

Cleaning and Decontamination of the epT.I.P.S.[®] Box 2.0

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Abstract

A longtime use of the epT.I.P.S.[®] Box 2.0 requires its constant cleaning and decontamination. Especially, when taking the aspect of sustainability into account.

While the box is typically decontaminated via autoclaving or UV irradiation, various agents are used to clean it in the laboratory. Therefore, the chemical resistance of the box is crucial when using such chemicals for the cleaning procedure.

Introduction

During routine lab work, various chemicals are used for cleaning and decontamination of the epT.I.P.S. Box 2.0. However, the use of these reagents has a variety of effects on the stability of its plastic. Two most important factors are the concentration and exposure length of the chemicals. This Userguide should provide an overview of reagents that

can be used safely for the cleaning and decontamination of Box 2.0. We tested for a general chemical resistance of Box 2.0 first and second, an assessment was made to determine whether cleaning and subsequent autoclaving, can lead to a change of the material.

Materials and Methods

Materials

- > epT.I.P.S. Box 2.0 (for epT.I.P.S. 10-300 µL)
- > Autoclave (Tuttauener, Autoclave 3840 EL-D)
- > Cleaning and decontamination agents:
 - > Biocidal™ ZF (WAK - Chemie Medical GmbH, Lot N°327181)
 - > COUNT-OFF Liquid Concentrate 2% (PerkinElmer®, Lot N°129-17461)
 - > COUNT-OFF Surface Cleaner (PerkinElmer®, Lot N°121-091101)
 - > Dismozon® pure 4% (Hartman, Lot N°913237)
 - > DNA AWAY® (Fisher, Lot N°19190323)
 - > DNA-ExitusPlus™ (PanReac AppliChem, Lot N°4Q013459)
 - > Formaldehyde 6% (Sigma Aldrich, Lot N°072K3686)
 - > Helipur® 6% (B. Braun, Lot N°19325M20)
 - > Hexaquart® S 5% (B. Braun, Lot15194M19)
 - > Korsolex® basic 5% (BODE, Lot N°370816)
 - > Meliseptol® (B. Braun, Lot N°12472M07)
 - > Sodium hypochlorite 10% (VWR International, Lot N°19K154011)
 - > Sodium hypochlorite 6% (VWR International, Lot N°19K154011)
 - > RNase Away® (ThermoFisher SCIENTIFIC, Lot N°18520482)
 - > RNase-ExitusPlus™ (PanReac AppliChem, Lot N°6G015763)
 - > Hydrogen peroxide 35% (J.T. Baker®, Lot N°1926501862)
 - > Ethanol 70% (VWR International, Lot N°20G214018)
 - > Isopropyl alcohol 70%, (VWR International, Lot N°21D014126)
 - > Cidex® OPA (Johnson & Johnson, Lot N°270421/090)
 - > Sodium hypochlorite 4% (VWR International, Lot N°19K154011)
 - > Sterilium® (BODE, Lot N°492021)

Method 1: Wipe test

Procedure

- > Soak a paper towel in cleaning or decontamination agent
- > Wipe the lid and all surfaces of the lower part of the box according to the manufacturer instruction time
- > Dry the Box and Lid
- > Rinse the lid and the box with sterile water
- > Visually inspect the parts of the Box for chemical resistance by comparing it to an untreated Box 2.0

Method 2: Decontamination in conjunction with autoclaving

Procedure protocol A:

- > Incubate the lid and the lower part of the Box 2.0 with 10 mL of reagent for 24 h
- > Empty the lid and the lower part of the Box 2.0
- > Inspect the parts and keep the residual quantity of reagent inside both parts
- > Immediately autoclave lid and lower part*
- > Cool the parts of the Box 2.0 to room temperature
- > Visually inspect the parts of the Box 2.0 for chemical resistance by comparing it to an Box 2.0 treated with water

Procedure protocol B:

- > Fill the lower part of Box 2.0 with 50 mL reagent
- > Close the Box 2.0 and place it into a sealing bag
- > Autoclave immediately*
- > Cool the Box 2.0 to room temperature
- > Visually inspect the parts of the Box 2.0 for chemical resistance by comparing it to Box 2.0 treated and autoclaved with water

*Parameter

Sterilization temperature	121 °C
Sterilization pressure	1 bar
Sterilization time	20 min.

