WD), also using mixed load with instruments, thermal disinfection A0 = 3000
2. Automated decontamination in WD using a special programme, short cleaning and thermal disinfection cycle, A0 = 600
3. Chemothermal disinfection in bed- or container washing decontamination facilities
4. Manual wipe disinfection

Sterilisation containers with no visible contamination:

Sterilisation containers must be subjected to automated cleaning and disinfection only if they are ➜ **VISIBLY CONTAMINATED**. The topic of manual processing of containers will be discussed in a later recommendation.

➜ **ONLY VISIBLY CONTAMINATED** sterilisation containers must be subjected to automated cleaning and disinfection.

Soiled sterilisation containers:
Automated decontamination of sterilisation or disposal containers is effected using the process specified by the container manufacturer. When subjecting to automated reprocessing in a WD, a ➜ **RINSE AID** tailored to the specific programme can be added to the final rinse to reduce surface tension and enhance drying performance. This is justified for mixed loads only if the ➜ **BIOCOMPATIBILITY** of the surfactants contained in the product has been verified. For ophthalmologic and other instruments used in sensitive areas the surfactant residues can give rise to itch and redness in delicate tissues.

➜ **SURFACTANT RESIDUES** as well as acids persisting on the synthetic surfaces of containers can cause damage.

Some hospital infection control officers advocate thermal disinfection with $A_0 = 3000$ for inactivation of hepatitis viruses.

➜ **A RINSE AID** may enhance drying performance.

➜ **THE BIOCOMPATIBILITY** must be verified when processing mixed loads.

➜ **SURFACTANT RESIDUES** as well as acids can cause damage to synthetic surfaces.

How materials respond to decontamination processes

Stainless steel containers:
Stainless steel containers respond just like stainless steel instruments and, as such, can be reprocessed with the same programme and alkaline detergents followed by neutralisation.

Aluminium containers:
Demineralised water and neutral detergents, suitable for aluminium, are recommended for anodised aluminium containers. Depending on the water quality, discoloration of the anodised layers cannot be safely ruled out after subjecting the containers to numerous reprocessing cycles. But this optical drawback has no negative implications as far as functional capabilities are concerned. The instructions specified by the manufacturer of the process chemicals used must be observed.

Plastic containers and plastic supports:
Predominantly PPSU is used here. PPSU is endowed with thermal stability and can be reprocessed using thermal disinfection and steam sterilisation. It can be cleaned with mild alkaline or neutral detergents. The use of rinse aids is not recommended since surfactant residues persisting on the surfaces would lead to alternation in the structure of the plastic material during subsequent steam sterilisation, and thus to formation of cracks. A final rinse with demineralised water is therefore recommended in principle to remove as far as possible residues of any process chemicals as well as residues resulting from the use of insufficient water qualities from the surfaces. The instructions specified by the manufacturer of the process chemical must be observed.

Decontamination processes for containers made from different materials (see also Tab. 2)

Decontamination step	Process	Products	Stainless steel	Aluminium	Plastic (PPSU)
Cleaning	WD	pH neutral	+	+	+
		Mild alkaline	+	+ if suitable	+
		Alkaline	+	–	–
		Oxidative	+	–	2)
		Acidic	+	> pH 5	–
	Manual	pH neutral	+	+	+1)
		Alkaline	+	–	-
		Acidic	+	–	-
Disinfection	WD	Thermal > 90 °C	+	+	+
		Chemothermal	+	+	+
	Manual	Wipe disinfection	+	+	+1)
Final rinse	WD	Surfactants (e.g. in rinse aids)	+	+	–

1) as a general rule, rinse with demineralised water *2) no data available for practical application*

Table 2: Overview of the suitability/limitations of decontamination processes for various materials