*Program run

- > Autoclave filled with demineralized water, which is heated to reach the sterilization temperature,
- > After the sterilization temperature has been reached, it remains constant throughout the set sterilization time.
- > Slow release of steam; steam is released from the chamber until the atmospheric pressure is reached.

Results

First, the chemical resistance of both parts of the Box 2.0 was assessed by the wipe test. The lid and the lower part of Box 2.0 were resistant to all tested cleaning and decontami-

nation agents since no surface damages were observed. The results are presented in figure 1 and table 1.

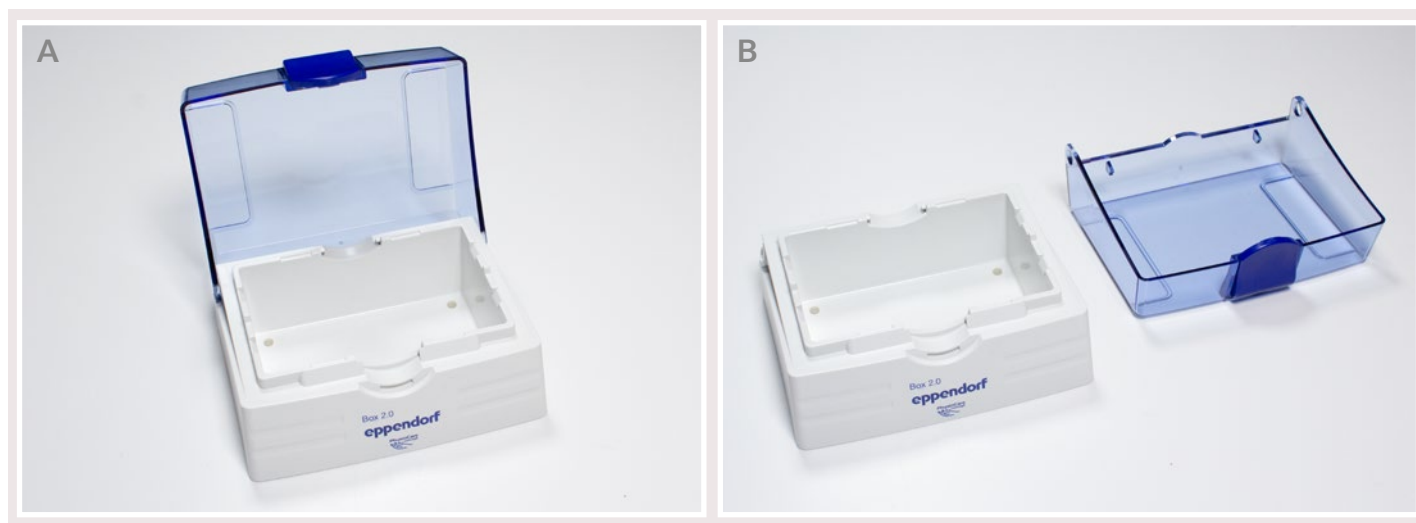


Figure 1: Results of the wipe test. The Box and the lid are resistant to the used cleaning agents.

Reagent	Concentration	Lid	Box
Biocidal ZF		r	r
COUNT-OFF Liquid Concentrat	2%	r	r
COUNT-OFF Surface Cleaner		r	r
Dismozon pure	4%	r	r
DNA AWAY		r	r
DNA-ExitusPlus		r	r
Formaldehyde	6%	r	r
Helipur	6%	r	r
Hexaquart S	5%	r	r
Korsolex basic	5%	r	r
Meliseptol		r	r
Sodium hypochlorite	10%	r	r
Sodium hypochlorite	6%	r	r
RNase Away		r	r
RNase-ExitusPlus		r	r
Hydrogen peroxide	35%	r	r
Ethanol	70%	r	r
Isopropyl alcohol	70%	r	r
Cidex OPA		r	r
Sodium hypochlorite	4%	r	r
Sterilium		r	r
Water		r	r

resistant

Table 1: Resistance of epT.I.P.S. Box 2.0 to commonly used cleaning and decontamination agents by wiping method.

In the second step, the chemical resistance of Box 2.0 was assessed for an incubation with the cleaning and decontamination reagent for 24 h and a subsequent autoclaving run. Before autoclaving the resistance of Box 2.0 was analyzed

after 24 h incubation with the chemical. The data presented in table 2 (left part) indicates that the surface of Box 2.0 can already be slightly altered by the presence of small traces or residues after a 24 h incubation time.

Reagent	Concentration	24 h incubation		24 h incubation + autoclaving	
		Lid	Box	Lid	Box
Biocidal ZF		r	r	r	r
COUNT-OFF Liquid Concentrat	2%	r	r	c	c
COUNT-OFF Surface Cleaner		r	r	c	c
Dismozon pure	4%	c	c	n	c
DNA AWAY		r	r	r	r
DNA-ExitusPlus		r	r	r	n
Formaldehyde	6%	r	r	r	r
Helipur	6%	c	c	c	c
Hexaquart S	5%	r	r	n	n
Korsolex basic	5%	r	r	r	r
Meliseptol		r	r	n	c
Sodium hypolchlorite	10%	c	c	c	c
Sodium hypolchlorite	6%	c	c	c	c
RNase Away		r	r	r	r
RNase-ExitusPlus		c	c	n	n
Hydrogen peroxide	35%	r	r	r	r
Ethanol	70%	r	r	r	r
Isopropyl alcohol	70%	r	r	r	r
Cidex OPA		c	c	n	n
Sodium hypochlorite	4%	c	c	c	c
Sterilium		r	r	n	r
Water		r	r	r	r

resistant
 conditionally resistant
 non resistant

Table 2: Resistance of epT.I.P.S. Box 2.0 to commonly used cleaning and decontamination agents after 24 h incubation (left) and after an additional autoclaving run (right).

When the cleaning and decontamination step is followed by an autoclaving run, the negative impact of some reagents on the Box 2.0 increases as summarized in table 2 (right part). Examples of boxes and lids that are not resistant are shown in figure 2.

For four reagents (Biocidal ZF, DNA Away, Korsolex basic and RNase Way), which give rise to any damages by using protocol A, protocol B can be applied. Here the reagent is kept inside the box during autoclaving. As shown in table 3, the resistance of the box is ensured under this condition as well.

Fig a-b. Cleaning and decontamination of Box 2.0. The Box 2.0 is not resistant against the reagents RNase-Exitus plus

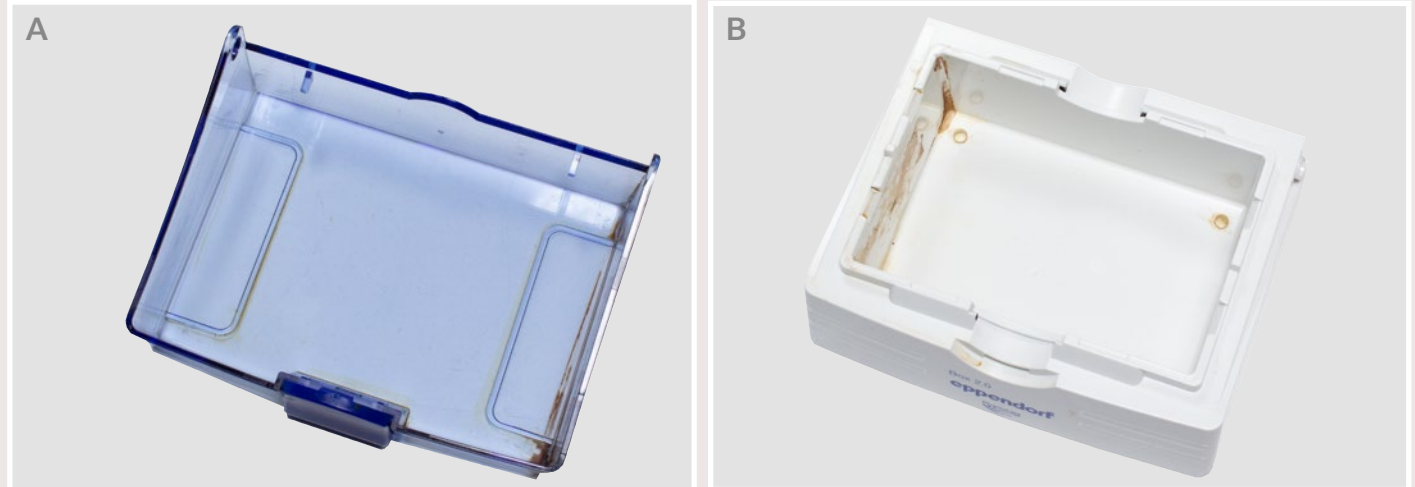


Fig c-d. Cleaning and decontamination of Box 2.0. The Box 2.0 is not resistant against the reagents Hexaquart S



Fig g-h. Cleaning and decontamination of Box 2.0. The Box 2.0 is not resistant against the reagents Cidex

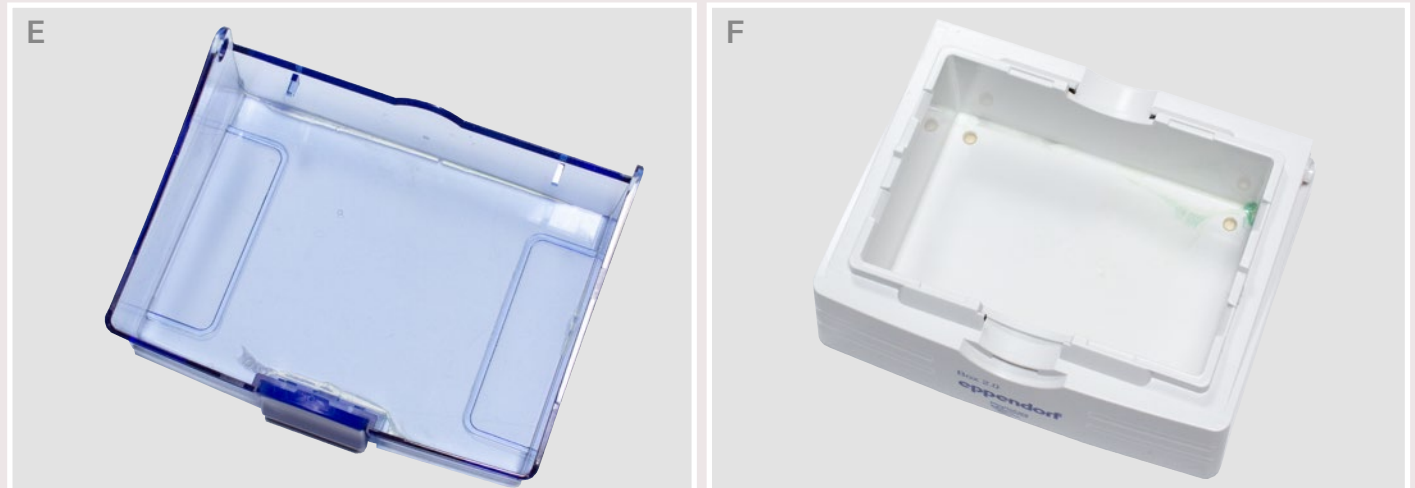


Figure 2a-f: Pictures show the Box appearance after 24 h of the reagent with a subsequent autoclaving run.

Reagent	Concentration	Lid	Box
Biocidal ZF		r	r
DNA Away		r	r
Korsolex basic	5%	r	r
RNase Away		r	r

■ resistant

Table 3: Resistance of epT.I.P.S. Box 2.0 to commonly used cleaning and decontamination. Reagent was kept inside of Box 2.0 during autoclaving.

Conclusion

As demonstrated by the wipe test, the epT.I.P.S. Box 2.0 can be easily and safely cleaned and decontaminated using the tested reagents (table 1).

The second test showed that the incubation length of the reagents plays a crucial role. After 24 h direct incubation of the cleaning and decontamination reagents, 7 of 21 reagents induce slight alteration on Box 2.0. By a subsequent autoclaving step, 12 from 21 reagents cause a slight to severe alterations on the lid and the lower part of Box 2.0 (table 2).

Therefore, these reagents should not be used before autoclaving the Box 2.0. However, as shown by the wipe test, the surfaces are chemically resistant. Thus, we recommend to rinse off the reagents by distilled water before autoclaving. The four tested reagents: Biocidal ZF, DNA Away, Korsolex basic and RNase Way, can be further recommended to use before or even with autoclaving the Box 2.0.

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